Port Authority of New South Wales Overseas Passenger Terminal Berthing Infrastructure Project -Dredging and Scour Protection Review of Environmental Factors

263976-00-RPT-0005

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Non-technical summary

The proposal

Port Authority of New South Wales (Port Authority of NSW) proposes to undertake maintenance and capital dredging and scour-protection works at the Overseas Passenger Terminal (OPT) on the western side of Circular Quay in Sydney Harbour.

The proposal is to deepen and expand the OPT berth pocket to increase the underkeep clearance of larger cruise ships and to protect the toe of the quay wall with scour protection.

The proposal's key features are:

- Installing a sheet pile retaining wall of about 70 m long at the southern end of the OPT berth pocket.
- Dredging approximately 20,000 m³ of sediment to deepen and expand the berth pocket.
- Dredging approximately 20,000 m³ of sediment to deepen the berth pocket
- Disposal of dredge material either by land disposal or offshore disposal (three Nautical Miles beyond State Waters).

A site compound would be used at Glebe Island to store equipment. The site may also be used for the casting of articulated concrete mattresses for the scour protection and the transfer of dredged materials from the barge to trucks. Activities at Glebe Island would be subject to the existing determination that allows Berths 1 and 2 to be used as a multi-user facility as obtained at the time under Part 5 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act) on 6 August 2013.

The proposed works are anticipated to be split. The sheet piling works would take place in Q3 & Q4 of 2020 and the dredging and scour protection works would take place in mid-2021. It would take around two months to complete the sheet piling works, while it would take about three-to-four months to carry out the dredging and scour protection works.

Need for the proposal

It is essential that the OPT berth continues to operate as efficiently and safely as possible, and that the infrastructure is maintained and progressively upgraded to continue to meet cruise vessel demands; including any anticipated increase in the size of visiting vessels. The identified scour and accretion issues pose potential hazards to vessel operations. This includes the potential for further decreasing the under-keel clearance for incoming cruise ships. There is a need for safe, efficient and reliable berthing to ensure the ongoing operation of the OPT.

Proposal objectives and development criteria

Objectives were developed to respond to the proposal's need. They included preventing erosion of the quay wall, preventing sediment movement within the berth pocket, reducing the risk of damage to berthing ships and providing enough depth for ships to berth.

Options considered

The option of doing nothing was initially considered. However, this was discounted as it would not meet the objectives of the proposal to improve safe vessel berthing and would lead the quay wall exposed to further erosion. Various dredging, sediment disposal and scour protection options were then considered.

The preferred option (the proposal) was considered to provide the best combination of positive project outcomes and minimised social and environmental impacts.

Statutory and planning framework

State Environmental Planning Policy (Infrastructure) 2007 permits development on any land for the purpose of port facilities to be carried out by or on behalf of Newcastle Port Corporation (Port Authority of NSW) without consent, providing the development is directly related to an existing port facility.

As the proposal is development for the purpose of a port facility and is to be carried out by Port Authority of NSW it can be assessed and determined under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Environmental impacts

The main environmental impacts of the proposal and the safeguards and management measures to address the impacts are summarised below.

Physical marine environment

There would be localised sediment disturbance during construction from installing piles and dredging. A safeguard has been proposed to install a silt boom around the backhoe dredger, minimising sediment disturbance. There is also the potential for acid sulfate soils and contaminants within the sediment to be released and impact on water quality during transfer for disposal. Sediment would be kept damp if taken to Glebe Island before treated and disposed of on land in a suitable facility. To reduce the risk of spills during the movement of dredging for disposal, a polymer would be added to absorb excess water and reduce the risk of overtopping of contaminated sediments.

Biodiversity

The proposal is unlikely to cause significant impact to any threatened aquatic or terrestrial species, populations or ecological communities or their habitats. The proposal and compound are not located within or near any protected areas, and no threatened or key habitat is expected to occur locally. Impacts on the surrounding substrate and sediment in Sydney Harbour would be limited through proposing to use a silt boom. A Marine Ecology Management Plan would be prepared as part of the CEMP.

Noise and vibration

The noise and vibration assessment concluded that at the OPT during night-time works there would only be minor impacts to residents. Exceedances in noise management levels would mainly be felt for non-residential receivers including Quay Restaurant, Cruise Bar, Squires Landing, Yuki's at the Quay) and MCA museum. Glebe Island residents would experience minor noise impacts.

Vibration impacts are minor due to the distance of residents. Safeguards have been proposed and a noise and vibration construction management plan would be prepared.

Landscape character and visual impact

The proposal would have temporary visual impacts to the landscape character and visual amenity. Impacts are considered to have a low to high visual impact for receivers of the OPT. Viewpoints with high visibility of the proposal would be from the Sydney-Opera House Forecourt and Concourse. Due to the sensitivity of the Sydney Opera House there would be a moderate to high impact.

The visual impact of the proposal would be minimised through safeguards including directional lighting and moving barges and equipment when not in use.

Socioeconomic

There would be a temporary loss of amenity for pedestrians and users of the OPT wharf public space as the OPT quay would be closed-off for periods during works. When works are not being undertaken access for pedestrians would be retained. Noise impacts from night-time works would have a temporary adverse impact on residents living near the OPT within the Rocks, and hotel residents in Campbell Cove.

There would be temporary short-term impacts for commercial vessel access at Campbells Cove and the Commissioners Steps during works.

Safeguards would include a communication plan as part of the construction environmental management plan to help provide timely and accurate information to stakeholders during construction.

Non-Aboriginal heritage

The proposed dredging works would have an impact on the former Campbell's Cove Wharf No.7. The works would remove in situ piles, sections of cut piles and other timber structural remains associated with the former wharf.

This is not considered to be a major impact as the remainder of the site located in Campbell's Cove would remain unaffected. A permit would be required from Heritage NSW, DPC, prior to dredging and scour protection works commencing. Safeguarding measures would include recording remains of the wharf and archaeological testing of material.

Aboriginal heritage

There is a low potential for Aboriginal site to be within the Proposal footprint due to previous activity and dredging. Should unknown archaeology be discovered during works a permit maybe required.

Traffic, transport and access

The proposal would result in a minor temporary increase in traffic during construction from construction workers, deliveries of equipment and concrete trucks. Most of the works (e.g. concrete pumping for scour protection) would occur at night when there is less traffic on the roads. The additional traffic movements would have a negligible effect on the existing road network. Importantly, there would be no construction traffic movement during cruise ship berth days.

During dredging works, barge movements would be required to remove dredged material offsite. These would be minimal and on average there would be one vessel movement a day to Glebe Island or two to three for offshore disposal.

Spoil, dredging and waste management

The proposed works would create spoil from the dredging of sediment. Material if disposed on land would be taken to Glebe Island for offloading and transported to appropriate waste facility. During transport of material by barge there is the risk of over spill. Works would be managed under a Sediment and Water Management Plan when transporting material off site to reduce impacts and a polymer added to absorb water.

During installation of concrete mattresses, concrete would be delivered to site only when needed and removed once pumping has finished. Materials would be barged to site, including fuels, oils and other required liquids which would be stored in bunded containers on the vessels. All waste removed from the site would be transferred by a licenced contractor to a licenced receiving facility.

Hazards and risks

Hazards and risks have been identified for the proposal. These include physical injury to construction workers and public from hazards associated with construction activities and objects falling from vessels, generation of sediment plumes leading to degradation of sensitive marine species and accidental fuel spills.

Odour

The proposal has the potential to create odour as a result of dredging sediments. Dredging is anticipated to be carried out over 10 weeks, depending on the dredge disposal location either on land or offshore; therefore, odour generation due to the proposal would be temporary and for a short duration. Once barges are fully loaded, they would be towed to Glebe Island for unloading and subsequent transport to a suitable disposal facility or towed to the offshore spoil ground for disposal. As any odour would be associated with the dredged materials, any potential impact would likely end once the material is removed from Circular Quay.

Justification and conclusion

The need for the proposal was identified due to a need for safe, efficient and reliable berthing to ensure the ongoing operation of the OPT.

The assessment of the environmental and social impacts has determined the proposal is not likely to have a significant impact and therefore assessment under Part 5.1 of EP&A Act is not needed.

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1 Introduction

This chapter introduces the proposal and provides the context of the environmental assessment. The development history is outlined along with the purpose of the report.

1.1 Proposal identification

Port Authority of New South Wales (Port Authority of NSW) proposes to undertake maintenance and capital dredging and scour-protection works at the Overseas Passenger Terminal (OPT) on the western side of Circular Quay in Sydney Harbour.

The proposal is to deepen and expand the OPT berth pocket to increase the underkeep clearance of larger cruise ships berthing at the facility. Scour protection would be installed along the whole length of the quay wall to prevent undermining from hydraulic instability. Currently, there is a risk of some incoming cruise ships having less than 0.5 m under-keep clearance and therefore berthing with operational restrictions.

The proposal's key features are (see Appendix A).

- Installing a sheet pile retaining wall approximately 70 m long at the southern end of the OPT berth pocket.
- Dredging approximately 20,000 m³ of sediment to deepen the berth pocket.
- Installing scour protection over an area of approximately 12,000 m² in the form of pumped or articulated concrete mattresses.

There are two options proposed for the disposal of the dredged material. These are:

- Option 1 transporting the material to a location at Glebe Island for processing prior to disposal to an appropriately licenced waste management facility.
- Option 2 transporting the materials offshore for disposal at the Sydney Offshore Spoil Ground located outside of State Waters.

This report assesses the potential for environmental impacts of the dredging and scour protection works. It also considers the impacts of transporting materials to Glebe Island (Option 1) or out to the State Water limit (Option 2).

- Activities at Glebe Island would be subject to the existing determination that allows Berths 1 and 2 to be used as a multi-user facility as obtained at the time under Part 5 of the *NSW Environmental Planning and Assessment Act 1979* (*EP&A Act*) on 6 August 2013.
- Offshore disposal under Option 2 would take place in Commonwealth Waters. The Australian Government Department of Agriculture, Water, and Environment (DAWE) would need to permit the ocean disposal under the *Environment Protection (Sea Dumping) Act 1981.*

The proposal compound location where the transported material would be unloaded at Glebe Island is presented on Figure 1. This is a nominal location, with the exact unloading location needing to be determined closer to the time of use due to ongoing port operational requirements. The OPT local setting is shown in Figure 2. Appendix A presents a plan of the key proposal features within the OPT.



Figure 1 Proposal location and compound site at Glebe Island



Figure 2: Local setting (proposal footprint shown in yellow)

1.2 Report purpose

Arup has prepared this review of environmental factors (REF) on behalf of Port Authority of NSW. For the purposes of the work, Newcastle Port Corporation (trading as Port Authority of NSW) is the proponent and the determining authority under Division 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The purpose of the REF is to describe the proposal, document its likely environmental impacts, and detail the protective measures that would be implemented to safeguard against and minimise impacts.

The description of the proposed work and assessment of associated environmental impacts has been carried out in the context of Clause 228 of the *Environmental Planning and Assessment Regulation 2000 NSW*, the factors in *Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979* (Is an EIS required? Guidelines, DUAP, 1995/1996), the NSW Biodiversity Conservation Act 2016 (BC Act), the NSW Fisheries *Management Act 1994* (FM Act), and the Australian Government's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

In doing so, the REF helps to fulfil the requirements of Section 5.5 of the EP&A Act including that Port Authority of NSW "examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity".

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the need for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Places under Division 5.2 of the EP&A Act.
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, and in accordance with Section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR).
- The significance of any impact on nationally listed biodiversity matters under the EPBC Act including whether there is a real possibility that the activity may threaten long-term survival of these matters, and whether offsets are required and able to be secured.
- The potential for the proposal to significantly impact any other matters of national environmental significance or Commonwealth land and the need, subject to the EPBC Act strategic assessment approval, to make a referral to the DAWE for a decision by the Commonwealth Minister on whether assessment and approval is required under the EPBC Act.

As mentioned above, the REF provides an assessment of the proposed works including two options for disposal of dredged materials.

2 Need for the proposal

This chapter discusses the proposal's need and objectives. It identifies the various options considered in selecting the preferred option.

2.1 Strategic need

Approximately 350 cruise ships visited Sydney Harbour in 2017/18 handling some 1.6 million passengers. Approximately 220 cruise ships berthed at the OPT, which is basically at full capacity during the primary cruise season from October to March each year.

There are currently two dedicated cruise passenger terminals within Sydney Harbour; the OPT, located east of the Sydney Harbour Bridge, and the White Bay Cruise Terminal (WBCT); located west of the Sydney Harbour Bridge. WBCT opened in April 2013 and it has a primary cruise ship berth and a secondary cruise ship berth known as White Bay berth 4. Access to WBCT requires passage under the Sydney Harbour Bridge, which is not possible for the larger cruise ships visiting Sydney.

It is essential that the OPT continues to operate as efficiently and safely as possible due to the above limitation. This means its infrastructure is maintained and progressively upgraded to continue to meet forward cruise vessel demands.

Since 2011, cruise ships have mainly berthed at the terminal under Azipod and bow thruster power only, rather than with the assistance of tugs. Recent hydrographic and diver surveys identified that scouring is occurring at both the southern and northern end of the OPT berth pocket. There is also evidence of loss of the existing scour protection, deposition of large rocks and slumping of an embankment into the berth pocket at the southern end due to scouring.

The observed scour and accretion can be attributed to:

- Significant increase in vessel size and changes in vessel power and berthing configurations since the construction of the berth in 1959.
- Use of Azipods and thrusters since 2011.

The identified scour and accretion issues pose potential hazards to vessel operations. This includes the potential for further decreasing the under-keel clearance for incoming cruise ships. There is a need for safe, efficient and reliable berthing to ensure the ongoing operation of the OPT.

2.2 Existing infrastructure

Table 1 and Figure 3 provide details on the existing berth infrastructure and berth pocket.

 Table 1: Existing infrastructure and berth

Element	Description
	The existing berth pocket is 375 m long (Ch -35 m to Ch 340 m) by 50 m wide, with a declared depth of -10 m chart datum (CD).
Existing berth pocket	Shoaling areas encroach up to 15 m into the berth pocket within the northern part of the OPT between Ch 310 and Ch 340 with a minimum depth of 6.5 m. Shoaling areas encroach 2 m into the berth pocket within the southern part between Ch -8 and Ch -1 with a minimum depth of 9.4 m.
	The berth is split into three sections on the quay side.
	The southern end of the OPT (Ch $-35 -$ Ch $.0$) consists of a sheet pile wall at the back of an embankment.
Quay side and	At the middle of the OPT (Ch $0 -$ Ch 220) the berth contains a reinforced concrete caisson structure with a rubble apron at the toe. This rock apron is separated into an inner and outer scour with varying rock size and dimensions.
berthing infrastructure	The northern end of the OPT (Ch 220 – Ch 280) is supported by a sheet pile wall, which passes through an existing rock revetment up to the end of the berth. Imported 20 mm aggregate engineering fill material is used as backfill at the rear of the sheet pile wall. Between the northern end of the OPT and the northern mooring dolphin (Ch 280 – Ch 340), the seabed consists of marine deposit made up of sand, silt and clay with some remnant scour protection rock. The seabed level rises to its shallowest adjacent to the mooring dolphin at approximately -6 m CD.



Figure 3: Existing infrastructure

2.3 **Proposal objectives and development criteria**

This section lists the proposal's objectives and development criteria.

2.3.1 Proposal objectives

The proposal's objectives are to:

- Prevent undermining of the caisson toe and erosion of the embankment south of the caisson wall.
- Prevent the movement of sediment and rock within the berth pocket.
- Reduce the risk of damage to berthing cruise ships from the accretion/movement of sediment and rock.
- Maintain stability of the existing quay infrastructure, including the southern sheet pile wall, caisson wall, northern sheet pile wall and northern mooring dolphin.
- Provide enough depth in the berth pocket for bidirectional berthing of all design vessels.

2.3.2 Development criteria

The proposal has been developed against the following themes and design principles.

Table 2. I Toposal development criteria	Table 2: Pro	posal deve	lopment	criteria
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Theme	Relevant principles
Design depth and dredging	The design depth of the OPT berth pocket has been developed in accordance with the guidelines presented in World Association for Waterborne Transport Infrastructure (PIANC) WG121 Harbour Approach Channels Design Guidelines, 2014 and WG 152 Guidelines for Cruise Terminals 2016. The design depth is to be achieved by dredging and it would provide enough under-keep clearance for berthing vessels without operational
	restriction, accounting for several vessel-related factors and dredging tolerances.
Scour protection	The installation of scour protection would facilitate dredging works and prevent undermining of the quay wall toe.

2.4 Alternatives and options considered

This section describes the alternatives and options considered to deliver the proposal.

2.4.1 **Preliminary considerations**

Do nothing

The 'do nothing' option would involve carrying out regular maintenance activities consistent with current operations.

Although it would present the lowest initial capital cost and it would result in the least environmental impact, this option was discounted as it would not meet the objectives of the proposal. It would not provide safe clearance for cruise ships to berth. It would also potentially shorten the terminal's life as it would leave the quay wall exposed and susceptible to erosion and therefore increased destabilisation.

It would potentially result in a higher overall operational cost across the terminal's life due to the need to periodically dredge the berth pocket, while it may result in lost revenue if the larger cruise ships are unable to berth in the future.

Carry out the proposed work

After discounting the 'do nothing' option, consideration was then given to expanding and deepening the OPT berth pocket by dredging, reinforcing and protecting the berth by:

- Installing a sheet pile retaining wall at the southern end of the OPT berth pocket.
- Dredging and installing scour protection over an area of approximately 12,000 m² along the base of the berth infrastructure.
- Transporting the dredged materials for disposal either:
 - On land
 - Back in Circular Quay under a waste exemption
 - Offshore at the Sydney Spoil Ground.

Method for selecting the preferred option

The method used by Port Authority of NSW to develop options for carrying out the works considered:

- Existing and future
 - Passenger use
 - Service demand
 - Future ship sizes
- Engineering design requirements and current structural integrity
- Passenger safety
- Environmental and social constraints

- Build cost
- Stakeholder feedback.

Preferred options

The preferred options are to deepen the existing OPT berth pocket and to either transport the materials for disposal on land or offshore.

Disposing of material back into other parts of Circular Quay was discounted due to its potential social impact on what is one of Sydney's most iconic and busiest areas. The decision whether to dispose of the materials on land or offshore would depend on several factors that Port Authority of NSW is still investigating. For this reason, two disposal options remain; both with their own benefits and impacts.

3 **Proposal description**

This chapter describes the proposal, its design, and the construction methods that would be used to carry out the works.

3.1 The proposal

The proposal's aim is to address scour and undermining of the OPT quay wall and expand the berth pocket. It would involve maintenance and capital dredging of around 20,000 m³ of sediment and installing approximately 12,000 m² of scour protection along the western edge of the berth pocket and southern embankment.

Appendix A shows the proposed works and construction footprint at the OPT.

Design criteria 3.1.1

The proposal and works have been designed to NSW, Australian and international maritime engineering and safety standards and guidelines developed by:

- Building Code of Australia: landside and superstructure •
- Standards Australia: AS4997: 2005 Guidelines for the Design of Maritime Structures.
- PIANC.

These standards describe the criteria that were adopted when designing the works as they provide detail on:

- Access and safety requirements for navigation and berthing.
- Enough dredging depths to safely berth without the risk of either grounding or • causing notable sediment disturbance and scour from propeller wash.
- Appropriate scour protection material selection and durability. .

3.1.2 **Engineering constraints**

Table 3 lists the main constraints to development and discusses how they have been addressed in the concept design.

Constraint	Design provision
Wind, wave, current and climate change	Develop a design that provides erosion protection from wind and wave impacts with allowance for climate change and storm events. Scour protection is proposed. This is outlined in section 3.2.
Heritage valuesEnsure the design is sensitive to the area's heritage values (see Secti 6.6). Respect the Aboriginal heritage values (see Section 6.7).	

Table 3: Engineering and design constraints

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Constraint	Design provision
Existing ferry traffic	Ensure navigational management measures are implemented through delivery of a navigation risk assessment (see Section 6.8).
Social and community infrastructure	Deliver a design to enable a safe passenger terminal in the long-term. Ensure construction works are managed to avoid disturbance to the social and community infrastructure and neighbours (see Section 6.5).

3.2 Key design features

This section describes the proposal's main design features. The construction method is described in section 3.3.

Proposed berth pocket design

The existing berth pocket would be dredged up to -12.1 m CD before placing scour protection mattresses. This would increase the declared depth to -10.7 m CD. The dredge depth includes an additional 0.5 m over-dredging allowance for installing scour protection to achieve the increase in declared depth.

Pumped or articulated concrete mattresses would be installed in front of the southern sheet pile and caisson walls. The mattresses would protect the existing quay wall and berth pocket from the scouring impacts.

Figure 4 shows an example of the installation of pumped and articulated concrete mattresses.



Source: Synthetex

Figure 4: Installation of pumped (left) and articulated (right) concrete mattresses

Sheet pile wall

A 70 m long underwater steel sheet pile wall would be installed from the southern end of the OPT structure. The sheet pile wall would support the toe of the southern embankment to allow the berth pocket to be dredged and deepened.

The harbour bed would be slightly reprofiled to the west of the underwater sheet pile wall. This would allow the concrete mattresses to be installed over an area of approximately $1,500 \text{ m}^2$ (see Appendix A).

3.2.1 Construction and dredging method

The appointed contractor would confirm the final construction activities in discussion with Port Authority of NSW. As such, this section only indicates a likely method and work plan as it may vary due to: the identification of additional constraints before work starts; detailed design refinements; and contractor requirements/limitations. Should the work method differ from what is proposed in this REF then the contractor would consult with Port Authority of NSW to determine if additional assessment is needed.

3.3 Work method

The proposal would be built under a construction environmental management plan (CEMP). The plan would cover environmental performance and management supplemented by aspects such as materials storage and management, and erosion and sediment control. The proposal would likely comprise a sequence of work activities consistent with the preliminary summary in Table 4.

Activity	Associated work	
1: site establishment and navigation safety provisions	Notify the public, public transport companies, Transport for NSW, local council and other stakeholders before work starts (see section 5.7).	
	Carry out prework inspections (see Chapter 7), and other investigation work before starting work.	
	Set out, mark and establish a maritime navigation exclusion zone in the harbour and no-go zone areas on land.	
	Establish the site compound.	
	Install environmental management controls.	
	Install temporary drainage controls (where needed).	
2: enabling works – Sheet pile wall installation	Install sheet piles via a crane mounted on a barge.	
3: stabilise southern embankment	Reprofile the southern embankment using a backhoe dredger. Remove excess material offsite for disposal either on land via Glebe Island (Option 1) under an existing approval, or offshore (Option 2) under a separate approval (see section 1.1).	
	Install scour protection in the form of pumped or articulated concrete mattresses.	

Table 4:	Construction	and	dredging	activities
	constituction	anu	urcuging	activities

Activity	Associated work			
4: extending and deepening the berth pocket	Dredge the harbour bed using an excavator off a barge or a backhoe.			
	Transfer the dredged material to a waiting barge.			
5: Materials transportation	Transport the material to either Glebe Island for land disposal (Option 1) or to the offshore disposal grounds (Option 2).			
5a: Option 1: materials and spo (which would take placed under	il management, testing (as needed), road transport and disposal r an existing approval as described in section 1.1).			
5b: Option 2: materials disposal offshore (which would take place under a separate approval as described in section 1.1.).				
6. install scour protection for	Articulated concrete mattresses			
the berth pocket	Transport articulated concrete mattresses by barge.			
	Lift and install the articulated concrete mattresses using a crane, within the berth pocket and along the embankment south of the quay wall. Placement of articulated concrete mattresses to be assisted by divers.			
	Pumped concrete mattresses			
	Transport geotextile and mobile concrete trucks.			
	Lay geotextile and pump grout mattress by divers.			
7: site finalisation and	Demobilise the site compound and remove temporary:			
demobilisation	Maritime navigation exclusion and no-go zones.			
	Environmental and safety controls (see Chapter 7).			

3.3.1 Construction hours

This section describes the proposed timeframe and working hours.

Start date and length of construction

The current proposal is to award contract for the works in Q3 2020, with the intent to carry out the enabling and sheet piling works in late Q3 or Q4 of 2020 (see Activity 1 and Activity 2 in Table 4). It would take around four-to-six weeks to carry out these works. The remaining activities would then take place in mid-2021 taking around three-to-four months to complete. Dredging would last up to 10 weeks and the scour protection works would take about 12 weeks to complete; with these two activities overlapping.

The program would be developed further once more is known about the 2021 cruise ship schedule. The construction program would also be affected by the need to coordinate with Transport for NSW, Port Authority of NSW, Property NSW, and other key stakeholders (see Chapter 5).

Working hours

The OPT works would take place during day, evening and at night over the construction program. However, most works at the OPT, including piling, dredging, and concrete work in the harbour, would need to take place at night. This is due to safety reasons and so that these works can occur when the waters of Circular Quay are far less busy and generally calmer. The duration of activities is anticipated to be as follows:

- Piling (sheet piled wall): six weeks
- Dredging: 10 weeks
- Mattress placement (scour protection): 12 weeks.

There would be some overlap between dredging and mattress placement activities.

Where night-time piling works are proposed, they would likely be scheduled as follows:

- 7:30pm to 8:30pm: Carry out checks, pre-start meetings.
- 8:30pm to 9pm: Set up
- 9pm to 5am: Pile pitching and vibropiling, followed by back-driving of piles
- 5am to 6am: Pack up.

Any night-time piling and hammering works would take place intermittently during the above periods. While piling may also take place during the day it would not be scheduled or permitted between 12pm and 2pm. This would be to ensure that the amenity of the area is preserved in its busiest time as discussed further in section 6.3.4.

On average, a pile would be pitched and vibrated every hour. Vibropiling would only last for approximately two to five minutes and it would be relatively quiet for the rest of the hour. Back-driving or hammering of the piles would occur during the last 30 to 60 minutes of the shift. Individual piles would be hammered for five to 10 minutes, followed by a relatively quiet period for the next five minutes or more before the pile is progressed.

For reference: the use of Glebe Island would generally take place within standard working hours between 7am and 6pm Monday to Friday and 8am to 1pm on Saturday. However, during dredging works, the Glebe Island site would be operated as needed seven days a week and in accordance with the existing 2013 approval (see section 1.1).

3.3.2 Workforce

During peak activities of dredging and scour placement, approximately 26 workers would be working at the OPT.

3.3.3 Plant and equipment

The largest and most complex of the equipment needed to carry out the work would be used during the dredging and piling activities. Table 5 indicates the plant and equipment that would be likely used onsite. The final plant and equipment schedule would be confirmed by the contractor.

OPT - Plant/equipment	Plant/equipment used to transport materials
Backhoe dredger	2 x hopper barges (unpowered) - intermittent
50 tonne long-reach excavator	Long-arm backhoe
2 x hopper barges (unpowered) - intermittent	Tug/vessel to move barges - intermittent
Tug/vessel to move barges - intermittent	Supply barge (unpowered) - intermittent
Concrete/grout boom pump	Crane
Barge-mounted crane (200 to 250 tonnes crawler crane)	
Barge-mounted backhoe and a barge- mounted/jack-up piling rig	
Impact piling hammer (3 to 5 tonnes)	
Vibropiling and drop hammer	
Storage barge (unpowered)	
Mattress lifting frame	
Day maker	
Dive equipment	
Work punt and dive vessel	
Generator	
Concrete delivery trucks	
Light vehicles	

Table 5: Indicative plant and equipment

3.3.4 Sheet pile wall

The sheet pile wall would be installed using a vibropiling method followed by back-driving or hammering of piles operated from a barge restrained by spuds. The sheet piles would be stored on the deck of the barge before being installed.

A steel frame pile gate supported on temporary piles would be installed along the required alignment of the new wall and pairs of sheet piles pitched into the gate. A vibropiling method would install the sheet piles. The piles would then be embedded using a drop hammer.

The pile gates would then be removed and moved to the next location. Once the sheet piles are installed, they would be cut down to the correct level by divers. The southern embankment alongside the sheet pile wall would be reprofiled using a backhoe dredger or an excavator mounted on a barge to redistribute material. The concrete mattress scour protection would then be installed. The method for installation is described in section 3.3.6.

3.3.5 Dredged method and spoil management

A barge-mounted backhoe dredger would be used to carry out the dredging. The backhoe would remove sediment from the harbour floor in a closed bucket, lifting it through the water column before transferring it into an adjacent waiting barge. Figure 5 shows a typical backhoe dredging operation.



Figure 5: Example backhoe dredger and waiting barge

Option 1: transport to Glebe Island

Once the barge is filled, it would be transported to Glebe Island. It is expected that the dredged material would have a high moisture content once loaded into the hopper. As such, two long arm excavators would first mix the dredged material in the barge with polymer. This would absorb any excess water to allow dredged material to be spread. This would allow the dredged material to be handled and loaded into trucks for road transport. Absorbent polymer would be delivered by road in sealed bulker bags that would be stored at Glebe Island.

The polymer would be mixed through the dredged sediment in the hopper barge and left for up to a 12-hours to cure while the barge is moored at Glebe Island. No excess water from the dredged material is expected to be discharged from the hopper barge while moored at Glebe Island.

Option 2: transport offshore

Once the barge is filled it would travel through Sydney Harbour to the Sydney Offshore Spoil Ground. While the barge is transporting material offsite, another barge would continue to be filled. There would be approximately three movements out of the Harbour per day, working 24-hours per day seven day per week. The final transport movements would be confirmed in consultation with the Harbour Master.

3.3.6 Scour protection

The concrete mattresses would be installed following piling and dredging works.

Option A: pumped concrete mattresses

Concrete mattresses, comprising rolled-up fabric formed bags, would be delivered to the OPT site by boat or truck. The mattress fabric would be rolled out by divers and secured prior to being filled with concrete. The mattress fabric would then be filled from the quayside using a long-arm concrete pump once positioned on the harbour bed. Concrete would be pumped through a boom that would be connected to the mattresses by divers. The concrete would be delivered to the OPT by trucks.

The pumped concrete mattresses would be installed by two groups of workers positioned on each end of the OPT. Regular bathymetric surveys would be undertaken to ensure the extent of mattresses are on the correct alignment and depth. Each work-front would install an average of two mattresses per shift. Each mattress would require approximately 25 m³ of concrete with an approximate total of 16 to 18 truck movements per shift. On average a shift would be approximately 10 hours.

Option B: articulated concrete mattresses

Articulated concrete mattresses would be cast at Glebe Island and brought to the OPT site, most likely by barge. These would be stacked onto a deck of the crane barge and then positioned and lowered into place using a lifting frame and global positioning system (GPS) to about half a metre above the harbour bed. Divers would then provide final directions to position the mattresses into place. Regular bathymetric surveys would be undertaken to ensure the extent of mattresses are on the correct alignment and depth. An average of six mattresses would be placed in each shift.

3.3.7 Source and material quantities

Various standard construction materials that are readily available across the Sydney Metropolitan region would be needed to carry out the works. The main materials needed to construct the proposal would comprise:

- Marine-grade steel for the sheet pile wall.
- Geotextile lining and grout/concrete mix to be pumped or prefabricated for the scour protection system.

3.3.8 Ancillary facilities

Given the limited space and road access, the preference would be to ship any major machinery and equipment to the OPT when needed; potentially making use of an offshore storage barge. When not in use, the storage barge would return to, and berth at, Glebe Island or White Bay, with the location depending on berth availability.

A shipping container may be placed on the OPT site for the duration of the work to store equipment, machinery and some key materials and equipment. Other equipment and materials may be temporarily stored at the Glebe Island site. The specific requirements for these sites would be confirmed by the contractor. Ideally, these sites would be:

- Away from biodiversity and heritage values
- Outside of flood prone land
- On previously disturbed areas
- More than 100 m from residential property
- Outside the drip line of trees and on level ground wherever possible.

As certain equipment maybe stored near Sydney Harbour, additional drainage and containment controls would be installed to prevent spills, leaks, leaching and/or sediment discharge (see Section 6.1).

For reference: a compound site would be provided at Glebe Island, nominally at Berths 1 & 2 (see Figure 1). Depending on the option taken, this may be used to:

- Transfer of dredged spoil from barge to trucks
- Cast articulated concrete mattresses.

3.4 Traffic management and access

This section describes how water and land-based traffic would be managed during construction including expected traffic movements.

3.4.1 Marine navigational traffic management

Most of the materials and equipment would be delivered by barge. Additional barge movements would take place at the OPT to deliver equipment and machinery.

Option 1: transport to Glebe Island

There would be one to two barge trips per day to and from Glebe under Option 1 (two to four movements).

Option 2: transport offshore

There would be several barge movements to and from the offshore ground per day under Option 2.

Both options

During cruise ship days, should these occur during construction, the OPT work site would be demobilised, and this could see movements to and from Glebe Island (or White Bay) increase to four barge trips if alternative moorings are not available.

There would also be a barge-mounted backhoe and a barge-mounted/jack-up piling rig located in the construction footprint at any point during construction. These would be located at Glebe Island (or White Bay) when not in use.

The expected vessel movements required to undertake the works are outlined in Table 6.

Construction Phase	Approximate number of expected vessel movements ¹ during construction.	Approximate length of time (may vary during works)
Dredging works and on land disposal (Option 1, see section 1.1)	200	6-10 weeks
Dredging works and offshore disposal (Option 2, see section 1.1)	200	6-10 weeks
Piling	10	3-4 weeks
Articulated concrete mattresses (Option A, see section 3.3.6).	400	11-12 weeks
Pumped concrete mattresses (Option B, see section 3.3.6).	100	11-12 weeks

Table 6: Construction vessel movements at OPT

A maritime navigation exclusion zone would be set up around the construction footprint to prevent both commercial and recreational traffic entering the area. A Marine Works Management Plan (MWMP) would be developed by the Contractor in consultation with the Harbour Master, Transport for NSW (Maritime) and other relevant stakeholders, and would define specifics such as exclusion zones, methods of marking the zones, clearance distances, mooring plans, communication protocols, emergency and incident response procedures, contact details of all parties and responsible persons, and transit routes.

The MWMP would be approved by the Harbour Master in advance of the works commencing. It is noted that Harbour Master approval would be required under Clause 67ZN of the Ports and Maritime Administration Regulation 2012 prior to any disturbance of the seabed.

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¹ Based on movements. One trip would equate to two movements

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3.4.2 Road traffic management

Despite proposing to deliver most of the material and equipment by barge, road traffic deliveries are expected to the OPT.

Vehicles arriving and leaving OPT would likely access the site via George Street and Circular Quay West Road. Road and turning restrictions mean there would be restrictions on the size and type of vehicles that could access the quayside. Site workers would be prevented from driving to site.

Table 7 Expected road traffic movements

Activity	Approximate number of vehicle movements	
Overseas passenger terminal		
Concrete trucks	$1,500 \text{ movements}^2 \text{ over } 12 \text{ weeks during the mattress placement works (see section 3.3.1).}$	
Other vehicles (Light vehicles – Supervisors, divers, concrete testing, etc. and general deliveries)	1,000 movements ³ over four months the dredging and mattresses placement works (see section 3.3.1).	

Road traffic access and management would be considered further during the detailed design including limits on the type, size and number of vehicles arriving and leaving the OPT. Any road traffic would be managed under a construction traffic management plan (see Section 6.8).

² This is equivalent to 750 trips

³ This is equivalent to 500 trips

4 Statutory and planning framework

This chapter provides the statutory and planning framework for the proposal and considers the statutory requirements including of the Environmental Planning and Assessment Act 1979 (EP&A Act), the Environmental Planning and Assessment Regulation 2000 (EP&A Regulations) and the provisions of relevant environmental planning instruments.

4.1 Environmental Planning and Assessment Act 1979

The proposed activity is subject to examination, determination and approval under Division 5.1 of the EP&A Act. Relevantly, the proposed activity is not declared to be State Significant Infrastructure (SSI) under Division 5.2 because:

- Based on the conclusions of this REF, Port Authority of NSW has formed the opinion that the activity is not likely to significantly affect the environment and therefore would not require the preparation of an EIS against the provisions of Section 5.7 of the EP&A Act (Clause 1, Schedule 3 of *State Environmental Planning Policy (State and Regional Development) 2011*, SRD SEPP, see section 4.2).
- The proposed activity does not meet the \$30 million capital investment value (CIV) threshold to declare development for the purpose of port and wharf facilities to be SSI (Schedule 3, Clause 2 of SRD SEPP). The proposed activity has not otherwise been specifically declared to be SSI by a SEPP, nor has the Minister for Planning and Public Spaces separately declared the activity to be SSI by way of an Order made under Section 5.12 of the EP&A Act.

Port Authority of NSW is the determining authority for the proposed activity under Division 5.1 of the EP&A Act due to the provisions of Clause 68 of ISEPP.

The EP&A Act outlines the matters that need to be considered when determining and approving an activity under Division 5.1 of the Act. Section 5.5 of the EP&A Act states:

"For the purpose of attaining the objects of this Act relating to the protection and enhancement of the environment, a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity."

The environmental impact of the activity has been assessed in section 6 and the supporting technical studies including the noise and vibration assessment (Appendix E), Maritime Archaeological and Indigenous Heritage Assessment and Statement of Heritage Impacts (Appendix F), and Sediment Contamination Assessment (Appendix G).

The authority for a proposed activity is required to determine if an activity will have a significant affect on the environment. To determine this, Port Authority has examined the proposal against the matters for consideration under Clause 228 of the EP&A Regulations (see Appendix B and in the context of the factors in *Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979* (Is an EIS required? Guidelines, DUAP, 1995/1996), the NSW *Biodiversity Conservation Act 2016* (BC Act), the NSW *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

4.2 State environmental planning policies

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 68(1) of the ISEPP permits development for the purpose of port facilities by or on behalf of Newcastle Port Corporation (Port Authority of NSW), without consent on any land providing the development is directly related to an existing port facility. Clause 68(6) of the ISEPP, in reference to development for the purpose of port facilities, also specifically permits dredging, or bed profile levelling, of existing navigation channels or to create new navigation channels.

As the proposal is directly related to an existing port facility (the OPT) and is being undertaken by or on behalf of Newcastle Port Corporation (Port Authority of NSW), the proposed activity is therefore permissible without consent and can be determined and approved under Division 5.1 of the EP&A Act.

Development consent from Council is not needed.

State Environmental Planning Policy (State and Regional Development) 2011

The main aim of the SRD SEPP is to identify development that is State Significant Development (SSD) or State Significant Infrastructure (SSI) under Parts 4 and 5 of the EP&A Act respectively. Clause 8(1) of the SRD SEPP states that development is declared to be SSD if:

"(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act [i.e. is not development that can be carried out under Part 5 of the EP&A Act as development without consent], and (b) the development is specified in Schedule 1 or 2.

The proposed activity is not listed under Schedule 1 or 2 of the SRD SEPP which identifies certain activities, and certain activities located on identified sites, as being SSD. Accordingly, the proposed activity is not declared to be SSD. The proposed activity is permitted without development consent under Clause 68 of ISEPP.

Clause 14(1) of the SRD SEPP states that development is declared to be SSI if:

"(a) the development on the land concerned is, by the operation of a State environmental planning policy, permissible without development consent under Part 4 of the Act, and (b) the development is specified in Schedule 3."

As stated above, the proposed activity is permissible without development consent under Clause 68 of the ISEPP and therefore an approval under Part 4 of the EP&A Act is not required. The development is not listed under Schedule 3 of the SRD SEPP and is not development that would require an EIS (pursuant to Schedule 3, Clause 1(1)) to be prepared under Division 5.2 of the EP&A Act. Hence, the proposed activity is not SSI.

State Environmental Planning Policy (Coastal Management) 2018

The aim of this SEPP is to promote an integrated and coordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the NSW *Coastal Management Act 2016*. The SEPP focusses on protecting the environmental asset of the coast, establishing a framework for land use planning, and defining areas where specific development controls should be implemented.

In terms of the proposal, the construction footprint and transport routes are within a coastal environment area. It is unclear if the site is in a costal vulnerability area as the mapping of these areas is still being prepared.

Despite this:

Clause 13(3) of the SEPP notes that the development controls covering coastal environmental areas do not apply to land with the Foreshores and Waterways Areas within the meaning of the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005. As described below the proposal is entirely within the above designation.

Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

The proposal is located within the Sydney Harbour Catchment and is subject to the Sydney Regional Environmental Plan (SREP, Sydney Harbour Catchment) 2005, which is a deemed SEPP, meaning its policies are still relevant and treated in the same way as a SEPP.

The aims of the SREP

Table 8 considers the aims of Clause 2 the Sydney Harbour SREP.

Aim Comment (a) To ensure that the Chapter 7 of this REF includes safeguards to protect and catchment, foreshores, maintain the natural and heritage values of the area. This waterways and islands of would ensure the values of Sydney Harbour are recognised, Sydney Harbour are recognised, protected, enhanced and maintained. protected, enhanced and maintained: (i) as an outstanding natural asset (ii) as a public asset of national and heritage significance, for existing and future generations. (b) To ensure a healthy, Provided the relevant measures and controls are sustainable environment on land implemented and monitored, as described in Chapter 7, the and water. environmental impacts of the proposal are expected to be safeguarded and minimised. Therefore, the land and water environments near the harbour would be protected. (c) To achieve a high quality The proposal aims to reduce the frequency of maintenance and ecologically sustainable dredging of the OPT and safeguard the existing structure urban environment. and berth pocket by installing scour protection, which is designed to protect the asset for 30 years. (d) To ensure a prosperous The proposal would allow for continued and safe berthing of working harbour and an cruise ships at the OPT, helping ensure the retention of a effective transport corridor. prosperous working harbour. There would be minimal impact to public ferry transport during the construction phase. It is not expected that changes to public transport services and wharf closures would be required. Any changes would be communicated with commuters ahead of time and direct them to alternative transport options as outlined in section 6.8. (e) To encourage a culturally The proposal would continue to provide access to cruise rich and vibrant place for ships to Sydney Harbour and Circular Quay. Cruise ship people. visitors would therefore continue to contribute to the economy through spending money at local restaurants and shops, maintain a vibrant place. The proposal would not change the operational movements (f) To ensure accessibility to and along Sydney Harbour and and management of the existing OPT. its foreshores. Road closures would not be required during construction, however access along the OPT quay would be temporarily restricted for pedestrians during working hours. (g) To ensure the protection. The proposal would have no significant impact on notable maintenance and rehabilitation terrestrial or marine environments or values in the area. of watercourses, wetlands, Additional standard controls would be implemented to riparian lands, remnant prevent any indirect impact on the wider ecological vegetation and ecological environment from spills and sediment disturbance, connectivity. mobilisation and smothering. (h) To provide a consolidated, The proposal is being delivered under the relevant planning simplified and updated provisions covering waterfront and port development set at a legislative framework for future State and Commonwealth level.

Table 8: Aims of the Sydney Harbour SREP

planning.

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Maritime Waters Zone and Sydney Opera House Buffer Zone

The proposal is within the W1: Maritime Waters Zone and the Sydney Opera House Buffer Zone but is not within a Wetland Protection Area. The proposal has been considered in respect of the objectives from Clause 17 of the SREP Sydney Harbour Zone W1 Maritime Waters objectives shown in Table 9.

Table 9: Zone W1 Maritime Waters objectives

Objective	Comment
(a) To give preference to and protect waters required for the effective and efficient movement of commercial shipping	The proposal would ensure continued and safe use of the OPT to receive cruise ships. Minor disruption would be caused during construction from increased vessel movements however most of works would be undertaken during night-time to minimise impacts.
(b) To allow development only where it is demonstrated that it is compatible with and will not adversely affect the effective and efficient movement of, commercial shipping, public water transport and maritime industry operations,	The proposal includes maintenance and capital dredging works within an existing cruise ship berthing facility to ensure the continued safe berthing of ships. The dredging pocket would be within a similar extent of the existing berth area. Measures will be put in place to minimise impacts to ferry services at Circular Quay and other shipping and maritime industry operations in Sydney Harbour.
(c) To promote the equitable use of the waterway	The proposal works would be undertaken mainly at night- time to minimise disruption impacts to other users and public ferry transport. Cruise ships would continue to berth as scheduled with all equipment being removed during these times.

Under Clause 18 of the Sydney Harbour SREP, the proposal is permissible with consent in the W1 Zone. In any case, the development is permissible without development consent pursuant to the provisions of the ISEPP which override the zoning provisions of the Sydney Harbour SREP (see clause 7(5) of the Sydney Harbour SREP).

Matters for consideration

The matters for consideration listed in Division 2 at Clause 21 to Clause 27 of the Sydney Harbour SREP are provided in Table 10.

Table 10: Division 2 matters

Division 2 matter	Comment
Clause 21 Biodiversity, ecology and environment protection	Section 6.2 describes the terrestrial and marine impact associated with the proposal. In summary, there is not predicted to be any significant environmental impact within the meaning or definition of the <i>Fisheries Management Act</i> <i>1994</i> or <i>Biodiversity Conservation Act 2016</i> with the implementation of the mitigation measures outlined in Section 7 of this REF.
Clause 22 Public access to, and use of, foreshores and waterways	Access to the foreshore at the OPT in the immediate vicinity of the works would be restricted, as required, for safety. There would be no changes to public access to and use of the foreshore area following completion of construction activities.
Clause 23 Maintenance of a working harbour	The proposal would allow cruise ships to continue to safely berth at the OPT and reduce the frequency of maintenance dredging.
Clause 24 Interrelationship of waterway and foreshore uses	Access to the foreshore at the OPT in the immediate vicinity of the works would be restricted, as required, for safety. There would be no changes to the existing interrelationship of waterway and foreshore use at the OPT following completion of construction activities.
Clause 25 Foreshores and waterways scenic quality	There would be temporary visual impacts during works however these would have no lasting change once the proposal is complete.
Clause 26 Maintenance, protection and enhancement of views	Section 6.4 describes the landscape character and visual impacts associated with the proposal. The overall construction impact would be low as people accept there being a port facility operating in this location, and temporary. There would be no change to existing views once construction activities are complete.
Clause 27 Boat storage facilities	There is no boat storage work associated with, or impacted by, the proposal.

Clause 31 of the Sydney Harbour SREP requires consultation for certain development proposals not requiring development consent. Consultation, including under the Sydney Harbour SREP is discussed in Chapter 5.

Part 5 of the Sydney Harbour SREP contains heritage provisions that are to be considered in respect of Division 5.1 activities. The Sydney Opera House is located 370 m east of the proposal footprint and is of World and National heritage importance. The Sydney Harbour Bridge is located 250 m west of the proposal footprint and is of National importance. The heritage objectives from the Sydney Harbour SREP in Clause 53(1) and Clause 53(2) are considered in Table 11 below.
Table 11: Heritage objectives

Objective	Comment
1(a) To conserve the environmental heritage of the land to which this Part applies.	The proposal would impact on part of the former historic Wharf No.7 in Campbells Cove. Dredging would remove around 18 percent of the heritage material associated with the Wharf. A permit under section 140 of the <i>Heritage Act 1977</i> would be needed to allow the work to progress. The Wharf heritage would be recorded before work starts and relics collected.
1(b) To conserve the heritage significance of existing significant fabric, relics, settings and views associated with the heritage significance of heritage items.	The remains of the wharf on the harbour bed would be recorded before starting construction to help understand the site formation processes associated with the demolition of the wharf.
1(c) To ensure that that archaeological sites and places of Aboriginal heritage significance are conserved.	There are no registered Aboriginal sites within the proposal footprint. The potential for submerged remains is considered to be low-to-moderate. Should relics be identified during dredging they would be recorded and an Aboriginal Heritage Impact Permit (AHIP) maybe required under Section 90 of the <i>National Parks and Wildlife Act 1974</i> .
1(d) To allow for the protection of places which have the potential to have heritage significance but are not identified as heritage items.	Works would be carried out within the vicinity of the OPT and not within proximity to the Opera House. While the proposal is within the buffer zone, it comprises 'minor works' in accordance with Clause 58c of the SREP. This is because the works are temporary and comprise of alternations to the quay wall carried out below ground level. Minor works are exempt from the requirements of the buffer zone set out in the SREP.
2(a) To establish a buffer zone around the Sydney Opera House to give added protection to its world heritage value.	Following the end of each shift, all equipment and barge mounted cranes would remain temporarily within the OPT berth when cruise ships are not mooring at the OPT. When a cruise ship is berthing, all equipment and barges will be removed to Glebe Island. There would be temporary impacts to the character of the setting of the Sydney Opera House. Following construction, there would be no change to the setting and views within the Sydney Opera House buffer zone and Campbells Cove.
2(b) To recognise that views and vistas between the Sydney Opera House and other public places within that zone contribute to its world heritage value.	There will be no change to existing views and vistas between the Opera House and other public places once construction activities are complete following the completion of construction activities.

Clause 55 to Clause 60 of the SREP provide protection for heritage items. A heritage impact assessment has been carried out in accordance with Clause 54 to Clause 60 (see Appendix F). As noted in section 6.7.2, no Aboriginal sites or relics were identified and therefore there is no need to seek permission or consult in accordance with Clause 57.

Other relevant NSW legislation

Table 12 lists the NSW legislation relevant to the proposal or the land on which the proposal would be built.

Legislation and application	Relevance to the proposal and further requirements
<i>National Parks and Wildlife Act</i> 1974: which provides for the protection of Aboriginal heritage values, national parks and ecological values	There are no registered Aboriginal sites present within the proposal footprint. Submerged remains of Aboriginal features are low to moderate potential. If Aboriginal objects are discovered during dredging, a Aboriginal Heritage Impact Permit (AHIP) would be applied for under section 90 of the Act.
<i>Heritage Act 1977</i> : which provides for the protection and conservation of buildings, works, maritime heritage (wrecks), archaeological relics and places of heritage value through their listing on various State and statutory registers	A heritage impact assessment has been carried out in accordance with the requirements of the <i>Heritage Act</i> (see Appendix F). The proposal would lead to the removal of 18 percent of the historic remains of Wharf No. 7 within Campbell's Cove. The Wharf is of local significance. Measures have been put in place to ensure that material associated with the Wharf removed during dredging is recorded and tested. This would ensure that there would not be a significant impact from the partial removal of buried remains of the Wharf. Prior to the commencement of these works, a Section 140 permit would be required.
<i>Fisheries Management Act</i> 1994: which provides for the protection of fishery resources	The proposal would not result in a significant impact on critical marine flora and fauna habitat, or marine threatened species, populations and ecological communities and their habitat. As such, SIS would not be required as per Section 221 of the Act. This is supported by the ecology assessment (see section 6.2) carried out to support the REF, which concluded that any impacts would not significantly affect aquatic ecology. Consultation has been carried out with the Minister for Primary Industries (NSW Fisheries) in accordance with Section 199 of the Act.
<i>Contaminated Land</i> <i>Management Act 1997</i> , which sets out requirements for investigating, remediating and managing land that is considered to pose a human health of environmental risk.	Investigation works have been carried out on the harbour bed material. This confirmed the presence of certain contaminants of concern. The proposal would remove the dredged material to Glebe Island where it could be tested and (waste) classified. It would then be disposed of at an appropriate licenced waste facility. If the option is taken to dispose of the materials offshore, then this Act would not

Table 12: Other relevant NSW legislation

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Legislation and application	Relevance to the proposal and further requirements
	apply. However, in securing a sea dumping permit (see section 1.1), Port Authority of NSW would need to demonstrate the suitably of the materials for ocean disposal against the National Assessment Guidelines for Dredging 2009.
Protection of the Environment Operations Legislation Amendment (Scheduled Activities) Regulation 2019 under the Protection of the Environment Operations Act 1997, which focusses on environmental protection and provisions for the reduction of water, noise and air pollution, and the storage, treatment and disposal of waste. It introduces licencing provisions for scheduled activities that are of a nature and scale that have a potential to cause environmental pollution.	Pollution management measures will be undertaken during the works to prevent impacts to water, noise and air pollution. These are set out in Chapter 7. If Option 1 is taken (see section 3.3.5) then a licence is likely needed under Clause 47 of Schedule 1 of the <i>Protection of the</i> <i>Environment Operations Act 1997</i> due to the use of a polymer agent to cure the dredged material. This is considered a mobile waste processing activity. Further consultation should be carried out with the NSW EPA to discuss additional licencing requirements.
Waste Avoidance and Resource Recovery Act 2001, which defines the waste hierarchy of avoidance, recovery and recycling over disposal while the Guidelines support waste classification.	The proposal would classify the dredged material for waste classification prior to disposal to a licenced facility. Due to contaminants present within the sediment, material would not be reused. If the option is taken to dispose of the materials offshore, then this Act would not apply.
Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017, which provide a framework to protect the health, safety and welfare of all workers at work. It also protects the health and safety of all other people who might be affected by the work.	The works would be carried out by a qualified and registered contractor who would need to demonstrate its ability to protect the workforce and public when carrying out work. This extends to on-land and over-water safety, including navigation safety.
Marine Pollution Act 2012, which sets out pollution provisions in the marine environment.	The proposal is unlikely to result in any oil, noxious liquid, pollutant, sewage or garbage discharge as controlled under this Act, providing relevant standard controls are implemented and monitored (see Chapter 7).
Ports and Maritime Administration Regulation 2012, which requires Harbour Master permission to change any structure or disturb the	The dredging works would disturb sediment on the harbour bed and therefore require permission from the Harbour Master before this work starts pursuant to Clause 67ZN of this Regulation.

Legislation and application	Relevance to the proposal and further requirements
harbour floor within Sydney Harbour.	
<i>Biosecurity Act 2015</i> , which provides for the control of noxious weeds and other plant and pathogen species. It places a responsibility on landowners to control, remove and eradicate noxious weeds while managing the introduction of marine pest species.	It is possible that pest species could be introduced due to the movement of vessels into and out of the construction footprint. This impact is expected to minimal, provided the relevant standard controls are introduced and monitored in accordance with the guidelines set out by the Department of Primary Industries as discussed in section 6.2.
Marine Safety Act 1998 and Marine Safety Regulation 2016, which set out the requirements for marine safety and the roles of the Harbour Master and marine pilots. It includes provisions relating to marine and navigational safety including collision prevention, spill limits, no-wash zones, shipping operation restrictions, and controls on reckless, dangerous and negligent navigation.	The <i>Marine Safety Act 1998</i> aims to ensure the safe and responsible operation of vessels in ports and other waterways to protect the safety and amenity of other users of those waters and occupiers of adjoining land. The proposed activity would minimise impacts to users of the waters of Circular Quay and Sydney Harbour by setting up a maritime navigation exclusion zone around the construction footprint and developing a vessel traffic management plan in consultation with, and to the satisfaction of, the Harbour Master. In addition, Harbour Master approval will be obtained under clause 67ZN of the Ports and Maritime Administration Regulation 2012 prior to any disturbance of the seabed.
<i>Biodiversity Conservation Act</i> 2016, which provides for the strategic approach to biological conservation in NSW. It includes provisions for the risk-based assessment of native plant and animal impacts, including the Biodiversity Assessment Method (BAM) to assess the impact of actions on threatened species, ecological communities and their habitats.	Due to the high volume of boat traffic and disturbed nature of the site, it is unlikely to provide significant habitat features for threatened plant and marine species. An assessment has been undertaken in section 6.2 supporting this conclusion.
<i>Coastal Management Act 2016</i> , which aims to protect and enhance natural coastal processes and coastal environmental values, while facilitating ecological sustainable development in the coastal zone	As noted, while the proposal is in a coastal environmental area and coastal use area none of the provisions of the <i>State</i> <i>Environmental Planning Policy (Coastal Management)</i> 2018 apply to the proposal or its development. Despite this, the assessment has considered the objects of the Act in ensuring the proposal is consistent with principles protecting the coastal environment in an ecologically sustainable manner for the social, cultural and economic well-being of the people of the State, as described in Chapter 6.

4.3 Commonwealth legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land'. These are considered in Appendix B and Chapter 6 of the REF.

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance or on Commonwealth land. Accordingly, the proposal has not been referred to the Australian Government Department of Agriculture, Water and the Environment under the EPBC Act.

4.4 **Confirmation of statutory position**

The proposal is categorised as development for the purpose of a port facility and is being carried out by or on behalf of Newcastle Port Corporation (Port Authority of NSW). Under Clause 68 of the ISEPP, the proposal is permissible without consent. As the proposal is not SSI, it can be determined and approved as an activity under Division 5 of the EP&A Act. Accordingly, Port Authority of NSW is the determining authority for the proposal, with this REF fulfilling the obligation under Section 5.5 of the EP&A Act "to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity".

5 Notifications

This chapter presents a summary of the notification submitted to Foreshores and Waterways Planning and Development Advisory Committee and NSW Fisheries department by Port Authority of NSW.

5.1 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 notification

Under the provisions of Clause 31 of the Sydney Harbour SREP, Port Authority of NSW is required to consult with the Foreshores and Waterways Planning and Development Advisory Committee (Department of Planning, Industry and Environment). In the case of the proposal, it triggers the consultation provisions of Part 3: Division 3, Clause 31 of the above Plan due to the works including dredging.

Accordingly, the Foreshores and Waterways Planning and Development Advisory Committee was notified on 17 January 2020. A response was received on 13 February 2020 from the Committee that they did not have any specific issues with the proposal.

5.2 Fisheries Management Act 1994 notification

Division 3 of Part 7 of the FM Act relates to dredging and reclamation. The objects of this Division are to "conserve the biodiversity of fish and aquatic vegetation and to protect fish habitat by providing for the management of dredging and reclamation work".

As discussed in section 6.2, no protected marine vegetation is known to occur in the study area therefore impacts on marine flora and fauna are considered highly unlikely.

In accordance with Section 199 of the FM Act, a public authority needs to write to the Minster for Primary Industries and consider any raised matters concerning the proposed activity within 28 days before carrying out dredging works.

Port Authority notified the Department of Primary Industries on 17 January 2020. No response was received during the 28-day feedback period.

6 Environmental assessment

This chapter provides a detailed description of the potential environmental impacts associated with the its construction and operation. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of:

- Potential impacts on matters of national environmental significance under the EPBC Act.
- The factors specified in the guidelines Is an EIS required? (DUAP 1995/1996), Marinas and Related Facilities EIS Guideline (DUAP, 1995) as required under Clause 228(1) of the Environmental Planning and Assessment Regulation 2000 (DUAP, 1996, see Appendix B).

Site-specific safeguards and management measures are also provided to mitigate against identified potential impacts.

As noted in section 1.1 either disposal option would be carried out under an existing determination (Option 1: land disposal) or a separate approval (Option 2: offshore disposal)

6.1 Physical environment

This section describes the predicted hydrodynamic and physical environmental impacts from carrying out the proposed works.

6.1.1 Method

Published mapping and data were used to define the hydrodynamic and physical characteristics of the harbour and marine environment. This included:

- Hydrographic and Dredge Plume Modelling report prepared by MetOcean Solutions (May 2020).
- Circular Quay Investigation: Sediment Contamination Assessment Report (GHD, December 2019)

Construction assessment

The assessment considered how the proposed construction activities, work methods, and required management controls (see section 3.3) would temporarily affect the physical characteristics of the harbour and marine environment at the OPT including localised sediment and pollutant disturbance and dispersion and any secondary aquatic ecology impacts.

Assessment criteria

The assessment was supported by a contamination report produced by GHD that assessed the results of sediment sampling within the proposal footprint. This report also considered the potential for acid sulfate soils (ASS).

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Samples of the sediment within the proposal footprint were analysed and provisionally classified under the Waste Classification Guidelines (NSW EPA, 2014), the National Assessment Guidelines for Dredging (NAGD, Australian Government 2009), and Australian Water Quality Guidelines for Fresh and Marine Water Quality ('the ANZECC Guidelines, ANZECC/ARMCANZ, 2000).

6.1.2 Existing environment

Marine environment: overseas passenger terminal

Sea level and tides

Sydney Harbour is tidally influenced, and the cycle is semi-diurnal meaning there is 12.5 hours between high tides. At Fort Denison the tidal conditions are as follows:

- Mean spring tide is 1.23 m above Australian Height Datum (AHD).
- Mean neap tide is 0.75 m above AHD.
- Mean high water is about 0.5 m above AHD.
- Mean low tide can be about one metre below AHD.
- The highest high tide that would occur once every 50 years is about 1.6 m above AHD.

Bathymetry (water depth)

The harbour bed is approximately -10.7 m CD, varying from -16 m to 0 m CD across the proposal footprint, with CD defined as -0.95 m AHD. The elevated section of harbour bed is located north-west and south-west of the site.

The existing berth pocket is 375 m long by 50 m wide, with a declared depth of -10.1 m CD. These levels have been maintained by undertaking dreading, as required, to allow for safe access of ships.

Currents and circulation

Sydney Harbour is influenced by the East Australian Current (EAC). It generally provides a nutrient depleted sub-tropical water mass (Sydney Institute of Marine Science, 2016). Average offshore current speeds are about 1.5 m/s, meaning that the water flowing past the heads is being constantly renewed. This allows for mixing, flushing and seawater exchange.

While no tide, current or gauge data were obtained in Circular Quay, it is appropriate to consider the current speeds to be at or close to zero. This reflects the sheltered and enclosed environment. However, the stormwater runoff from the land, in combination with seaward groundwater movement, would mean that the water would trend towards the main deep channel and heads. Over any tidal cycle there would therefore be a very small (likely about 0.01 m/s) net current towards the heads. There is also likely to be a localised swash created by propeller turbulence and general vessel movements and activities. This has no influence other than immediately within Circular Quay. It creates turbid conditions locally.

Wind conditions

Three dominant wind patterns affect Sydney Harbour. The strongest winds, which occur for about 17 percent of the time, come from the south. These affect the northern shoreline. The most frequently observed winds come from the north east (about 22 percent of the time), and the third most common pattern are winds coming from the west, which occur for about 17 percent of the time mainly during the winter (Sydney Institute of Marine Science, 2016).

Sydney Harbour is largely an enclosed system. This means the waves are typically only wind generated. The maximum wave heights are closer to the heads and across the main channels however they are typically less than one metre peak to trough. However, the low-energy and sheltered nature of the many bays, including Circular Quay, means that the conditions are further limited, resulting in very small waves and typically calm to still conditions other than in storm conditions.

Water exchange (flushing) and quality

Sydney Harbour, including the OPT, receives stormwater surface runoff from the surrounding land. The waters around the terminal are highly disturbed from propeller wash, vessel movements and other human activity. This creates turbid water of poor quality.

While water is regularly exchanged in this part of the Harbour due to the tidal influence, it is still affected by stormwater runoff and general human activity. Poor water quality is typically experienced after a dry period followed by a storm; an effect known as first flush runoff. The water quality is also likely affected by the corresponding poor sediment quality (see the following heading). When disturbed, any sediment bound contaminants may transfer into solution (e.g. dissolve) affecting the water quality.

Aquatic geology and sedimentology

The geology and sedimentology of the proposal footprint is characterised by the following layers:

- Hawkesbury Sandstone underlies the Harbour. This is medium-to-coarse with minor shale and laminate. Its depth and composition vary locally within Circular Quay. It is overlain by alluvial and estuarine sediments. The top of the sandstone is -5 to -39 m CD across the area, with the shallowest section occurring north-east of the proposal footprint. The change in depth across the proposal footprint corresponds approximately to changes in sediment thickness.
- Alluvial and estuarine deposits, consisting of clay-to-sand quaternary sediment with layers of shale, range from 0 to -30 m CD across the proposal footprint. The thinnest section is in the north-west corner and along the quay wall.

Sediment chemistry

Contamination testing was undertaken on collected sediment samples. The results are presented in the Sediment Contamination Assessment Report (see Appendix G) and summarised below.

Under the National Assessment Guidelines for Dredging 2009, the following was identified:

Exceedances of:

- Soil quality guideline (SQG) screening levels for:
 - (SQG-low) copper, lead, mercury, silver and zinc
 - (SQG-high) zinc and lead.

Detected:

- Polycyclic aromatic hydrocarbons (PAHs)
- Total polychlorinated biphenyl (PCBs)
- Tributyltin (TBT, normalised to total organic carbon, TOC).

Undetected (e.g. below the laboratory reporting limits):

- Total petroleum hydrocarbons (TPH)
- Cyanide, herbicides, chlorinated hydrocarbons, explosives, nitroaromatics, nitrosamines and phthalates.

TOC ranged from 0.05 to 2.82 percent.

See Figure 6 for the location of exceedances of contaminants.



Figure 6 Location of Exceedances of Sediment Contaminants

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Acid sulfate soils

Potential acid sulfate soils (PASS) are present in the sediments.

6.1.3 **Potential impacts**

Hydrodynamic effects

The proposed piling, dredging and the installation of the concrete scour mattresses would physically disturb the marine and harbour environment. The scale of the disturbance would be minimal and insufficient to cause any dynamic changes in current speed, wave characteristics, saline/freshwater mixing or flushing. As the location of the proposal footprint is within a sheltered area of the harbour disturbance from changes in wave movement would be only during a peak ebb flow and flood conditions. Works would only be typically carried out during calm conditions therefore the proposal activities would have a minimal impact.

Erosion and scour

During construction, the dredging and piling would be the only main activities that may impact the harbour bed. However, dredging works would be temporary and would not cause any significant scouring. The piling would also be a temporary activity taking place over a short period. It would take place during calm conditions. This would reduce any potential scour and erosion.

While anchors and spud would be used during construction the associated erosion and scour would be limited as they would remain in place for a short time. They would also have a minimal impact compared to the disturbance created by the dredging and piling works.

Sedimentation dispersion, deposition and smothering

The proposal would disturb sediment during dredging creating turbidity.

The results of the hydrodynamic modelling report (see Appendix D) shows that at a worst case, the maximum level of temporary suspended sediment concentrations (turbidity) would be higher within the vicinity of the dredging location. Finer sediments would disperse and transport across a larger area beyond Circular Quay.



Source: MetOcean Solutions, 2020, Hydrodynamic and Dredge Plume Modelling

Figure 7 Final cumulative sediment deposition thickness [m] and volume settled in dredge pocket for the scenario assuming maximum dredging rate over a 6-day period



Source: MetOcean Solutions, 2020, Hydrodynamic and Dredge Plume Modelling

Figure 8 Final cumulative sediment deposition thickness [m] and volume settled in dredge pocket for the scenario assuming average dredging rate over a 16-day period

The proposal would generate a limited amount of sediment as shown in Figure 7 and Figure 8. The maximum thickness of the sediment deposition (settlement) is shown to be below 1 mm within the proximity of the proposal footprint. The sediment within this area would reduce quickly over time, while the finer sediment (a thickness of 0.2 mm and below) would deposit and settle over a larger area. This concentration of finer sediments is far less than the natural variability in

dispersion and settlement patterns that occurs during storm events and shipping movements (e.g. propeller wash).

The results of the turbidity levels presented within Appendix D were modelled without mitigation of a silt boom. With a silt boom in place, the levels of turbidity outside the boom would be reduced. Further monitoring during dredging works is proposed to ensure impacts are maintained to an acceptable level.

Accidental spills (sediment and pollutant discharge)

The works would be undertaken by machinery and barges as described in section 3.3.3. There is the potential for accidental spills. Should accidental spills occur these would result from:

- Accidents during loading, unloading and installation work.
- Leaks and drips from poorly maintained machinery and equipment.
- The mismanaged storage of waste materials, including potential for debris to enter the water. This would be greatest when loading, transporting and unloading the dredged sediment.

The principal impact from any spills would be pollution and reduction in water quality. The impact would depend on the quantity and type of materials spilt. However, providing relevant standard controls are implemented the impacts are expected to be minimised.

Acid sulfate soils

There is the potential for water quality and health impacts from transporting the dredged sediments. ASS generate sulphuric acid once dried out and exposed to the oxygen in air. The sediment would therefore be classified and/or treated in accordance with the NSW Environment Protection Authority's (EPA) Waste Classification Guidelines – Part 4: Acid Sulfate Soils (2014) for onshore disposal and dampened down to reduce potential oxidisation of sediment.

Under either disposal option (see section 1.1) then then they would be prevented from drying out during transportation. Sediment would be monitored during transit. Where required the sediments would be sprayed with sea water and kept moist to prevent drying out. If the decision is taken to dispose of the material on land (see section 1.1) a polymer would be used to absorb excess water. They would remain wet to a level that would reduce the risk for ASS generation (GHD, 2020, pers comms).

These provisions would be included with the Acid Sulfate Soil Management Plan.

Localised pollutant disturbance

Given the history of the surrounding area and marine traffic, it is likely that contaminated sediments and poor water quality, particularly following storm events and runoff from the surrounding land, would be encountered within the proposal footprint. As described above, the sediment contamination assessment (see Appendix G) identified contaminants and pollutants to include heavy metals that exceed the soil quality guidelines (see the sediment chemistry heading above). While a range of hydrocarbons were detected along with TBT, concentrations were less than the ANZECC guidelines for fresh and marine water quality.

The contaminants could be transported in a sediment-bound form through dredging activities, including the activity of lifting the sediment through the water column and transferring it to a barge at the OPT. The hydrocarbon and benzo(a)pyrene contaminants could pass into solution and be dispersed into the water column.

GHD prepared a series of hydrodynamic modelling plots to consider the above. Appendix D describes the modelling. A small portion of the dredged material would remain in suspension for enough time that they would be carried beyond Circular Quay and transported around Bennelong Point and Dawes Point on the ebb and flood tides respectively. The pollutant concentrations dispersed over this area would be well below any trigger or water quality levels.

Odour generation

The hydrocarbon and organic carbon present in the sediment has the potential to be odour generating if it oxidizes (e.g. exposed to the air). This could happen once the sediments are lifted onto a barge and transported to Glebe Island. Odours could also potentially occur if any of the organic material has broken-down below the surface, as this can release gases through the water column. However, this pathway is considered unlikely. Section 6.11 describes the odour impact in more detail and its potential effect on receivers in the area.

Creation of migration pathways

The presence of marine sediments over sandstone, coupled with the shallow depth to groundwater means that any piling activities could create a pollution pathway into the underlying groundwater. Sheet piles would be installed using a vibropiling method followed by back-driving or hammering of piles operated from a barge restrained by spuds (see section 3.3.4).

There is the potential for pollution impacts from the creation of such pathways during piling. Standard controls would be implemented within a CEMP to ensure the potential for significant impacts are managed.

6.1.4 Safeguards and management measures

Table 13 lists the safeguards and management measures that would be implemented to protect the aquatic environment to account for the impacts identified in section 6.1.3.

Table 13: aquatic environment	t safeguards and	l management measures
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Ref.	Impact	Environmental safeguard	Responsibility	Timing
1	Sediment and water	A Sediment and Water Management Plan (SWMP) would be prepared and implemented as part of the CEMP. The SWMP would outline all reasonably potential risks relating to sediment erosion and water pollution and describe how to address these risks throughout construction.	Contractor	Pre-construction/ construction
2	Sediment and water	The SWMP would include turbidity monitoring requirements that would be implemented before starting the dredging works and maintained throughout. The plan would involve the following steps and activities: Develop and submit a Water Quality Monitoring Plan to Port Authority of	Contractor	Pre-construction/ construction
		NSW at least one month before deploying instrumentation.		
		Establish turbidity monitoring system to capture (baseline) data before starting work and while the work is taking place. As a minimum the system would comprise monitoring equipment, buoys, anchoring system, data management, timing, quality assurance and an equipment failure plan.		
		Install and commission the water quality monitoring instrumentation at least 10 days before starting dredging. Operate the equipment for up to 14 days or as agreed with Port Authority of NSW after the completion of post dredge clearance survey.		
		Fit a water sensor at each monitoring location to record turbidity. The sensors would be installed approximately 1 m below the surface.		
		Deploy twin turbidity sensors at each monitoring location to allow the collection of two independent data sources. The two data sources shall undergo automatic processing noting that:		
		• Any difference in turbidity readings within 20% then the average value shall be used		

Ref.	Impact	Environmental safeguard	Responsibility	Timing
		• If the difference in turbidity readings is greater than 20%, then the minimum value shall be used.		
		• Calibrate and clean water quality sensors as required, just prior to dredging and no longer than two-week intervals.		
		• Ensure the water quality loggers provide continuous logging of data, with anti-fouling guards and sensor wiping apparatus to prevent interference to sensors from marine growth.		
		• Carry out continuous water quality monitoring for each location and data shall be fed live onto a secure website and processed for real-time viewing by key project personnel and Port Authority of NSW.		
		• Ensure the water quality monitoring system provides automatic instantaneous notifications to identify when the water quality thresholds are met or exceeded.		
		• Controls for sediment and rock debris.		
		• Controls to avoid concrete pour spills.		
		• Oil/fuel/chemical storage and spill management.		
		• Machinery and engine maintenance schedule to minimise risk of oil/fuel leakage.		
		• Response for accidental waste/material overboard (e.g. construction materials fallen into harbour).		

Ref.	Impact	Environmental safeguard	Responsibility	Timing
3	Sediment and water	 Turbidity limits would be in accordance with Table 3.3.3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality Volume 1 (ANZECC, 2000) and (in the absence of local limits) the relative increase criteria is set out under Turbidity Water Quality Standards Criteria Summaries; A Compilation of State/Federal Criteria (USEPA, 1998) where relative to background concentrations the following would be achieved: Seven-day rolling average criterion: no more than a 5 nephelometric 	Contractor	Pre-construction/ construction
		turbidity units (NTU) increase		
		 <i>24-nour rolling average criterion</i>: No more than a 10 NTU increase <i>Instantaneous criterion</i>: No more than a 10% increase when background concentrations are above 50 NTU or above. 		
4	Sediment and water	Should the monitoring record an exceedance of the instantaneous criterion or detect an abnormal reading at the 'near field' monitor then:	Contractor	Pre-construction/ construction
		Dredging works and any water discharge would stop		
		Work would only recommence once the near-field readings had stabilised/normalised over a 30-minute period and the there was also no exceedance of the instantaneous criterion for the same period.		
5	Sediment and water	Should the monitoring record an exceedance of the 24-hour or seven-day rolling average criteria then:	Contractor	Pre-construction/ construction
		• Dredging would stop if there were three exceedances of either criteria within a 24-hour period.		
		• Work would only recommence once limits had dropped to below the associated criteria relative to the rolling average.		

Ref.	Impact	Environmental safeguard	Responsibility	Timing
6	Sediment and water	A silt boom would be installed around the backhoe dredger bucket when dredging the harbour bed. The boom would only be removed when dredging work is complete or if required for maintenance once the sediment concentrations in the water column inside the silt boom had dropped to below the 24-hour rolling average criterion described in safeguard 3 above.	Contractor	Construction
7	Sediment and water	A silt boom would also be placed around the vessel when unloading materials onshore if the option is taken to dispose of the material on land via Glebe Island. The material transfer between the barge and quayside would be carefully managed to limit any transfer loss into the marine environment.	Contractor	Construction
8	Sediment and water	An Acid Sulfate Soil Management Plan (ASSMP) would be prepared in line with the requirements of the Acid Sulphate Soils Management Advisory Committee Guidelines (ANZECC/ARMCANZ 2000) and implemented as part of the CEMP. Sediment would be kept damp to reduce potential oxidisation. This includes during the period when the sediment would be temporarily stored at Glebe Island or transported offsite. Sediment would be monitored during transit. Where required the sediments would be sprayed with sea water and kept moist to prevent drying out. It would also include the need for adequate sampling and testing prior to disposal in line with the wider requirements of safeguard 50 in Table 37 below to classify waste before disposal in accordance with Waste Classification Guidelines: Part 1 Classifying Waste (DECCW, 2014). Where possible the material to be dredged will be classified prior to dredging based on sampling data and confirmation from NSW EPA that the dredged material meets general solid waste criteria.	Contractor	Detailed design/pre- construction

Ref.	Impact	Environmental safeguard	Responsibility	Timing
9	Sediment and water	Weather forecasts would be frequently checked during construction. Should severe weather be forecasted, works would stop, and all equipment and materials would be removed from the construction area or secured.	Contractor	Construction
10	Water quality	A Spill Management Plan would be prepared, implemented as part of the CEMP and communicated to all staff working on site. Any spill, whether it occurred in water or on land and subsequently entered the water, must be immediately reported to Sydney Vessel Traffic Service (VTS). Aquatic spill kits are to be kept on site during construction.	Contractor	Construction
11	Water quality	All equipment and machinery would be maintained in good condition and regularly inspected visually for leaks.	Contractor	Construction
12	Water quality	Any fuels or chemicals stored on Glebe Island, at the OPT or on barges, would be stored in a bunded area to prevent any chemical leaks or spills entering the water.	Contractor	Construction
13	Water quality	Work involving barges and piling should take place during calm conditions and at night where possible to minimise scouring and other impacts.	Contractor	Construction

6.2 **Biodiversity**

This section describes the predicted terrestrial and marine ecology impacts from carrying out the proposed works.

6.2.1 Method

The assessment included a desk review of State and Commonwealth records, data and literature to confirm the likely presence of threatened flora, fauna and endangered communities in the local aquatic environment. The following published records were reviewed:

- NSW Wildlife Atlas: containing information on State protected species.
- NSW Fisheries species profiles, 'Primefact' publications and expected distribution maps.
- Department of Primary Industries (Fisheries) Policy and Guidelines for Fish Habitat Conservation and Management (2013).
- Protected Matters Search Tool: containing information on Commonwealth protected species.
- Foreshore and Waterways Area Development Control Plan: Ecological Communities and Landscape characteristics map.
- PlantNet Database: containing information on sensitive and rare plants.
- BioNet Atlas of Wildlife: containing information on threatened and protected fish species.
- List of Noxious Weeds: containing information on non-native plant species that are listed as noxious weeds.

The impact assessment was prepared with consideration of the:

- BioBanking Handbook for Local Government (DECCW, 2008)
- Significant Impact Guidelines 1.1: Matters of National Environmental Significance (Commonwealth Department of Environment and Energy, 2013).

The assessment focussed on a desk review to confirm if the ecological potential in the area was enough to warrant further investigation (e.g. a maritime ecology or dive survey). Based on the desk review, no further investigation was carried out. Also, the lack of ecological value and nature of proposed works resulted in the conclusion of there being no potential impact on protected matters of national environmental significance. As such, no assessment was made against the EPBC Act Significant Impact Guidelines 1.1 and the proposal was not referred to the Australian Government DAWE.

The assessment considered the impacts from the activities descried in Chapter 3.

Once the works were complete, there would be no change in operation. As such, there is predicted to be no operational impacts.

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6.2.2 Existing environment

Marine environment: Overseas Passenger Terminal

Protected areas and key ecological communities

The proposal is not located close to any protected areas, namely wetlands of international significance, seagrass habitat, coastal saltmarsh, coastal wetlands, fish spawning or nursery areas, wetland protection areas (see Section 4.1.1 SREP policy objectives), or mangrove habitat (as reviewed on Creese *et al* 2009 mapping habitats of NSW estuaries). While there is currently no mapping to show coastal vulnerability areas, it is considered unlikely that the proposal footprint is in such an area.

A review of the Foreshore and Waterways Area Development Control Plan: Ecological Communities and Landscape characteristics map did not show the presence of terrestrial or aquatic ecological communities within or close to the proposal footprint.

Habitat

A search of the Protected Matters Search Tool identified no threatened ecological communities in proximity to the proposal footprint. Due to the high volume of boat and ship traffic, the type of berth construction and disturbed nature of the area, it is unlikely to provide significant habitat features for threatened species that are recorded elsewhere in parts of Sydney Harbour such as black rock cod, sygnathiformes (e.g. White's seahorse) or turtles.

White's seahorse *Hippocampus whitei*, is endemic to Sydney Harbour and found throughout its reaches, including west of the Harbour Bridge up to Mort Bay at Balmain. They have been listed as endangered under Part 1 Schedule 4 of the FM Act.

The substrate habitat is bare sand, which under the Department of Primary Industries (Fisheries) Policy and Guidelines for Fish Habitat Conservation and Management (2013), is identified as a key fish habitat (KFH) type 3. Type 3 is a minimally sensitive KFH that is represented by unvegetated subtidal sediment, intertidal mudflat with sparse infauna and intertidal seawall.

Threatened flora

No threatened plant species were identified from a desk study review. Due to the bare sand substrate within the proposal footprint, there is lack of supporting habitat for seagrass cover.

Threatened fauna

A review of the BioNet Atlas of NSW and the NSW Fisheries Species Profiles identified that vulnerable shark species (grey nurse and great white) and other fish had been sighted locally. However, due to the habitat of the proposal footprint being bare unvegetated substrate (harbour floor), the potential for it to support habitat for threatened species or for foraging is unlikely. Circular Quay is a very busy part of Sydney Harbour and is heavily used by a variety of vessels and cruise ships berthing regularly. The vessels create significant propeller wash; particularly with cruise ships generating significant thrust causing disturbance of the harbour bed. This means any megafauna are only likely to enter the area by exception, potentially when chasing prey or occasionally for protection.

Other fauna

A range of benthic or sub-benthic sessile fauna and infauna species are likely to be present in the sediment. These species are common to any sediment and create an important function in supporting primary production. They provide an indication of wider ecological health. While no benthic sampling was carried out, the level of activity in Circular Quay, coupled with the sediment quality (see section 6.1) means the benthic communities are likely limited and provide no real value to the wider ecology of the Harbour.

Native and non-native bird species have also been sighted in the area. These are non-threatened species and common to many parts of Sydney Harbour and its foreshores (e.g. ibis, gulls, cormorants).

Pests

Aquatic pest species can reduce local aquatic values and introduce toxins into the marine environment. Table 14 lists the aquatic pest species and pathogens that have a moderate-to-high potential of occurring locally due to ship movements.

Habitat	Description	Effect
<i>Caulerpa taxifolia:</i> seaweed	Ballast water and ship hull fouling	Leading to habitat degradation through outcompeting key habitats.
<i>Alexandrium sp.:</i> dinoflagellate: aquatic plankton	Cysts carried in benthic sediment	Can introduce neurotoxins in the water column leading to fish kill and bioaccumulation in shellfish.

Table 14: Aquatic pest species

Underwater noise sensitivity

Large megafauna and fish are sensitive to the impacts of underwater noise. While they can perceive piling generated noise up to 400 metres from its source, they typically avoid coming within 30 metres (Engell-Sorensen, K, *et al.*, 2000). If they do come within 30 metres of any piling work, then they could be injured or harmed through hearing loss or in extreme instances they can be killed; a term known as acoustic shock.

Terrestrial

The landside of the terminal is considered to have limited habitat potential. The area is made up of hardstand within an urbanised area. There is evidence of native pest and vermin in the area. Due to limited habitat potential on the landside, this has not been included in the assessment of impacts.

6.2.3 **Potential impacts**

Marine environment: overseas passenger terminal

Protected areas and threatened species

As identified above, the proposal footprint and compound are not located within or near any protected areas, and no threatened or key habitat is expected to occur locally. While threatened fauna have been recorded in the area, these species are unlikely to rely on its habitat or values for foraging or their survival. Any recorded species are wide-ranging, and they would likely use other parts of the harbour. As such, there is unlikely to be any direct or indirect impact on protected areas or threatened species.

Loss of aquatic vegetation and habitat

The dredging and scour protection work would directly impact the harbour bed. However, given the location of the proposal in an area of high traffic and the disturbed nature of the proposal footprint, it is unlikely that any notable vegetation or habitat would be directly lost to the proposal.

The harbour bed in the proposal footprint is identified as a Type 3 KFH lowsensitive habitat. The loss of this habitat from dredging would have no associated material impact.

Smothering and light preclusion

Impacts on the surrounding substrate and sediment in Sydney Harbour would be somewhat mitigated using a silt boom (see Table 13).

There would be some additional sediment disturbance from the temporary increase in vessel movements, the piling, and from the use of spuds and anchors to stabilise the dredger. While none of these have not been modelled, the associated level of disturbance would be unlikely to have any material benthic or primary production impact on the area's ecological values despite some thin-layer smothering (see section 6.1.3) of nearby low-value benthic habitat including infauna burrows.

As described in section 6.1.3 and Appendix D, the maximum depth of deposition would be 1 mm without the use of a boom. Most benthic fauna and habitat communities can tolerate a temporary covering of sediment to this depth without critical loss or impact. It is also likely that the natural variability of sediment deposition across the harbour bed is far greater than the deposition caused as a result of the proposal; again, noting that the modelled results are a worse case because they do not include the silt boom.



Source: MetOcean Solutions, 2020, Hydrodynamic and Dredge Plume Modelling

Figure 9 Timeseries of total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, at four reference sites

Figure 9 shows a time series of turbidity levels in and local to Circular Quay. The figure shows that the peak turbidity levels at the surface, mid-level and bottom of the harbour at different times. However, the turbidity levels are predicted to return to ambient concentrations within three to four days after dredging. Concentrations would also vary during the dredging works, depending on the rate of work and natural conditions.

While turbidity levels may be up to 10 times that of the natural conditions without using a silt boom, this would only occur for about an hour over a very localised area in Circular Quay, with concentrations being near to ambient conditions farther-a-field. Given the limited amount of time the water would remain turbid and the small area this would cover, this is unlikely to cause any impact through the loss of light. Further, there are no important photosynthetic communities within the dredge-impact footprint.

Injury and mortality

While there is the potential for large fauna to pass through the area, including grey nurse and great white shark, the risk of injury or death is currently present due to the existing movement of ferries, cruise ships and other vessels in the area. Any temporary increase in activity due to the barges or boats required for construction would present minimal additional boat strike impact or risk.

There is the potential for any benthic fauna and infauna and sessile species near the proposal footprint to be injured or killed due to the dredging, piling work and/or use of spuds and anchors impacting on the harbour floor. Similarly, benthic and sessile species may be injured or killed due to the localised smothering of these species. The nature of these impacts is considered unlikely to have a material impact on ecological function or value in the harbour. Impacts would be further reduced by introducing the safeguards and management detailed in section 6.2.4. Providing these are in place and effective, then any associated impacts could be avoided or minimised.

Entrapment and impingement

A silt boom would be provided around the backhoe dredger bucket to manage and help reduce larger sediment dispersion. This is unlikely to have an impact on entrapment of fish as there would be no curtain to trap fish. The silt boom would float on the surface.

Underwater noise

The potential for underwater noise impacts is minimal due to several reasons:

- The potential for aquatic megafauna to pass through the proposal footprint is low and they would likely avoid any dredging or scour protection activities.
- Although there are fish present in the area, they would likely avoid any underwater noise sources.
- Drilling of piles (the key underwater noise impact) would occur intermittently over a six-week period. Pile hammering typically happens for two to five minutes, followed by a relatively quiet period of 30 minutes or more before the next stage begins.

The most likely impact would be any startled response from the start of the drilling of piles. This would be avoided by gradually increasing the piling rate to avoid startling surrounding fish and megafauna.

Key threatening processes

The proposal would not include a key threatening process listed under Part 7A of the FM Act.

Indirect and secondary impacts

There is potential for sediment discharge, accidental spills and localised scour and unplanned erosion to occur during construction. By including standard safeguards described in section 6.2.4, the impact on the marine environment is assessed to be low.

There would be a small increase in vessel movements through Sydney Harbour during the works (see Table 6). This would have negligible impact in terms of any disturbance to fish and megafauna due to the existing shipping activity in the area.

Pest species

Pest species may be introduced due to the movement of vessels into and out of the proposal footprint and while in transport to and from Glebe Island and offshore. This impact is expected to be minimal provided the relevant standard controls are introduced and monitored.

Terrestrial environment

While noise and lighting would be temporarily introduced during construction, along with general disruption in the area, this is unlikely to have any terrestrial ecology impacts. This is due to there being no terrestrial habitat loss; while any fauna in the area is habituated (used to) the high level of human activity in Circular Quay.

Conclusion on significance impacts

The proposal is unlikely to cause significant impact to any threatened aquatic or terrestrial species, populations or ecological communities or their habitats, within the meaning of the BC Act or FM Act, and thus a SIS is not needed.

The proposal is also unlikely to cause significant impact to threatened aquatic or terrestrial species, populations or ecological communities or migratory species, within the meaning of the EPBC Act. Therefore, a referral to the Australian Government DAWE is not required for matters relating to biodiversity.

6.2.4 Safeguards and management measures

Table 15 lists the aquatic biodiversity safeguards and management measures that would be implemented to account for the impacts identified in section 6.2.3.

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Table 15: biodiversity safeguards and management measures

Ref.	Impact	Environmental safeguard	Responsibility	Timing
14	Aquatic biodiversity	 A Marine Ecology Management Plan would be prepared as part of the CEMP. This would include, but not limited to, measures relating to the following activities: Aquatic fauna management Biological hygiene (e.g. prevention of noxious species spreading on and off site) 	Contractor	Pre-construction
15	Biodiversity	If a previously unidentified threatened aquatic species is observed in the proposal footprint during construction works would temporarily stop until a suitably qualified expert has advised that works can recommence.	Contractor	Construction
16	Biodiversity	Work would stop if large aquatic fauna is observed nearby.	Contractor	Construction
17	Biodiversity	Gradual start-up piling to allow undetected aquatic fauna to move away from the area.	Contractor	Construction
18	Pest species	Equipment and machinery would be locally sourced and/or procured from areas where the risk of introducing pest species is low. Regular inspection of machinery, materials and equipment would be carried out where needed to ensure the importation of pests or weeds to the area is prevented.	Contractor	Construction
19	Biodiversity	Positioning work barges, drilling and pile driving should occur during calm conditions.	Contractor	Construction

6.3 Noise and vibration

This section describes the proposal's predicted noise and vibration impacts during construction. Changes are not proposed to the day-to-day operation of the OPT therefore no operational assessment has been undertaken. Appendix E contains the supporting technical paper.

Note: Appendix E also considered the noise amenity impacts from carrying out the works at Glebe Island under Option 1 (see section 1.1). This was to ensure the impact on the community was consistent with the assessment carried out in 2013.

6.3.1 Method

The construction assessment was undertaken from a review of the proposed activities and methodology. The assessment focussed on impacts from:

- Construction activity noise
- Construction traffic noise
- Construction vibration.

A baseline review of background noise data was undertaken and inputted into a model to predict noise emissions. Noise background data presented in the following environmental assessments were used:

• Overseas Passenger Terminal Wharf Extension: Construction Noise and Vibration Assessment (AECOM, 2014).

6.3.2 Existing environment

Ambient noise levels

Overseas passenger terminal

The OPT is located within an area of relatively low-to-medium ambient noise. The main activities and sources that contribute to the ambient noise are:

- Harbour-related activities such as boat noise, ferry movements, and major shipping movements.
- Residential and commercial activities, including traffic, bars and restaurants, visitors.

Table 16 presents the background noise levels (AECOM, 2014), which are discussed further in Appendix E. The table also details the noise monitoring locations.

Monitoring Location	RBL: rating background level ¹ dB(A) ³			
	Day	Evening	Night	
Holiday Inn, 55 George Street, The Rocks	61	60	57	
Quay Grand, 61 Macquarie Street, East Circular Quay	63	62	52	
Destination NSW Office, Level 2, 88 Cumberland St.	61	61	57	
Park Hyatt, 7 Hickson Rd, The Rocks	61 ²	59	56	

Table 16: Existing ambient acoustic noise environment for Circular Quay

1 - Day is defined as the period from 7 am to 6 pm Monday to Saturday; or 8 am to 6 pm on Sundays and Public Holidays. Evening is the period from 6 pm to 10 pm. Night is the remaining period.

2 - Denotes results in which all periods were affected by rain or wind noise.

3 - Db (A) denotes a single number sound pressure level that includes a frequency weighting to reflect the sound level.

Note: The noise monitoring was undertaken from 23 July 2013 to 1 August 2013 at the first two locations and further logging was conducted at two additional locations from 8 November 2013 to 2 November 2013.

The local background noise levels represent the activity in the area, with noise levels remaining high during the day, evening and at night compared to other areas of Sydney. It was noted that in three locations, the Holiday Inn, Destination NSW office and the Park Hyatt, background levels were within 1dB or each other. Therefore, the Holiday Inn monitoring location was used to represent the background noise at all receivers on the western side of Circular Quay. Measurement results from the Quay Grand were used to represent background noise at receivers east of Circular Quay.

Sensitive receivers

Overseas passenger terminal

The proposal footprint is near to non-residential and residential receivers.

Heritage structures have also been identified within 100 m of the OPT (see Appendix F). The heritage buildings are considered structurally sound, and in accordance with industry standards (BS7385- 2^4), these are not considered to be more sensitive than other surrounding structures. Based on the distance of the heritage items from the proposal footprint, vibration is not anticipated to be an issue.

Residential receivers located within similar environments and with comparable relationship to surrounding noise sources have been grouped into Noise Catchment Areas (NCAs). They are shown in Figure 10 and described in Table **17**.

⁴ British Standard 7385 Part 2-1993

NCA	Description	Noise environment
NCA 1	Eastern Circular Quay	Background levels dominated by road traffic along Cahill Expressway, local road traffic and surrounding local activity from entertainment venues or commercial premises.
NCA 2	Western Circular Quay	Generally, background levels are dominated by local intermittent road traffic, local activity and natural sources.

Table 17 NCAs and description

Residential receivers with the potential to be impacted by the proposed construction are listed in Table 18.

Receiver ID	Address	No. of floors	Approximate distance to site [m]
R1	1-3 Macquarie Street, Sydney	12	260
R2	3-7 Macquarie Street, Sydney	12	260
R3	61-69 Macquarie Street, Sydney	15	270
R4	8 Hickson Road, Dawes Point	6	160
R5	54 Gloucester Street, The Rocks	2	250
R6	2 Phillip Street, Sydney	27	320

Table 18: Residential receivers

The nearest non-residential sensitive receivers to the OPT are listed in Table 19. All identified receivers are also shown in Figure 10.

Receiver Name Address No. of Approximate ID floors distance to site [m] Commercial C1 Northern Commercial 3 <10 **Overseas Passenger** Terminal, The Rocks Premises (Quay Restaurant, The Squire's Landing) Southern Commercial 3 C2**Overseas Passenger** <10 Terminal, The Rocks Premises (Cruise Bar, Yuki's at the Quay) C3 7 Hickson Road, The 5 110 Park Hyatt Rocks C4 Opera Bar Sydney Opera House, 1 320 Macquarie Street, Sydney C5 Holiday Inn Old 55 George Street, The 5 130 Sydney1 Rocks

Table 19: Non-residential receivers

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Receiver ID	Name	Address	No. of floors	Approximate distance to site [m]
Educational	Facilities			
E1	APM College of Business and Communication, Torrens University Australia, William Blue	1-5 Hickson Road, The Rocks	5	70
E2	Julian Ashton Art School	117 George Street, The Rocks	3	140
Passive Reci	reation Area			
PR1	First Fleet Park	George Street, The Rocks	0	130
PR2	Hickson Road Reserve	Hickson Road, The Rocks	0	140
PR3	Foundation Park	Gloucester Walk, The Rocks	0	200
Cultural				
H1	Australian Steam Building	1-5 Hickson Road, The Rocks	5	70
H2	Cadman's Cottage	110 George Street, The Rocks	2	70
Н3	Museum of Contemporary Art	136-140 George Street, The Rocks	6	50
H4	The Rocks Discovery Museum	Kendall Lane, The Rocks	3	130
Н5	Susannah Place	58/64 Gloucester Street, The Rocks	2	260
1In accordance with the NSW Interim Construction Noise Guidelines 2009, hotel residents are classified as non-residential receivers. However, hotel guests would experience some sleep disturbance as identified within section 6.3.4. Mitigation measures for residential receivers would also be applied to hotel guests.				

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Figure 10: Noise sensitive receiver locations surrounding the OPT site and NCAs

6.3.3 Assessment criteria

The assessment of noise impacts was assessed against criteria discussed in detail in Appendix E. Table 20 to Table 22 summarises the key criteria used for the assessment.

Fable 20 Construction	ı noise	assessment	criteria
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Aspect	Criteria (LAeq (15 min)1)	
Work activity	Residents: Standard hours	Noise affected: RBL + 10dB
noise		Highly noise affected: 75dBA
externally	Residents: out of hours	RBL + 5 dB
RBL: rating background level	Residents: sleep disturbance	LA902 noise level by more than 15 dB3
	Passive recreation areas	60 dB(A)
	Active recreation areas	65 dB(A)
	Educational institutions	45 dB(A)
	Museums	45 dB(A)2
	Commercial premises	70 dB(A)

1 The average equivalent ('eq') continuous sound level, used to describe the level of a time-varying sound or vibration measurement.

2 The sound level exceeded for 90% of the measurement period. The L90 is often defined as the 'average minimum' or 'background' noise level for a period of measurement. For example, 45 dBLA90,15 min indicates that the sound level is higher than 45 dB(A) for 90% of the 15-minute measurement period. 3 Not applied to traffic noise.

Table 21 Road traffic criteria for traffic generating development - residential receivers

		Assessment criteria – dBL _{Aeq}	
Road category	Type of project/land use	Day (7 am-10 pm)	Night (10 pm-7 am)
Freeway/arterial/ sub- arterial roads	Existing residences affected by additional traffic on existing roads generated by land use developments.	L _{Aeq,(15 hour)} 60 (external)	L _{Aeq,(9 hour)} 55 (external)

Note: These criteria are for assessment against façade corrected noise levels when measured in front of a building façade.

The following guidance provides recommended minimum safe working distances for vibration intensive plant. These are based on international standards and guidance and reproduced in Table 22 below for reference.

		Minimum working distance		
Plant Item	Rating/description	Cosmetic damage (BS 7385)	Human response (OH&E Vibration Guideline)	
Vibratory pile driver	Sheet piles	2 m to 20 m	20 m	

Table 22: Recommended minimum working distances for vibration intensiveplant

6.3.4 **Potential impacts**

Overseas Passenger Terminal

Activity-based noise

The construction works would include different activity stages, each with different types of equipment in each construction work area. Equipment sound power levels are provided in Appendix E. These define the noise levels emitted at the source of the equipment.

The OPT works would take place during day, evening and at night over the construction program. Most of works at the OPT, including piling, dredging, and concrete work in the harbour, would mainly take place at night. This is due to safety reasons and the water tends to be calmer at night and the harbour is least busy, however there may be a need to undertake these activities during the day.

As assessment has been carried out to consider works taking place during the day, evening and at night (see section 3.3.1 construction hours).

Activity-based noise impacts at the OPT

Chapter 6 of Appendix E describes the detail of the noise impacts. In summary, and in relation to Table 4 Construction and dredging activities:

- There would be no impact during the **day**.
- Residents and hotel guests in Campbells Cove would be affected **at night** and they may have their sleep disturbed when: installing the sheet piling (enabling works), stabilising the embankment, and extending and deepening the berth pocket (dredging). These include:
 - R1: 1-3 Macquarie Street, Sydney
 - R2: 3-7 Macquarie Street, Sydney
 - R3: 61-69 Macquarie Street, Sydney
 - R6: 2 Phillip Street, Sydney

Exceedances of NMLs for non-residential receivers would mainly impact the commercial receivers (Quay Restaurant, Cruise Bar, Squires Landing, Yuki's at the Quay) and MCA museum. They would be affected when they are open.
The duration of these impacts would depend on the final work schedules and whether the identified works would take place during the evening or at night (see section 3.3.1).

While noisy activities including piling and hammering may also take place during the day it would not be scheduled or permitted between 12pm and 2pm. This would reduce impacts during the busiest time of day for commercial receivers within Campbells Cove and the MCA museum, as well reducing impacts on the public amenity for receivers passing through the area.

Road-traffic noise impacts at the OPT

Construction works at the OPT are proposed to be 24/7 operation. A worst-case assessment has been undertaken for traffic generated during the night-time period of 10pm to 6am. A maximum of 20 daily truck movements is anticipated for construction works at the OPT. A workforce of 22 has been assumed to arrive within one hour during the night-time.

The predicted traffic-generated noise levels at the nearest residential receiver, 8 Hickson Road, Dawes Point (R4) would be noticeable however they would not exceed the criteria in Table 23 (see Chapter 6 of Appendix E).

Activity-based vibration impacts

Vibratory sheet piling would be the only activity that could give rise to potential vibration impacts. As this work would be more than 20 m from the nearest receiver a safe working distance could be maintained (see Table 25).

Glebe Island

Appendix E includes a noise assessment of the works at Glebe Island. This was to see if the impacts of the planned activities are consistent with the impact predicted in 2013. In summary:

- The noise impact from the planned works would be in general accordance with the 2013 assessment.
- The influence of the shipping movements to and from Glebe Island would have negligible influence on the overall noise emissions. This is because the vessels produce a comparatively low level of noise compared to the other planned activities and they only arrive and leave site a few times each day (see section 3.4.1).

6.3.5 Safeguards and management measures

Table 23 summarises the noise and vibration safeguards and management measures that would be implemented to account for the impacts identified in section 6.3.3.

Ref.	Impact	Environmental safeguard	Responsibility	Timing
20	Noise	 A Construction Noise and Vibration Management Plan would be prepared and implemented as part of the CEMP. This will specify the actual plant to be used and will include updated estimates of the likely levels of noise and the scheduling of activities. The Plan would include: All potential significant noise and vibration generating activities associated with the activity Feasible and reasonable mitigation measures to be implemented A monitoring program to assess performance against relevant noise and vibration criteria. Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures, and contingency measures to be implemented in the event of non-compliance with noise criteria. 	Contractor	Pre-construction
21	Noise	 Electric/hydraulic equipment would be used where possible using the smallest equipment as is practical. All plant and equipment used on site would be: Maintained in a proper and efficient condition. Operated in a proper and efficient manner. All vehicles, plant and equipment would be turned off when not in use. 	Contractor	Construction
22	Noise	The offset distance between noisy plant and adjacent sensitive receivers would be maximised. Plant used intermittently would be throttled or shut down. Noise- emitting plant would be directed away from sensitive receivers where possible. Truck movements and haulage routes would be planned to avoid residential streets where possible.	Contractor	Construction

Table 23 noise and vibration safeguards and management measures

Ref.	Impact	Environmental safeguard	Responsibility	Timing
23	Noise	Non-tonal reversing beepers (or an equivalent mechanism) would be fitted and used on all mobile site-based vehicles, plant and equipment.	Contractor	Construction
24	Noise and vibration	All works would be scheduled with the aim of avoiding particularly noisy works (installing the sheet piling, stabilising the embankment, and dredging) after 10pm and before 6am, noting that these works will likely have to take place at night due to safety and operational reasons. Piling and particularly noisy works would be restricted and not undertaken between 12pm and 2pm.	Contractor	Pre-construction
25	Noise and vibration	Advanced warning of works and potential disruptions to the community would be provided. The notification may consist of a letterbox drop (or equivalent) detailing work activities, time periods over which these will occur, impacts and mitigation measures. This would be in accordance with the provisions in Safeguard B in Table 43 below.	Contractor/Port Authority of NSW	Pre-construction

6.4 Landscape character and visual impact

This section describes the proposal's potential landscape character and visual impacts.

6.4.1 Method

Landscape character and visual impacts

A desk review of the landscape character and visual receivers was undertaken for the site and surrounding area through online mapping. The landscape assessment for the Overseas Passenger Terminal Wharf Extension REF by AECOM (2017) was reviewed to identify key viewpoints to assist in the assessment.

The assessment of impacts used the ratings outlined in the Guidelines for Landscape Character and Visual Impact Assessment (EIA-N04, Roads and Maritime, 2013) to determine:

- The sensitivity of viewpoints and the landscape character to changes in form, setting and composition from carrying out the proposed works.
- The scale of change in the landscape and to people's views.

The grading matrix from EIA-N04 is shown in

Table 24 below. This has been considered within the assessment of potential impacts.

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Table 24: landscape	character and	i visuai impaci	rating matrix

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	Magnitude						
		 High 	Moderate	Low	• Negligible		
Sensitivity	• High • High impact		• High-moderate • Moderate • N		• Negligible		
	Moderate	• High-moderate	 Moderate 	• Moderate-low	• Negligible		
	Low	 Moderate 	• Moderate-low	• Low	• Negligible		
	• Negligible	• Negligible	● Negligible	 Negligible 	• Negligible		

Lighting impacts

TT 11 04 1

An assessment of light spill activities at the OPT was undertaken with reference to AS4282-1997: Control of the Obtrusive Effects of Outdoor Lighting (Standards Australia, 1997).

Only construction impacts have been assessed as the operation of the proposal would remain unchanged.

6.4.2 Existing environment

Overseas passenger terminal

Landscape character and context

The OPT is in Sydney Harbour within a visually prominent location with uninterrupted views to and from Circular Quay, Sydney Opera House and the Harbour Bridge. The OPT lies within the Sydney Opera House World Heritage Site buffer zone (see section 4.1.1).

The landscape character of the area is defined by its urban waterside setting and the context of key tourist landmarks and high-rise residential and office buildings.

The waterfront is locally characterised by the regular movement of ferries, tourist craft, water taxis and cruise ships, which tend to dominate and temporarily change the area's local character. The level of tourist activity and movement helps shape and place-make the area. This collectively leads to creating a distinct sense of place, which is characterised differently by locals, commuters, tourists and visitors, who hold different values to the area's landscape characteristics. For instance, tourists' reference and value the key iconic structures and the area's relationship with the Sydney Opera House and Sydney Harbour Bridge. By comparison, commuters see the area more functionally, characteristically valuing the transport interchange between light rail, bus, rail and ferry services.

The landscape characteristics have been divided into four key zones within the local area of the OPT. Each has distinct and recognisable components and patterns. Table 25 describes the key LCZs in the local area along with their characteristics, quality and sensitivity to change. These LCZs are presented in Figure 11.

Zone	Land use characteristics	Sensitivity to change
LCZ1: The Rocks	Forms the backdrop to the OPT. Characteristic of historic buildings and mix of high rise and low-rise buildings. Urban character of bars, shops and restaurants. Views across to the Sydney Opera House.	• Moderate due to the historic nature of the area.
LCZ2: Circular Quay	Characteristics of open water within a busy ferry port. The backdrop of Circular Quay is characterised by high rise buildings and Sydney CBD.	• Low due to the nature of the area as a busy ferry hub.
LCZ3: Sydney Opera House	Characterised as a tourist landmark. Prominent views of the harbour and harbour bridge, as well as Circular Quay and the Rocks. World Heritage Site. Provides public open space and tourism.	• High given the heritage and national/world importance of this site.

Zone	Land use characteristics	Sensitivity to change
LCZ4: Kirribilli	Characteristic of a residential urban area with mix of medium to low rise buildings. Adjacent to the harbour with prominent views of the city, Sydney Opera House, Harbour Bridge and the OPT.	• Low due to changeable views of construction sites within the city and movement of ferries.



Figure 11: landscape character zones around the OPT

The character areas provide moderate-to-high amenity value due to the provision of public spaces and an historic built form.

Viewpoints and receivers

A review of the Overseas Passenger Terminal Wharf Extension REF (AECOM, 2017) identified key landmark viewpoints to and from the OPT. These are also relevant for this proposal as the works are within the same location. These viewpoints are listed in Table 26 and shown on Figure 12.

Viewpoint	Location	Sensitivity to change	
VP1: tourists	Sydney Opera House Forecourt	• High, due to high number of observers and visitors.	
VP2: tourists	Sydney Opera House concourse	• High, due to high number of observers and visitors.	
VP3: tourists	Cahill Walk lookout point	• Moderate, due to the moderate number of users.	
VP4: tourists	Museum of Contemporary Art (MCA) café	• Moderate, due to the moderate number of users.	
VP5: tourists and residents	Harbour Bridge walk entry	• High, due to high number of observers and visitors to the bridge.	
VP6: tourists	Cadman's Cottage	• Moderate, due to the moderate number of users.	
VP7: tourists and residents	Dawes Point	• High, due to high number of observers and visitors.	
VP8: tourists	Harbour Bridge Pylon	• High, due to high number of observers and visitors.	
VP9: commuters and tourists	Sydney Harbour view from the ferries and recreational boat users	• High, due to high number of observers and visitors.	

Table 26: Overseas Passenger Terminal: viewpoint location		0	D	T • 1	•	• •	1
	Table 26:	Overseas	Passenger	Terminal:	viewi	oont	location

Ambient light levels

Sydney Harbour and Circular Quay are lit at night from the surrounding land uses. The proposal footprint therefore experiences a high level of lighting from the OPT terminal and adjacent properties.



Note: VP9 shown on the figure represents boat users through the harbour

Figure 12 Location of viewpoints near the OPT

6.4.3 **Potential impacts**

Overseas passenger terminal

Landscape character and visual amenity

The works would be perceptible within the landscape setting as they would involve a distinct activity that does not normally take place in the area. Given this distinction it may temporarily distract from the key and important landscape values and landmarks in the area as summarised in Table 33.

Table 27:	temporary	landscape char	acter impacts
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Zone	Sensitivity	Magnitude	Impact
LCZ1: The Rocks	 Moderate 	• Low	 Moderate-low
LCZ2: Circular Quay The presence of construction equipment and barges	• Low	• Moderate	• Moderate-low
LCZ3: Sydney Opera House	 High 	• Low	 Moderate
LCZ4: Kirribilli	• Low	• Negligible	• Negligible

Visual amenity construction impacts are outlined below in Table 28.

Viewpoint	Sensitivity	Magnitude	Impact			
High visibility						
VP1: Sydney Opera House Forecourt	• High	 Moderate 	• High-moderate			
VP2: Sydney Opera House Concourse	• High	 Moderate 	• High-moderate			
VP3: Cahill Walk Lookout Point	• Moderate	 Moderate 	• Moderate-low			
VP4: MCA Cafe	 Moderate 	 Moderate 	 Moderate 			
VP7: Dawes Point	• High	 Moderate 	 Moderate 			
Low or obscured visibility						
VP5: Harbour Bridge Walk Entry	• High	• Low	 Moderate 			
VP6: Cadman's Cottage	 Moderate 	• Low	• Moderate-low			
VP8: Harbour Bridge Pylon	• High	• Low	 Moderate 			

Table 28: temporary visual impacts

The proposal would also affect the visual amenity of:

- Visitors to Sydney Opera House concourse (VP2), Cadman's Cottage (VP6), and MCA Café (VP4).
- Recreational users and pedestrians on Cahill Walk lookout point (VP3) and Harbour Bridge (VP8).

The visual amenity and landscape character impacts would be temporary in nature and would occur at different times of the day (see section 3.3.1). Overall, despite the discernible nature of the works, their small scale and short duration (see section 3.3.1) means any impact would be short-term.

Light spill and night work

As described in section 3.3.1, night works would be undertaken given the harbour conditions are more suitable for activities such as piling and dredging. This would require additional safety and security lighting. There is potential for temporary light spill impacts affecting nearby residents within the Rocks and hotel guests in Campbells Cove. While this is the case, stationary site lighting and security lights on the barges would be carefully directed and shielded to limit its impact.

Transport movements

The movement of around four vessels between Circular Quay and either Glebe Island or the offshore disposal ground (see section 3.4.1) who have negligible influence on the landscape setting and visual amenity of Sydney Harbour in the context of the many commercial, recreational, tourist and other vessel movements that occur each day.

6.4.4 Safeguards and management measures

Table 29 lists the landscape character and visual amenity safeguards and management measures that would be implemented to account for the impacts identified in section 6.4.3.

Table 29: landscape character and	l visual amenity	safeguards and	management
measures			

Ref.	Impact	Environmental safeguard	Responsibility	Timing
26	Light spill	Direction of lighting would be controlled to limit light spill from nearby receivers such as residencies in the Rocks and take into consideration any reflective impacts from the water.	Contractor	Construction
27	Landscape character and visual amenity.	The shipping container at the OPT would be stored for the duration of the works and would be screened where possible to reduce visual impacts for pedestrians and ferry users accessing the area.	Contractor	Construction

6.5 Socioeconomic

This section describes the proposal's predicted social and economic impacts and benefits.

6.5.1 Method

The assessment considered the following community, business and industry impacts and benefits:

- Community disruption during construction from noise, traffic, visual amenity, and community values such as the sense of place.
- Ferry service disruption.
- Tourism impacts and effects on social amenity and infrastructure.
- Business and economic disruption, including the aquatic-based companies that use the harbour and ferry passenger services.

Operational impacts have not been considered the would be no change from the current activity at the OPT.

A qualitative construction assessment has been undertaken based on:

- Census data
- Council website data (City of Sydney, 2013, Our Villages: CBD and Harbour)
- Noise and vibration assessment for the proposal (see Section 6.3)
- Landscape character and visual assessment of the proposal (see Section 6.4)

• Traffic, transport and access assessment of the proposal (see Section 6.8).

6.5.2 Existing environment

Overseas passenger terminal

Demographic and socioeconomic profile

The proposal is situated next to the Rocks which is part of the City of Sydney Local Government Area (LGA). The Rocks include a mix of land uses focussed on officebased employment, retail and tourism. The area is home to a small but diverse population, living in apartment towers, heritage terraces and public housing. The area had a population of approximately 8,500 residents (City of Sydney 2014 data) and 227,000 workers (City of Sydney 2012 data).

The key social and economic characteristics of the people that live in area is summarised in Table 30. The Rocks suburb occupies an area of 0.3km² (ABS, 2012).

Demographic Indicator	2016		
Population	774		
Population by age bracket	0-19	58	
	20-34	210	
	35-49	237	
	50-64	141	
	65+	127	
Method of travel to work	Car	20.2%	
	Bus	2.6%	
	Train	12.4%	
	Walked	41.3%	
	Other	23.5%	
Weekly household income	\$ 3516		
Home ownership/rentals	Homeowners	44.8%	
	Renters	53.9%	
	Other	1.3%	

Table 30: Statistical Data for The Rocks suburb census 2016

The above information demonstrates that the Rocks is an affluent suburb. Residents are mainly renters within high rise apartments. Most residents walk to work. The most common occupation for people living in the Rocks in 2016 was professionals (42% of the employed residents).

Ferry service users

Approximately 50 million people travel to Circular Quay by ferry every year. This is forecast to increase up to 81 million by 2041 (Transport for NSW).

Community values

Community values are those socioeconomic aspects that people hold important to their quality of life and wellbeing. They include physical assets, such as parks and recreational areas, as well as social factors such as a sense of safety and wellbeing, belonging and community diversity.

Accordingly, there is a likely high level of community value associated with the area's landscape and heritage values and setting within the Rocks; a conservation area. Community values are likely held by a wider demographic than lives in the area, including visitors, workers and tourists. These include:

- Liveability, due to harbour access and access to the commercial centre of Sydney.
- Retained local character defined by the ease of access to facilities, restaurants and bars.
- Local amenity and sense of place provided by: the historic buildings and history of the area; its continued significance use as a transport hub and overseas passenger terminal; the high-levels of public activity; its use for special events such as Vivid; and its setting as part of Sydney Harbour and views towards the Sydney Opera House and Sydney Harbour Bridge.

Social infrastructure

Social infrastructure refers to the community facilities, services and networks that help individuals, families, groups and communities meet their social needs, maximise their potential for development, and enhance their community wellbeing. It includes such things as: educational facilities; health, emergency and agedcare services; sports, recreational and cultural facilities; community support services; and transport facilities.

The social infrastructure associated with the local area benefits a wider demographic than those people that live locally. It includes:

- Circular Quay, which provides a major transport hub for ferries, light rail, busses and trains.
- The OPT as an arrival and departure point for tourists. It also includes restaurants, function facilities, and public open space.
- Campbells Cove, which provides public open space, and restaurants.
- MCA, which provides a cultural facility for residents and tourists.
- Sydney Opera House, which provides a cultural facility for residents and tourists.

Key public events

Major public events have been cancelled and impacted during 2020 due to the COVID-19 restrictions. The programme of proposed works is therefore not expected to be impacted by the usual, scheduled large-scale public events in the immediate area. At this stage it is unclear when these activities would resume.

6.5.3 **Potential impacts**

Overseas passenger terminal

There would be a small temporary level of employment needed during construction (approximately 39 workers across the proposal).

The proposed works would not disrupt ferry movements in and out of Circular Quay as the proposal footprint and need for a maritime exclusion zone (see section 6.8) would not impact ferry movements to and from the wharves. Ferry times are also not predicted to be impact. This is further considered within section 6.8.

Cruise ships could continue to berth at the OPT during the construction program, providing they are operating at the time. Construction works would stop during this time and this has been considered in the construction program.

The proposed works would occur adjacent to a busy tourist area. This has the potential to impact nearby businesses. This includes businesses located at the OPT, in Campbells Cove and its environs and along George Street including the MCA. The businesses located within Campbell Cove comprise restaurants, although the site is not yet fully occupied by businesses following a major renovation. Access to these businesses would be maintained off George Street and Hickson Road. Construction activity would therefore not directly affect access to these businesses by foot or car. However, there may be amenity impacts associated with noise from construction works, which would affect these during day works (see section 6.3).

Noise impacts from night-time works would have a temporary adverse impact on residents living near the OPT within the Rocks and hotel guests at Campbells Cove (see section 6.3). While lighting impacts may also have a temporary adverse impact on nearby hotel guests (see section 6.4.3) it is unlikely to have any material impact on community values, including liveability. This is due to the limited duration and scope of the works and that any lights would be controlled to minimise glare.

There would be a temporary, minor loss of amenity for pedestrians and users of the OPT as parts of the site would be closed-off for periods during works. When works are not being undertaken (e.g. cruise days) pedestrian access would be reinstated. There is unlikely to be impacts to public events held within the area, as works would not be carried out during these times.

During the enabling works for the sheet pile wall installation, a crane mounted barge would install sheet piles in front of the Commissioners Steps. This area would be temporarily restricted for commercial vessels accessing the Commissioners Steps during these works. Commercial vessels mainly include water taxis and small ferries. This would have a temporary impact on commercial vessel operators and users not being able to access this area during the enabling works. This would be short term and prior to works Transport for NSW would be notified of restriction to access.

Transport movements

The movement of around four vessels between Circular Quay and either Glebe Island or the offshore disposal ground (see section 3.4.1) who have negligible influence on the area's amenity, and it would have no effect on the area's community values. It would not prevent any commercial, recreational or public transport traffic or vessel movements during the movement of dredged material. Overall, this element of the proposal is not predicted to have any material socioeconomic impact.

6.5.4 Safeguards and management measures

Table 31 lists the socioeconomic safeguards and management measures that would be implemented to account for the impacts identified in section 6.5.3.

Table 31: socioeconomic safeguards and management measures

Ref.	Impact	Environmental safeguard	Responsibility	Timing
28	General socio- economic impacts	A Communication Plan would be prepared and implemented as part of the CEMP to help provide timely and accurate information to stakeholders prior to and during construction.	Contractor/Port Authority of NSW	Pre-construction
29	Social impacts	Access to neighbouring businesses would be maintained during construction, any temporary constraints to access would be communicated ahead of time.	Contractor/Port Authority of NSW	Pre-construction/ construction
30	Socio-economic impacts	The maritime exclusion zone would be clearly defined as part of the Marine Works Management Plan (see Safeguard 43 in Table 36 below) and communicated to relevant stakeholders to delineate access restrictions for surrounding water users.	Contractor/Port Authority of NSW	Pre-construction/ construction
31	Socio-economic impacts	The works would be scheduled to maintain public access to Circular Quay and the wharf frontage where feasible and reasonable; especially during peak and event periods.	Contractor	Pre-construction/ construction

6.6 Non-Aboriginal heritage

This section describes the proposal's predicted non-Aboriginal heritage impacts. Appendix F contains a supporting technical report prepared by AECOM (2020).

6.6.1 Method

The assessment included a desk review of local, State, national and world heritage registers to confirm the likely presence of non-Aboriginal heritage values locally. It also included a review of borehole data and a maritime archaeological assessment carried out by Cosmos Archaeology in 2014. This was followed by a dive survey in February 2020 that was used to confirm the non-Aboriginal heritage value and potential by searching for evidence of surface items and relics, intact natural deposits, and sediment disturbance.

The assessment also referred to: Assessing Heritage Significance (NSW Heritage Office, 2001), Statements of Heritage Impact (NSW Heritage Office and DUAP, 2002), and The Burra Charter: The Australian ICOMOS Charter for Places of Cultural Significance (2013).

6.6.2 Existing environment

European history

Appendix F details the European settlement history of the area. In summary:

- The first wharf was in operation by 1792 in the vicinity of present day First Fleet Park.
- The Rocks was developed into Government Dockyards and the OPT was occupied by Captain Piper comprising a property, rocky foreshore and possible wharf. Campbells Cove was home to Robert Campbell. It contained stables, warehousing and a wharf.
- By 1845, Campbells Wharf contained a house, stores, warehouse and wharf. Three stores and an office were also located at the northern end of the wharf.
- Circular Quay was constructed between 1854 and 1855.
- Argyle Street was extended out over reclaimed land between 1859 and 1863 moving the foreshore alignment.
- In 1876, a 320-foot wharf and two jetties were built within Campbells Cove along the foreshore. The warehousing was further developed in the mid-1890s with further wharfage improvements.
- By 1900s, the Rocks street layout was redesigned, and terrace housing was built. Large areas of existing buildings were demolished to create the area. Campbells Cove also changed leading to the demolition of the two jetties built in 1876 and the erection of a single central wharf (Wharf No. 17) for commercial shipping.

- Following the Second World War, cruise passenger movements increased dramatically demanding the need for a passenger terminal. Sydney Cove (Circular Quay) was chosen due to its proximity to public transport. The OPT was constructed in 1958. This led to the demolition of wharves and sheds built in the early 1900s and further land reclamation.
- In the 1980s the wharf was reconfigured, and frontage reshaped. Campbells Cove was further redeveloped resulting in the upgrade of the OPT in the lead up to the 2000 Olympics.

Heritage items

Table 32 lists the recorded items in the local area. They reflect its history as described above along with describing the key wider values represented in the Sydney Opera House and Sydney Harbour Bridge. The location of listed heritage items within and or adjacent to the proposal footprint is shown on Figure 13.

Item	Value and designation
World Heritage	
Sydney Opera House	Located 370 m east of the proposal footprint. The Sydney Opera House is listed on the World Heritage List and National Heritage List and has an international and national level of significance.
Other Heritage	
Sydney Harbour Bridge	Located 250 m west of the proposal footprint. The Harbour Bridge is listed on the National Heritage List and is of National Significance.
The Rocks Conservation Area (Sydney Harbour Foreshore Authority Section 170 Register)	Located adjacent to the Proposal footprint.
Railings, Sydney Cove (State listed #01572)	Located 10 m west of the Proposal footprint of State significance
Sydney Cove West Archaeological Precinct (State listed #01860)	Located 50 m west of the Proposal footprint of State significance
Cadman's Cottage, grounds, trees, space (State listed #00981)	Located 70 m west of the Proposal footprint of State significance
Sailor's Home (former) (State listed 01576)	Located 70 m west of the Proposal footprint of State significance
Coroner's Court (former) – Shops & offices (State listed #01541)	Located 70 m west of the Proposal footprint of State significance
Mariners' Church (State listed #01559)	Located 70 m west of the Proposal footprint of State significance

Table 32 Summary of listed heritage items within the surrounding area

Item	Value and designation
ASN Co Building (State listed #01526)	Located 70 m west of the Proposal footprint of State significance
Campbell's Stores (State listed #01536)	Located 100 m west of the Proposal footprint of State significance
Sydney Cove Passenger Terminalis (listed on Port Authority of NSW Section 170 heritage and conservation register)	Located 40 m from the Proposal footprint and are of State significance.
Three Bees shipwreck	Unknown location may have been re-floated or have not been located but unlikely to be within the Proposal footprint.
Ann Jameson shipwreck	Unknown location may have been re-floated or have not been located but unlikely to be within the Proposal footprint.
Princess shipwreck	Unknown location may have been re-floated or have not been located but unlikely to be within the Proposal footprint.



Source: AECOM 2020, Maritime Archaeological and Indigenous Heritage Assessment and Statement of Heritage Impact

Figure 13 Location of nearby Heritage items listed on heritage registers

Maritime archaeology

Historic research and geophysical and archaeological surveys carried out in 2014 and 2020 confirmed the presence of the remains of the former Wharf No.7 (1901-1980) in Campbells Cove. This is within the north of the proposal footprint (see Table 11 or a historic photo location of Wharf No.7). These include cut sections of piles and deck beams on the harbour bed. The archaeological survey undertaken in 2020 noted material present below the harbour bed it concluded that this may also relate to the construction of the OPT wharf extension and/or from the construction of the mooring dolphin

This wharf was an integral part of maritime commerce and trade functioning in Sydney Harbour. It was leased by international merchant shipping companies before being taken over by the Maritime Services Board. The remains of the former Campbells Cove Wharf are of local significance.



Source: AECOM 2020, Maritime Archaeological and Indigenous Heritage Assessment and Statement of Heritage Impact

Figure 14: 1960s aerial photograph showing the configuration of the OPT after the expansion works and Wharf No.7 to the north

Archaeological potential

The potential for other maritime archaeological remains and relics is low due to existing disturbance from dredging of the OPT berth pocket and the previous extension works of the OPT.

6.6.3 **Potential impacts**

Heritage listed items impacts

The proposal footprint is within the Sydney Operate House buffer zone; introduced to protect its world heritage values (see Table 11). There would be no change to existing views once construction activities are complete. Following construction, there would be no change to the setting and views within the Sydney Opera House buffer zone and Campbells Cove.

The proposed works would have a temporary impact on the setting of the heritage listed items (see Table 32) from crane mounted barges using for the dredging and piling works. There may also be temporary impacts when installing the pumped or articulated concrete mattresses (see section 3.2). These would result in a minor short-term impact that would have permanent impact on any heritage values in the area.

Wharf No. 7 impacts

The proposed dredging works would have an impact on the former Campbells Cove Wharf No.7. The works would remove in situ piles, sections of cut piles and other timber structural remains associated with the former wharf.

The depth of the proposed dredging in the area of the former wharf would also remove material remains and unknown relics that are present below the current harbour bed. The total area that would be impacted would be 18 percent of the Wharf No. 7 site. The remainder of the Wharf site would remain undisturbed. This would include relics associated with the operation of the Wharf with vessels that berthed at the former Wharf.

This is not considered to be a major impact as the remainder of the site would remain unaffected including its key heritage values. A permit would be required from Heritage NSW prior to any construction works commencing.

Archaeological and other heritage impacts

There is not expected to be any additional impacts from dredging other areas of the berth pocket as no previous historic wharves or structures were located within this area prior to the land reclamation that took place in 1958 Previous dredging would have also removed any maritime archaeology that might have existed.

There are not expected to be any shipwrecks or related materials within the proposal footprint or surrounding area based on historical research.

The scour protection works is also not considered to have an impact as the proposed works would repair and add to the existing armour wall already present.

6.6.4 Safeguards and management measures

Table 33 lists the non-Aboriginal heritage safeguards and management measures that would be implemented to account for the impacts identified in section 6.6.3.

Table 33: non-Aboriginal heritage safeguards and management measures

Ref.	Impact	Environmental safeguard	Responsibility	Timing
32	Non-Aboriginal heritage	A permit under section 140 of the <i>NSW Heritage Act</i> would be obtained prior to the commencement of dredging and scour protection works.	Port Authority NSW	Pre-construction
33	Non-Aboriginal heritage	The remains of the wharf on the harbour bed would be recorded before starting construction to help understand the site formation processes associated with the demolition of the wharf.	Contractor	Pre-construction
34	Non-Aboriginal heritage	An archaeologist would inspect, and record elements associated with the timbers before their removal to better-understand the construction techniques used.	Contractor	Construction
35	Non-Aboriginal heritage	As part of the early works, and once the timbers on the harbour bed had been removed, a series of maritime archaeological test transects would be used to understand the potential for relics, patterning and dispersal of relics across the site. This information would be held as a record to support an application made under section 140 of the <i>Heritage Act 1997</i> , to secure permission to excavate or disturb land that would likely "result in the discovery, movement and/or destruction of [a heritage] relic". Dredging work would only be allowed to take place once the Heritage Council of NSW gives its permission under the Act.	Port Authority of NSW	Pre-construction

Ref.	Impact	Environmental safeguard	Responsibility	Timing
36	Non-Aboriginal heritage	If it is not possible to carry out the pre-construction investigations under safeguard 35 above, then the contractor would work with Port Authority of NSW and a heritage specialist to develop an agreed sampling program of the dredged sediment to ensure a representative sample is collected to record and recover any remaining.	Port Authority of NSW/ contractor	Construction
37	Non-Aboriginal heritage	A Standard Management Procedure for Unexpected Heritage Items would be followed as per Appendix B of Appendix F in the event of unexpected heritage items, skeletal remains, archaeological remains or relics are encountered. This would include an adequate stop-and-start work procedure and the need to engage a qualified heritage specialist to advise on the required action.	Contractor	Construction

6.7 Aboriginal heritage

This section describes the predicted Aboriginal heritage impacts. Appendix F contains a supporting technical report prepared by AECOM (2020).

6.7.1 Method

The assessment included a desk review of published records, data and literature, including the Aboriginal Heritage Information Management System (AHIMS), National Native Title Register (NNTR) and Register of Native Title Claims (RNTC) to confirm the likely presence of values in the local area. This was followed by a dive survey in February 2020 to confirm the potential for archaeology.

The assessment also referred to the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW (DECCW, 2010), Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW, 2010) and the draft code of Practice of Archaeological Investigations in NSW (DECCW, 2010).

6.7.2 Existing environment

Aboriginal history

Aboriginal Peoples have occupied the Sydney region for at least 36,000 years. The OPT is located within the traditional lands of the Gadigal People; a member of the Eora nation who referred to Circular Quay as 'Warrane'. Research has also identified that the Darug territory may have also extended to the coastline between Port Jackson and Botany Bay based on observations of early explorers and settlers.

Darug is believed to have been spoken in the area. Available historical records indicate that a wide range of marine and freshwater fauna were exploited by Darugspeaking peoples for food and other resources.

Any Aboriginal sites within submerged water are less likely to have survived as discussed in Table 34, which provides a summary of different Aboriginal site types and likelihood within the proposal footprint.

Site type	Description	Preservation potential	Likelihood
Open Artefact Sites	Objects susceptible to abrasion and translocation during slow and highly dynamic inundation.	 Moderate 	 Moderate
	Artefact scatter sites likely to be dispersed rather than being identified in situ.		

Table 34 Preservation potential by site type

Site type	Description	Preservation potential	Likelihood
Culturally modified trees	Unlikely to survive in marine conditions.	• Low	• Low
Shell middens	Only likely to survive rapid, low-energy inundation unless deeply buried in consolidated sediments prior to inundation.	• Low to moderate	 Moderate
Fish traps	Only fish traps constructed from stone would survive inundation, more likely to survive relatively intact in low-energy environs, e.g. estuarine.	• Low to moderate	• Low
Rock shelters	Moderately resistant to inundation, particularly in low energy environs.	• Moderate	• Moderate
Rock art sites	Engravings are unlikely to survive on soft sandstone where dynamic environs may result in rapid erosion.	• Low	•Low

Recorded items and artefacts

A search of the AHIMS database identified no registered Aboriginal sites within the proposal footprint. The closest site is an Open Artefact called Harrington IFS01 (#45-6-3762) located approximately 280 m south west inland of the proposal footprint. The location of recorded sites items within the surrounding area to the proposal footprint is shown on Figure 15.

A search of the NNTR and RNTC confirmed that there are no current Native Title listings or claims within the City of Sydney LGA.



Source: AECOM 2020, Maritime Archaeological and Indigenous Heritage Assessment and Statement of Heritage Impact

Figure 15 AHIMS Search results

Archaeology

Despite the known Aboriginal history of the local area, there is enough evidence that the proposal footprint has been subject to disturbance from historic ship building activities and land reclamation. This means there is low archaeological potential. This confirmed during the 2020 surveys, which did not identify any features or artefacts.

6.7.3 **Potential impacts**

There is a low potential for Aboriginal sites to be within the proposal footprint due to previous activity and dredging. Should unknown archaeology be discovered during works a permit maybe required (see section 6.7.4 below).

6.7.4 Safeguards and management measures

Table 35 lists the Aboriginal heritage safeguards and management measures that would be implemented to account for the impacts identified above.

Ref.	Impact	Environmental safeguard	Responsibility	Timing
38	Aboriginal heritage	A Standard Management Procedure for Unexpected Heritage Items would be followed as per Appendix B of Appendix F in the event of unexpected heritage items, skeletal remains, archaeological remains or relics are encountered. This would include an adequate stop-and-start work procedure and the need to engage a qualified heritage specialist to advise on the required action.	Contractor	Construction
39	Aboriginal heritage	Should any Aboriginal objects be identified at any stage of the project, an Aboriginal Heritage Impact Permit (AHIP) maybe required under Section 90 of the <i>National</i> <i>Parks and Wildlife Act 1974</i> . This would be obtained in accordance with the requirements of the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a).	Contractor and Port Authority	Construction

Table 35: Aboriginal heritage safeguards and management measures

6.8 Traffic, transport and access

This section describes the proposal's predicted maritime and land-based traffic, transport and access impacts.

6.8.1 Method

The assessment considered how the work methods, program, expected vehicle movements, and required traffic and navigational management controls (see section 3.4) would temporarily impact:

- Traffic network performance on the key roads in the area.
- All modes of public, private and active transport.
- Public road and private property access.
- Maritime commercial, public and recreational traffic.
- Ferry services and timetables.

Only construction impacts have been considered as the operation of the OPT would remain unchanged.

6.8.2 Existing environment

Overseas passenger terminal

Land transport and parking

The OPT is accessed from Circular Quay West Road. This is a private road owned by Port Authority of NSW that leads off George Street and Hickson Road. Vehicular access to Circular Quay West Road is controlled through a gatehouse located at the entrance of Circular Quay West.

During cruise ship days access is restricted and parking is not available. Vehicular access to Circular Quay West Road during this time is restricted to delivery supplies for the ships and restaurants, service cars, taxis and private buses, other cruise related traffic and Port Authority of NSW staff.

On non-cruise ships berthing days vehicular access and parking is provided and open to the public. There are 120 spaces available that are privately managed through Wilson Parking.

The OPT is pedestrianised around the terminal building and public access is also provided along the quay adjacent to the proposal footprint. This leads to Campbells Cove and Walsh Bay. Events are held in the area throughout the year; including Vivid, Bastille festival, Sydney Harbour 10km race, and Blackmoore's running festival. These events attract large numbers of visitors. However, due to the current global Covid-19 pandemic these events will not be occurring in 2020 and currently their future is yet to be confirmed.

Maritime transport in Circular Quay

The OPT wharf is used by cruise ships all year round. The busiest period is over the summer months. Campbells Cove is adjacent to the wharf to the north and has three berths; one on each side of a jetty and one on a floating pontoon on the southern shore. The jetty berths are used by visiting superyachts and sailing vessels that offer harbour cruises. The pontoon berth is used by water taxis and Transport for NSW as an overflow berth. The jetty and pontoon berths are managed by Transport for NSW.

There is a mooring dolphin located in Campbells Cove that is used by larger cruise ships when berthed at the OPT. When in use, access to Campbells Cove by other vessels remains open but is partially restricted due to the cruise ship mooring lines.

Harbour City Ferries operates throughout the harbour and the closest wharves are at Circular Quay. The ferries operate from Circular Quay from 5.30am to 00.20am Monday to Friday, and 6.20am to 00.20am Saturday and Sunday. Captain Cook Ferries also operate a service starting from 7.15am to 6.40pm from Circular Quay.

To the south of the site at the location of the enabling works for the sheet pile wall (see Appendix A) is located the Commissioners Steps which are used by commercial vessel access e.g. water taxis and ferries, to pick up and drop off passengers. The access is regulated by Transport for NSW and must be booked prior to use.

A jet boat company (Thunder Jet) operates within the harbour during the day between 11am and 4pm.

Transport movements

Glebe Island is used by dry bulk for cargo ships and for various ad hoc port related activities as an ancillary site by Port Authority of NSW. There are four commonly used berths. Glebe Island Berth 1 and Berth 2 are in Johnstons Bay. They serve the unloading/loading of dry bulk goods and other port-related purposes such as laying-up and decommissioning of shipping vessels. Glebe Island Berth 7 and Berth 8 are in White Bay. They are used for unloading and loading of dry bulk shipping vessels (sugar, cement and gypsum). The compound would likely be located within the area of Berth 2, which is also the general site for the upcoming construction of the Glebe Island Multi-user facility.

6.8.3 **Potential impacts**

Overseas passenger terminal

Land transport

The proposal would result in a minor temporary increase in traffic during construction from workers, deliveries of equipment and concrete trucks. Peak construction traffic would be during the installation of scour protection where around 20 concrete trucks would access the OPT on a typical shift for Option A. If Option B is undertaken, articulated concrete mattresses would be cast at Glebe Island and brought to the OPT site by barge which will reduce construction traffic at the OPT.

The additional traffic movements would have a negligible effect on the existing road network. Importantly, there would be no construction traffic movement while cruise ships are at berth, should this resume during the term of the works.

The area along the OPT quay adjacent to the proposal footprint would be closed to the public, which would temporarily restrict pedestrian movement in this area. This would have only a minor impact on pedestrians walking along the harbour to Campbells Cove when works take place. This would be the inconvenience of using the available alternative routes such as Circular Quay West Road and George Street. These alternatives would mean pedestrian access would be maintained and the additional travel (walking) times would be marginal.

Works would be coordinated during key events, should they resume, to ensure adequate pedestrian access is maintained.

Onsite car parking is not expected to be notably impacted as a maximum of 10 workers would be present onsite during construction. They would only park onsite during the works (e.g. when there was not a cruise ship berthed) otherwise they would park offsite at any number of public parking areas in the vicinity or at Glebe Island.

Maritime transport in Circular Quay

Construction of the proposal would require a maritime navigation exclusion zone to be set up around the works area. A similar exclusion zone applies around the berthed cruise ships, as such, there is expected to be no disruption to the ferry services or for other vessel activities that take place in Circular Quay.

A Marine Works Management Plan (MWMP) would be developed by the contractor in consultation with the Harbour Master, Transport for NSW (Maritime) and other relevant stakeholders. The stakeholders would define specifics such as exclusion zones, methods of marking the zones, clearance distances, mooring plans, communication protocols, emergency and incident response procedures, contact details of all parties and responsible persons, and transit routes. The MTMP would be approved by the Harbour Master in advance of the works commencing. Harbour Master approval will also be required under Clause 67ZN of the Ports and Maritime Administration Regulation 2012 (see Table 12) prior to any disturbance of the seabed.

There would be no change in access to the jetty berths in Campbells Cove used by visiting superyachts, commercial sailing vessels and water taxis. During works access would be maintained as far as practicable. Transport for NSW (Maritime) would be consulted with regards to access impacts and agreed management measures would be included in a Marine Traffic Management Plan.

During the enabling works for the sheet pile wall installation, a crane mounted barge would install sheet piles in front of the Commissioners Steps. This area would be temporarily restricted for commercial vessels accessing the Commissioners Steps during these works. Prior to works Transport for NSW would be notified of restriction to access during work times.

During the operation of the OPT, cruise ships would continue to berth within the same location. The arrangement of cruise ships berthing would not change and therefore there would be no impact on surrounding ferry wharves within Circular Quay.

Transport movements

The movement of around four vessels between Circular Quay and either Glebe Island or the offshore disposal ground (see section 3.4.1) who have negligible influence in the context of the many commercial, recreational, tourist and other vessel movements that occur on Sydney Harbour each day. It would have no conflict on regular and timetabled services. All vessel movements through the harbour would need to comply with the standard safety and transport requirements set by the Harbour Master and Port Authority of NSW.

6.8.4 Safeguards and management measures

Table 36 lists the traffic, transport and access safeguards and management measures that would be implemented to account for the impacts identified in section 6.8.3.

Table 36: traffic, transport and access safeguards and management measures

Ref.	Impact	Environmental safeguard	Responsibility	Timing
40	Land transport and parking	A Traffic Control Plan would be prepared and implemented for the OPT in accordance with the Traffic Control at Work Sites manual (Roads and Maritime, 2018) and the Australian Standard 1742.3 (Manual of uniform traffic control devices, 2019). This would involve items such as installing appropriate wayfinding signage for alternative transport options where necessary. The Traffic Control Plan would also include pedestrian access management at the OPT and provision of diversion signs, and safe access around the OPT to avoid construction works.	Contractor	Pre-construction/construction
41	Land transport and parking	The Traffic Control Plan would be developed in consultation with and to the satisfaction of Port Authority of NSW.	Contractor	Pre-construction/construction
42	Land and water transport	Equipment and materials would be transported to site via boat and/or barge when possible to reduce land transport and impacts to local road networks.	Contractor	Construction
43	Water transport	Harbour master approval would be obtained under Clause 67ZN of the Ports and Maritime Administration Regulation 2012 prior to any disturbance of the seabed.	Contractor	Pre-construction/construction
44	Water Transport	Transport for NSW would be notified prior to enabling works for access restrictions to Commissioners Steps.	Contractor	Pre-construction

Ref.	Impact	Environmental safeguard	Responsibility	Timing
45	Marine works management	A Marine Works Management Plan (MWMP) would be developed by the contractor in consultation with the Harbour Master, Transport for NSW (Maritime) and other relevant stakeholders. The stakeholders would define specifics such as exclusion zones, methods of marking the zones, clearance distances, mooring plans, communication protocols, emergency and incident response procedures, contact details of all parties and responsible persons, and transit routes. The MWMP would be approved by the Harbour Master in advance of the works commencing. Harbour Master approval will also be required under Clause 67ZN of the Ports and Maritime Administration Regulation 2012 prior to any disturbance of the seabed.	Contractor	Pre-construction/construction
46	Water transport	 A Marine Traffic Control Plan would be developed and implemented in consultation with the Harbour Master, Transport for NSW and other relevant stakeholders to accommodate the works, vessel movements and safety requirements. This plan would: Ensure that vessel speeds would comply with the Harbour Master requirements within Circular Quay and Sydney Harbour. Vessels within the second state of the second state of the second state. 	Contractor	Pre-construction/construction
		proposal footprint would also be restricted in speed.		
		Sydney Harbour & Botany Bay (Port Authority of NSW, 2015).		
		• Include the requirement of the maritime navigational exclusion zone established before starting construction in accordance with the Harbour Master approval.		
		• Include the required methods of communication with the Harbour Master to manage the additional vessel movements within the Shipping Channels. Shipping schedules would be forwarded and agreed in advance.		

6.9 Spoil, dredging and waste management

This section describes the spoil, dredging and waste management impacts from carrying out the works.

6.9.1 Method

The assessment considered the impacts associated with:

- Sediment spoil from dredging.
- The proposal's ability to respond to waste management and resource conservation plans, policies and guidelines.

The basis of assessment was to consider the hierarchy of avoiding waste generation and primary resource use in favour of reduction, reuse and recycling, consistent with the NSW *Waste Avoidance and Resource Recovery Act 2001*.

The sediment spoil would either be disposed on land (Option 1) or offshore (Option 2, see section 3.3.5). As identified in the sediment testing (see section 6.1.2).

6.9.2 Existing environment

Private contractors typically deal with recovered and recycled materials in Sydney. There are also licenced contractors who deal with forms of controlled and restricted wastes that need transporting to licenced facilities.

6.9.3 **Potential impacts**

Sediment generation

Approximately 20,000 m³ of dredged material would be generated over 10 weeks (see section 3.3.1). As discussed in section 6.1, there is the potential for contaminants to be released into the marine environment during dredging, handling, and transportation and transfer mismanaged; especially when lifting the materials to land Glebe Island (see section 1.1).

There is also the potential for overspill while the materials are in transit either to Glebe Island or the Sydney Offshore Spoil Ground (see section 1.1). A Sediment and Water Quality Management Plan would be used to deal with this risk.

If disposed on land (see section 3.3.5), the dredged sediment would be kept on a barge while a polymer is added to reduce its water content. This would result in bulking the material (e.g. its overall volume would increase). Where possible prior to removal of sediment, the material would be waste classified and if ASS is present based on sampling data and confirmation from NSW EPA that the material meets general solid waste criteria (see Safeguard 48).

The sediment would also be tested to confirm its final waste classification and ASS content. This would ensure the dredged sediment would be disposed of at an appropriately licenced waste facility.

Under either disposal option (see section 1.1), there would be the risk of material over spill from the barges while in transport. Works would therefore be managed under a Sediment and Water Management Plan to reduce impacts (see Section 6.1).

Other waste generation and management

Other wastes would be limited to small quantities of common materials including small amounts of wood, paper, and metal, surplus building and packaging materials (e.g. pallets, crates, cartons, plastics, wrapping materials). It would also include small amounts of waste chemicals and oils (e.g. oil absorbent materials, oily rags, cartons) and domestic and food waste.

Landside ancillary facilities would be contained within a small compound on the OPT site that would include a small shipping container to store equipment and machinery. No significant landside storage of materials is anticipated at the OPT. During installation of mattresses for both options (see Section 3.3.6), concrete would be trucked to site pre-mixed where it would be pumping into the mattresses.

Materials would generally be barged to site, including fuels, oils and other required liquids which would be stored in bunded containers on the vessels. All waste removed from the site would be transferred by a licenced contractor to a licenced facility. Some materials and fuels would also be stored at the compound on Glebe Island within bunded containers.

6.9.4 Safeguards and management measures

Table 37 lists the spoil, dredging and waste management safeguards and management measures that would be implemented to protect the aquatic environment to account for the impacts identified in section 6.9.3.

Table 37: spoil, dredging and waste management safeguards and management measures

Ref.	Impact	Environmental safeguard	Responsibility	Timing
47	Waste	The SWMP would include measures to ensure the dredged material is correctly stored in the barges when they are being transported either to Glebe Island or offshore to limited overspill impacts.	Contractor	Pre-construction/ construction
48	Waste	Waste management, littering and general tidiness would be monitored during routine site inspections.	Contractor	Construction
49	Waste	Appropriate measures to avoid and minimise waste associated with the project should be investigated and implemented where possible.	Contractor	Construction
50	Waste	Waste would be classified before being disposed offsite to an appropriately licenced facility in accordance with Waste Classification Guidelines: Part 1 Classifying Waste (DECCW, 2014). Where necessary, this would include sampling and analysis. Where possible the material to be dredged will be classified prior to dredging based on sampling data and confirmation from NSW EPA that the dredged material meets general solid waste criteria. A waste classification report would include an unexpected finds protocol requiring further sampling and analysis should this occur.	Contractor	Construction
51	Waste	The dredged sediment would be kept on a barge while a polymer is added to reduce its water content if it is being disposed on land. The material transfer between the barge and quayside would be carefully managed to limit spill back into the marine environment. A pre and post hydrographic survey would be carried out to ensure the overall depth has not been impacted. The difference would be confirmed with Port Authority of NSW and if unacceptable additional levelling or dredging would be needed to prevent future operational performance.	Contractor	Construction
6.10 Hazards and risks

This section describes the potential hazards and risks associated with the proposal.

6.10.1 **Method**

The assessment considered hazards and risks relating to the provisions of the NSW Work Health and Safety Act 2011.

6.10.2 **Existing environment**

Since 2011, cruise ships have mainly berthed at the terminal under Azipod and bow thruster power only, rather than with the assistance of tugs. Recent hydrographic and diver surveys identified that scouring is occurring at both the southern and northern end of the OPT berth pocket. There is also evidence of loss of the existing scour protection, deposition of large rocks and slumping of an embankment into the berth pocket at the southern end due to scouring.

The observed scour and accretion can be attributed to:

- Significant increase in vessel size and changes in vessel power and berthing • configurations since the construction of the berth in 1959.
- Use of Azipods and thrusters since 2011.

The identified scour and accretion issues pose potential hazards to vessel operations. This includes the potential for further decreasing the under-keel clearance for incoming cruise ships. There is a need for safe, efficient and reliable berthing to ensure the ongoing operation of the OPT

The OPT is currently managed in accordance with a hazards and safety management plan implemented by Port Authority of NSW.

6.10.3 **Potential impacts**

The following hazards and risks would be associated with the proposal:

- Construction materials, wastes, and other objects have the potential to fall from the vessels and landside works during construction. This has the potential to cause water pollution and risk to human health, including navigational safety risks for other boats in Circular Quay, Sydney Harbour and Glebe Island.
- Physical injury to construction workers and public walking within the area due • to various hazards and risks associated with the construction activities.
- Extreme weather resulting in damage to vessels involved in dredging and piling • works.
- Disturbance, loading and transport of contaminated sediment through Sydney • Harbour to Glebe Island potentially resulting in a pollution risk from an accident or spillage.
- Loss of containment of other polluting materials (e.g. oils and diesels) from • construction vessels.

6.10.4 Safeguards and management measures

Table 38 lists the hazard and risk safeguards and management measures that would be implemented to account for the impacts identified in section 6.10.3. These supplement the other safeguards and management measures described above to mitigate against some of the above hazards.

Ref.	Impact	Environmental safeguard	Responsibility	Timing
52	Hazards and risks	Marine spill kits would be kept within the construction and compound area.	Contractor	Construction
53	Hazards and risks	Emergency equipment such as first aid kits and flotation devices would be kept within the construction and compound area.	Contractor	Construction
54	Hazards and risks	Work Safety Method Statements or similar would be used to manage any health and safety risks associated with the works.	Contractor	Construction
55	Hazards and risks	A Safety Plan would be put in for extreme weather conditions this would involve measures to safely close-down the site, secure/remove all equipment and machinery and demobilise offsite.	Contractor	Construction
56	Hazards and risks	Barge loading activities would be closely monitored.	Contractor	Construction

 Table 38: hazard and risk safeguards and management measures

6.11 Odour

This section describes the potential odour impacts associated with the proposal.

6.11.1 Method

A qualitative review of the duration and method of dredging activity and the proximity of sensitive receivers has been carried out to determine potential impacts.

6.11.2 Existing environment

The existing odour environment at the OPT is influenced by the harbour and marine transport activity, as well as commercial kitchens in nearby restaurants and bars.

The prevailing wind direction in the area is north-east (see section 6.1.2). Wind conditions during dredging would affect any generated odour.

There are limited sensitive residential receivers within near the dredging activity (see section 6.3.2); the closest of which is at the Rocks on George Street, about 160 m from the OPT site. Given the location of the OPT in Circular Quay, there would be transient sensitive receivers, such as tourists and locals using the numerous local commercial and recreational facilities.

6.11.3 **Potential impacts**

Overseas passenger terminal

During dredging, there would be the potential for organic matter and hydrocarbons in the sediment to become odorous on contact with the air (see section 6.1.2 for a summary of sediment chemistry). This has the potential to generate odour impacts near the dredging activity and while the material is being transported. The amount of odour generated would depend on several factors including the content and composition of the dredged materials, the dredging rate and loading times, and the prevailing wind direction and strength.

If dredging takes place under prevailing wind directions, any odour impacts would be most likely experienced by receivers to the south-west of the OPT, including recreational areas within Circular Quay.

Odour maybe generated periodically over the planned 10-week dredging program (see section 3.3.1). Once barges are fully loaded, they would move away from the area of Circular Quay and travel towards Glebe Island or the Sydney Offshore Spoil Ground. As any odour would be associated with the dredged materials, any potential impact would likely end once the material is removed from Circular Quay.

Transport movements

Odour impacts are also not expected when the dredged materials are being transported either to Glebe Island or offshore. Any perceptible odours from people in the vicinity of the material being transported would last for a very short time. Also, the wetting of the dredged material to prevent the generation of ASS (see section 6.1.3) would help reduce odour emissions.

6.11.4 Safeguards and management measures

Given the low potential for odour impacts, no specific odour safeguards or management measures are required for the proposal. However, the SWMP proposed under section 6.1 would include controls over the generation of acid sulfate soils from the dredged material to ensure the potential for odour impacts are managed.

6.12 Other impacts

The proposal is expected to have a negligible to minor impact in relation to:

- Air quality
- Greenhouse gasses
- Climate change adaptation.

The proposed works would generate negligible emissions from machinery. The number of heavy vehicles and plant would not be significant enough to generate a negative impact on air quality or have a significant contribution to local greenhouse gas emissions.

Works to install scour protection would contribute to improving the resilience of the OPT berth and quay wall against the impacts of climate change.

6.12.1 Existing environment and potential impacts

This section describes existing environment and potential impacts associated with the other environmental aspects where there is expected to be a negligible to minor impact. These are outlined in Table 39 below.

Environmental factor	Existing environment	Potential impacts
Air quality	The nearest Environment, Energy and Science air monitoring station to the proposal site is Cook and Phillip Sydney. This is categorised as part of the Sydney central-east region and has been temporarily set up since early September 2019. A review of the air quality data for month of November 2019 ⁵ indicates the air quality is generally good-to-poor, considering the Air Quality Index (AQI) rating range of 34-149. Poor air quality is measured from 100 to 149 AQI. The poor AQI for November however is not representative of a typical month due to the significant bushfires occurring within New South Wales.	Temporary impacts may occur throughout construction from equipment and construction vehicle emissions. The potential for dust generation from the works is considered negligible as the dredged sediment would be waterlogged and would be kept damp, as required, during transport management.

Table 39: other impacts

⁵ At time of writing, November 2019 was the most current month for which a full set of data was available.

Environmental factor	Existing environment	Potential impacts
Greenhouse gas	Greenhouse gas emissions remain a point of State and National policy. Emissions within the area of the OPT and the Rocks are dominated by vehicle movements emissions from vessels using Circular Quay.	Construction of the proposal would result in very minor greenhouse gas emissions via consumption of materials and use of required plant and equipment.
Climate change adaptation	The long-term use of the OPT as a cruise ship terminal is expected to continue.	The proposal includes climate change adaptation in its design by including protection from hydraulic impacts on the quay wall from scour protection, which will also improve the resilience of the structure from climate change related impacts.

6.12.2 Safeguards and management measures

Table 40 lists the safeguards and management measures that would be implemented to account for the impacts identified in section 6.11.1.

 Table 40: other safeguards and management measures

Ref.	Impact	Environmental safeguard	Responsibility	Timing
57	Air quality	The CEMP would consider and address management measures for air quality during construction. The plan would outline procedures for work during various weather conditions.	Contractor	Construction

6.13 Cumulative impacts

Cumulative impacts relate to any combined impact resulting from multiple individual sources. These sources can occur in the present or future in comparison to the construction and operation of the proposal.

The consideration of cumulative impacts is required to assess this combined impact in the context of the region.

6.13.1 Study area

The study area included a search of significant development within 500-metres of the proposal footprint.

6.13.2 Past, present and future projects

The following databases were searched to identify any projects that may result in a cumulative impact with the proposal:

- Department of Planning, Industry and Environment major projects register
- Sydney and Regional Planning Panels Development Assessment register
- Infrastructure NSW projects
- City of Sydney development application register
- Key agency development including focussing on Transport for NSW and Sydney Trains.

Most projects involved minor alterations or would not generate impacts that would significantly affect the surrounding area by the time the proposed works are carried out. As such, only the projects outlined in Table 41 were considered to have the potential to have a cumulative impact in combination with the proposal.

Table 41: present and future projects

Project	Construction impacts	Operational impacts			
Overseas passenger terminal site	Overseas passenger terminal site				
Sydney Opera House Concert Hall upgradeThe upgrade involves the renovation of the ConcertHall in the Sydney Opera House. This includesimplementing new theatre machinery and stagingsystem.The renewal works are expected to begin in 2020.	Construction impacts would be limited to Sydney Opera House staff and patrons only. As the works focus on the interior of the building, it is unlikely that there will be impacts to visitors of the wider Circular Quay. The number of visitors to the area may be reduced during this time as the Concert Hall will be closed. The delivery of construction materials and presence of heavy vehicles near the Sydney Opera House may impact the traffic and accessibility of the area.	No operational impacts are anticipated.			
Walsh Bay Arts & Culture Precinct Construction on Wharf 4/5 began in 2018 and involved refurbishing the arts facilities, introducing new retail options and redesigning the general facilities. Pier 2/3 works commenced in 2019 and involves constructing new arts facilities and performance venues.	The works will be taking place in the wharf area in Walsh Bay, with most of the construction focused on the interior of the buildings. The number of visitors to the area may be reduced during this time as some of the theatres will be closed. Based on the timeframe, works won't significantly overlap with the proposal. The delivery of construction materials and presence of heavy vehicles near Walsh Bay may impact the traffic and accessibility of the area.	No operational impacts are expected.			
The precinct is expected to open mid-2020.					

Project	Construction impacts	Operational impacts
Circular Quay Precinct Renewal NSW Government propose to upgrade Circular Quay ferry wharves. The renewal works are expected to take place in the future and not within the proposal programme	Works would be within circular Quay, and construction impacts would include disruption to land and water-based traffic. The delivery of construction materials and presence of heavy vehicles would impact local traffic. There would be visual amenity and socio-economic impacts from noise, dust and closure of parts of the walkway. However, as the construction of the upgrade is not due to commence during the timing of the proposal there would be no cumulative construction impacts	No operational impacts are expected.
Glebe Island		
Western Harbour Tunnel and Warringah Freeway Upgrade Upgrades to the Warringah Freeway and new tunnel crossing of Sydney Harbour. Works would also include improved performance on the Anzac Bridge Not yet approved. Works are expected to commence late 2020.	The works would generate traffic disruption impacts, marine traffic impacts and noise and air quality impacts on nearby residents.	No negative operational impacts are expected but would provide a positive impact for commuter travel time and connection across Sydney.
Glebe Island Concrete Batching Plant and Aggregate Handling Facility A new aggregate and concrete handling building facility adjacent to the proposed multi use facility proposal Not yet approved – construction start unknown	The works would generate traffic disruption impacts, noise and air quality impacts on nearby residents.	The proposal would likely have visual, air quality and noise impacts on nearby residents

Project	Construction impacts	Operational impacts
Multi-User Facility (by Port Authority) A new multi-use facility at Glebe Island for storage of dry construction materials adjacent to berths 1 and 2 and the Proposal.	Construction works would be within Glebe Island adjacent to the nominal Proposal compound. Construction impacts would include disruption to traffic and delays for commuters. Works would also generate dust and noise impacts on residents adjacent to the site and workers on Glebe Island.	Key operational impacts are related to visual effects, noise and air quality.
Works are expected to commence mid-2020 and be operational in mid-2021.		
WestConnex: Rozelle InterchangeThe third stage of WestConnex will link the M4 atHaberfield to the New M5 Motorway at St Peters.This comprises a new tunnel and interchange atRozelle Bay.Tunnelling commenced in the 1 st quarter of 2020and works will continue until 2023.	Works would mainly be within the Rozelle rail yards site. Construction impacts would include disruption to traffic and delays for commuters. Works would also generate dust and noise impacts on residents adjacent to the site and workers in the area.	No negative operational impacts are expected but would provide a positive impact for commuter travel time and connection across Sydney.
Sydney Metro West The new underground metro will connect Greater Parramatta with the Sydney CBD. The metro will extend under Sydney Harbour, through to new stations in the CBD, including a station in the Bays Precinct near the White Bay Power Station.	Construction impacts associated with Sydney Metro West are expected to comprise traffic impacts from heavy vehicles, noise and dust effects.	No operational impacts are expected. Once in operation benefits would be provided in high speed public transport across Sydney.
Works are expected to commence late 2020, largely outside the proposal programme.		

6.13.3 Potential impacts

Table 42 outlines the possible cumulative impacts. Proposal activities at Glebe Island are being undertaken under an existing 2013 Part 5 approval.

 Table 42: potential cumulative impacts

Environmental factor	Construction impacts
Socioeconomic	There are unlikely to be any cumulative socio-economic impacts as a result of the proposal and the other projects in the vicinity of the OPT due to the short program length and limited scale of the planned works.
Traffic and transport	There are unlikely to be any significant cumulative traffic and transport impacts as a result of the proposal and the other projects in the vicinity of the OPT, given the nature of the other projects and the minor amount of construction related traffic associated with the proposal due to the short program length and limited scale of the planned works.
Air quality	The Proposal would have negligible impacts on air quality and dust generation and therefore cumulative effects on air quality from other projects would be unlikely.
Noise	There are unlikely to be any significant cumulative noise impacts as a result of the proposal and the other projects in the vicinity of the OPT.

6.13.4 Safeguards and management measures

There are unlikely to be any significant cumulative impacts as a result of the proposal. Safeguards and management measures are therefore not considered necessary.

7 Environmental management

This Chapter describes how the proposal would be managed to reduce potential environmental impacts throughout detailed design, and construction. A framework for managing the potential impacts is provided. A summary of site-specific environmental safeguards is provided, and the licence and/or approval requirements required prior to construction are also listed.

7.1.1 Environmental management plans

Several safeguards and management measures have been identified in the REF to minimise adverse environmental impacts, including social impacts, which could potentially arise because of the proposal. Should the proposal proceed, these safeguards and management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A construction environmental management plan (CEMP) will be prepared to describe the safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by Port Authority of NSW before starting any onsite work. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements.

7.2 Summary of safeguards and management measures

Environmental safeguards and management measures outlined in this REF would be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed work on the surrounding environment. The safeguards and management measures are summarised in Table 43. In addition to the measures below the contractor would need to secure:

- Harbour Master approval under Clause 67ZN of the Ports and Maritime Administration Regulation 2012 (see Table 12) prior to any disturbance of the seabed.
- An excavation permit under section 140 of the NSW Heritage Act 1977.
- An environmental protection licence under Part 3.2 of the NSW *Protection of the Environment Operations Act 1997* would be required only for Option 1 (land disposal.

Offshore disposal under Option 2 would take place in Commonwealth Waters. The Australian Government Department of Agriculture, Water, and Environment (DAWE) would need to permit the ocean disposal under the *Environment Protection (Sea Dumping) Act 1981*.

Table 43: Summary of site-specific environmental safeguards

Ref	Impact	Environmental safeguard	Responsibility	Timing	
General	General				
A	General	 A Construction Environmental Management Plan (CEMP) would be prepared prior to construction. This would provide the safeguards and measures identified below and address pollution, contamination and disturbance to receivers that may arise during construction. As a minimum the CEMP would address the: Any requirements associated with statutory approvals Details of how the project will implement the identified safeguards outlined in the REF Issue-specific environmental management plans Roles and responsibilities Communication requirements Induction and training requirements Procedures for monitoring and evaluating environmental performance, and for corrective action Reporting requirements and record-keeping Procedures for emergency and incident management Procedures for audit and review. The endorsed CEMP will be implemented during the undertaking of the activity. 	Contractor	Pre- construction	
В	General	All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least 10 working days prior to commencement of the activity. The contractor would provide the information needed to support any notification and consultation requirements.	Port Authority of NSW/ contractor	Pre- construction	
С	General	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular	Contractor	Pre- construction	

Ref	Impact	Environmental safeguard	Responsibility	Timing
		"toolbox" style briefings.		
1	Sediment and water	A Sediment and Water Management Plan (SWMP) would be prepared and implemented as part of the CEMP. The SWMP would outline all reasonably potential risks relating to sediment erosion and water pollution and describe how to address these risks throughout construction.	Contractor	Pre- construction/ construction
2	Sediment and water	 The SWMP would include turbidity monitoring requirements that would be implemented before starting the dredging works and maintained throughout. The plan would involve the following steps and activities: Develop and submit a Water Quality Monitoring Plan to Port Authority of NSW at least one month before deploying instrumentation. Establish turbidity monitoring system to capture (baseline) data before starting work and while the work is taking place. As a minimum the system would comprise monitoring equipment, buoys, anchoring system, data management, timing, quality assurance and an equipment failure plan. Install and commission the water quality monitoring instrumentation at least 10 days before starting dredging. Operate the equipment for up to 14 days or as agreed with Port Authority of NSW after the completion of post dredge clearance survey. Fit a water sensor at each monitoring location to record turbidity. The sensors would be installed approximately 1 m below the surface. Deploy twin turbidity sensors at each monitoring location to allow the collection of two independent data sources. The two data sources shall undergo automatic processing noting that: Any difference in turbidity readings is greater than 20%, then the minimum value shall be used. Calibrate and clean water quality sensors as required, just prior to dredging and no longer than two-week intervals. Ensure the water quality loggers provide continuous logging of data, with anti-fouling guards and sensor wiping apparatus to prevent interference to sensors from marine growth. Carry out continuous water quality monitoring for each location and data shall be fed live onto a 	Contractor	Pre- construction/ construction

Ref	Impact	Environmental safeguard	Responsibility	Timing
		 secure website and processed for real-time viewing by key project personnel and Port Authority of NSW. Ensure the water quality monitoring system provides automatic instantaneous notifications to identify when the water quality thresholds are met or exceeded. Controls for sediment and rock debris. Controls to avoid concrete pour spills. Oil/fuel/chemical storage and spill management. Machinery and engine maintenance schedule to minimise risk of oil/fuel leakage. Response for accidental waste/material overboard (e.g. construction materials fallen into harbour). 		
3	Sediment and water	 Turbidity limits would be in accordance with Table 3.3.3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality Volume 1 (ANZECC, 2000) and (in the absence of local limits) the relative increase criteria is set out under Turbidity Water Quality Standards Criteria Summaries; A Compilation of State/Federal Criteria (USEPA, 1998) where relative to background concentrations the following would be achieved: <i>Seven-day rolling average criterion</i>: no more than a 5 nephelometric turbidity units (NTU) increase <i>24-hour rolling average criterion</i>: No more than a 10 NTU increase <i>Instantaneous criterion</i>: No more than a 10% increase when background concentrations are above 50 NTU or above. 	Contractor	Pre- construction/ construction
4	Sediment and water	 Should the monitoring record an exceedance of the instantaneous criterion or detect an abnormal reading at the 'near field' monitor then: Dredging works and any water discharge would stop Work would only recommence once the near-field readings had stabilised/normalised over a 30-minute period and the there was also no exceedance of the instantaneous criterion for the same period. 	Contractor	Pre- construction/ construction

Ref	Impact	Environmental safeguard	Responsibility	Timing
5	Sediment and water	 Should the monitoring record an exceedance of the 24-hour or seven-day rolling average criteria then: Dredging would stop if there were three exceedances of either criteria within a 24-hour period. Work would only recommence once limits had dropped to below the associated criteria relative to the rolling average. 	Contractor	Pre- construction/ construction
6	Sediment and water	A silt boom would be installed around the backhoe dredger bucket when dredging the harbour bed. The boom would only be removed when dredging work is complete or if required for maintenance once the sediment concentrations in the water column inside the silt boom had dropped to below the 24-hour rolling average criterion described in safeguard 3 above.	Contractor	Construction
7	Sediment and water	A silt boom would also be placed around the vessel when unloading materials onshore if the option is taken to dispose of the material on land via Glebe Island. The material transfer between the barge and quayside would be carefully managed to limit any transfer loss into the marine environment.	Contractor	Construction
8	Sediment and water	An Acid Sulfate Soil Management Plan (ASSMP) would be prepared in line with the requirements of the Acid Sulphate Soils Management Advisory Committee Guidelines (ANZECC/ARMCANZ 2000) and implemented as part of the CEMP. Sediment would be kept damp to reduce potential oxidisation. This includes during the period when the sediment would be temporarily stored at Glebe Island or transported offsite. Sediment would be monitored during transit. Where required the sediments would be sprayed with sea water and kept moist to prevent drying out. It would also include the need for adequate sampling and testing prior to disposal in line with the wider requirements of safeguard 50 below to classify waste before disposal in accordance with Waste Classification Guidelines: Part 1 Classifying Waste (DECCW, 2014). Where possible the material to be dredged will be classified prior to dredging based on sampling data and confirmation from NSW EPA that the dredged material meets general solid waste criteria.	Contractor	Detailed design/pre- construction

Ref	Impact	Environmental safeguard	Responsibility	Timing
9	Sediment and water	Weather forecasts would be frequently checked during construction. Should severe weather be forecasted, works would stop, and all equipment and materials would be removed from the construction area or secured.	Contractor	Construction
10	Water quality	A Spill Management Plan would be prepared, implemented as part of the CEMP and communicated to all staff working on site. Any spill, whether it occurred in water or on land and subsequently entered the water, must be immediately reported to Sydney Vessel Traffic Service (VTS). Aquatic spill kits are to be kept on site during construction.	Contractor	Construction
11	Water quality	All equipment and machinery would be maintained in good condition and regularly inspected visually for leaks.	Contractor	Construction
12	Water quality	Any fuels or chemicals stored on Glebe Island, at the OPT or on barges, would be stored in a bunded area to prevent any chemical leaks or spills entering the water.	Contractor	Construction
13	Water quality	Work involving barges and piling should take place during calm conditions and at night where possible to minimise scouring and other impacts.	Contractor	Construction
14	Aquatic biodiversity	 A Marine Ecology Management Plan would be prepared as part of the CEMP. This would include, but not limited to, measures relating to the following activities: Aquatic fauna management Biological hygiene (e.g. prevention of noxious species spreading on and off site) 	Contractor	Pre- construction
15	Biodiversity	If a previously unidentified threatened aquatic species is observed in the proposal footprint during construction works would temporarily stop until a suitably qualified expert has advised that works can recommence.	Contractor	Construction

Impact	Environmental safeguard	Responsibility	Timing
Biodiversity	Work would stop if large aquatic fauna is observed nearby.	Contractor	Construction
Biodiversity	Gradual start-up piling to allow undetected aquatic fauna to move away from the area.	Contractor	Construction
Pest species	Equipment and machinery would be locally sourced and/or procured from areas where the risk of introducing pest species is low. Regular inspection of machinery, materials and equipment would be carried out where needed to ensure the importation of pests or weeds to the area is prevented.	Contractor	Construction
Biodiversity	Positioning work barges, drilling and pile driving should occur during calm conditions.	Contractor	Construction
Noise	 A Construction Noise and Vibration Management Plan would be prepared and implemented as part of the CEMP. This will specify the actual plant to be used and will include updated estimates of the likely levels of noise and the scheduling of activities. The Plan would include: All potential significant noise and vibration generating activities associated with the activity Feasible and reasonable mitigation measures to be implemented A monitoring program to assess performance against relevant noise and vibration criteria. Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures, and contingency measures to be implemented in the 	Contractor	Pre- construction
	event of non-compliance with noise criteria.		
Noise	 Electric/hydraulic equipment would be used where possible using the smallest equipment as is practical. All plant and equipment used on site would be: Maintained in a proper and efficient condition. Operated in a proper and efficient manner. All vehicles plant and equipment would be turned off when not in use 	Contractor	Construction
	Impact Biodiversity Biodiversity Pest species Biodiversity Noise Noise	Impact Environmental safeguard Biodiversity Work would stop if large aquatic fauna is observed nearby. Biodiversity Gradual start-up piling to allow undetected aquatic fauna to move away from the area. Pest species Equipment and machinery would be locally sourced and/or procured from areas where the risk of introducing pest species is low. Regular inspection of machinery, materials and equipment would be carried out where needed to ensure the importation of pests or weeds to the area is prevented. Biodiversity Positioning work barges, drilling and pile driving should occur during calm conditions. Noise A Construction Noise and Vibration Management Plan would be prepared and implemented as part of the CEMP. This will specify the actual plant to be used and will include updated estimates of the likely levels of noise and the scheduling of activities. The Plan would include:	ImpactEnvironmental safeguardResponsibilityBiodiversityWork would stop if large aquatic fauna is observed nearby.ContractorBiodiversityGradual start-up piling to allow undetected aquatic fauna to move away from the area.ContractorPest speciesEquipment and machinery would be locally sourced and/or procured from areas where the risk of introducing pest species is low. Regular inspection of machinery, materials and equipment would be carried out where needed to ensure the importation of pests or weeds to the area is prevented.ContractorBiodiversityPositioning work barges, drilling and pile driving should occur during calm conditions.ContractorNoiseA Construction Noise and Vibration Management Plan would be prepared and implemented as part of the CEMP. This will specify the actual plant to be used and will include updated estimates of the likely levels of noise and the scheduling of activities. The Plan would include:Contractor• All potential significant noise and vibration generating activities associated with the activityFeasible and reasonable mitigation measures to be implemented• Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures, and contingency measures to be implemented in the event of non-compliance with noise criteria.ContractorNoiseElectric/hydraulic equipment would be used where possible using the smallest equipment as is practical. All plant and equipment would be: • Maintained in a proper and efficient condition. • Operated in a proper and efficient condition. • Operated in a proper and efficient condition.Contractor

Ref	Impact	Environmental safeguard	Responsibility	Timing
22	Noise	The offset distance between noisy plant and adjacent sensitive receivers would be maximised. Plant used intermittently would be throttled or shut down. Noise-emitting plant would be directed away from sensitive receivers where possible. Truck movements and haulage routes would be planned to avoid residential streets where possible.	Contractor	Construction
23	Noise	Non-tonal reversing beepers (or an equivalent mechanism) would be fitted and used on all mobile site-based vehicles, plant and equipment.	Contractor	Construction
24	Noise and vibration	All works would be scheduled with the aim of avoiding particularly noisy works (installing the sheet piling, stabilising the embankment, and dredging) after 10pm and before 6am, noting that these works will likely have to take place at night due to safety and operational reasons. Piling and particularly noisy works would be restricted and not undertaken between 12pm and 2pm.	Contractor	Pre- construction
25	Noise and vibration	Advanced warning of works and potential disruptions to the community would be provided. The notification may consist of a letterbox drop (or equivalent) detailing work activities, time periods over which these will occur, impacts and mitigation measures. This would be in accordance with the provisions in Safeguard B above.	Contractor/Port Authority of NSW	Pre- construction
26	Light spill	Direction of lighting would be controlled to limit light spill from nearby receivers such as residencies in the Rocks and take into consideration any reflective impacts from the water.	Contractor	Construction
27	Landscape character and visual amenity.	The shipping container at the OPT would be stored for the duration of the works and would be screened where possible to reduce visual impacts for pedestrians and ferry users accessing the area.	Contractor	Construction

Ref	Impact	Environmental safeguard	Responsibility	Timing
28	General socio- economic impacts	A Communication Plan would be prepared and implemented as part of the CEMP to help provide timely and accurate information to stakeholders prior to and during construction.	Contractor/Port Authority of NSW	Pre- construction
29	Social impacts	Access to neighbouring businesses would be maintained during construction, any temporary constraints to access would be communicated ahead of time.	Contractor/Port Authority of NSW	Pre- construction/ construction
30	Socio- economic impacts	The maritime exclusion zone would be clearly defined as part of the Marine Works Management Plan (see Safeguard 45 below) and communicated to relevant stakeholders to delineate access restrictions for surrounding water users.	Contractor/Port Authority of NSW	Pre- construction/ construction
31	Socio- economic impacts	The works would be scheduled to maintain public access to Circular Quay and the wharf frontage where feasible and reasonable; especially during peak and event periods.	Contractor	Pre- construction/ construction
32	Non- Aboriginal heritage	A permit under section 140 of the NSW Heritage Act would be obtained prior to the commencement of dredging and scour protection works.	Port Authority NSW	Pre- construction
33	Non- Aboriginal heritage	The remains of the wharf on the harbour bed would be recorded before starting construction to help understand the site formation processes associated with the demolition of the wharf.	Contractor	Pre- construction
34	Non- Aboriginal heritage	An archaeologist would inspect, and record elements associated with the timbers before their removal to better-understand the construction techniques used.	Contractor	Construction

Ref	Impact	Environmental safeguard	Responsibility	Timing
35	Non- Aboriginal heritage	As part of the early works, and once the timbers on the harbour bed had been removed, a series of maritime archaeological test transects would be used to understand the potential for relics, patterning and dispersal of relics across the site. This information would be held as a record to support an application made under section 140 of the <i>Heritage Act 1997</i> , to secure permission to excavate or disturb land that would likely "result in the discovery, movement and/or destruction of [a heritage] relic". Dredging work would only be allowed to take place once the Heritage Council of NSW gives its permission under the Act.	Port Authority of NSW	Pre- construction
36	Non- Aboriginal heritage	If it is not possible to carry out the pre-construction investigations under safeguard 35 above, then the contractor would work with Port Authority of NSW and a heritage specialist to develop an agreed sampling program of the dredged sediment to ensure a representative sample is collected to record and recover any remaining.	Port Authority of NSW/ contractor	Construction
37	Non- Aboriginal heritage	A Standard Management Procedure for Unexpected Heritage Items would be followed in the event of unexpected heritage items, skeletal remains, archaeological remains or relics are encountered. This would include an adequate stop-and-start work procedure and the need to engage a qualified heritage specialist to advise on the required action.	Contractor	Construction
38	Aboriginal heritage	A Standard Management Procedure for Unexpected Heritage Items would be followed the event of unexpected heritage items, skeletal remains, archaeological remains or relics are encountered. This would include an adequate stop-and-start work procedure and the need to engage a qualified heritage specialist to advise on the required action.	Contractor	Construction
39	Aboriginal heritage	Should any Aboriginal objects be identified at any stage of the project, an Aboriginal Heritage Impact Permit (AHIP) maybe required under Section 90 of the <i>National Parks and Wildlife Act 1974</i> . This would be obtained in accordance with the requirements of the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a).	Contractor and Port Authority	Construction

Ref	Impact	Environmental safeguard	Responsibility	Timing
40	Land transport and parking	A Traffic Control Plan would be prepared and implemented for the OPT in accordance with the Traffic Control at Work Sites manual (Roads and Maritime, 2018) and the Australian Standard 1742.3 (Manual of uniform traffic control devices, 2019). This would involve items such as installing appropriate wayfinding signage for alternative transport options where necessary. The Traffic Control Plan would also include pedestrian access management at the OPT and provision of diversion signs, and safe access around the OPT to avoid construction works.	Contractor	Pre- construction/c onstruction
41	Land transport and parking	The Traffic Control Plan would be developed in consultation with and to the satisfaction of Port Authority of NSW.	Contractor	Pre- construction/c onstruction
42	Land and water transport	Equipment and materials would be transported to site via boat and/or barge when possible to reduce land transport and impacts to local road networks.	Contractor	Construction
43	Water transport	Harbour master approval would be obtained under Clause 67ZN of the Ports and Maritime Administration Regulation 2012 prior to any disturbance of the seabed.	Contractor	Pre- construction/c onstruction
44	Water Transport	Transport for NSW would be notified prior to enabling works for access restrictions to Commissioners Steps.	Contractor	Pre- construction
45	Marine works management	A Marine Works Management Plan (MWMP) would be developed by the contractor in consultation with the Harbour Master, Transport for NSW (Maritime) and other relevant stakeholders. The stakeholders would define specifics such as exclusion zones, methods of marking the zones, clearance distances, mooring plans, communication protocols, emergency and incident response procedures, contact details of all parties and responsible persons, and transit routes. The MWMP would be approved by the Harbour Master in advance of the works commencing. Harbour Master approval will also be required under Clause 67ZN of the Ports and	Contractor	Pre- construction/c onstruction

Ref	Impact	Environmental safeguard	Responsibility	Timing
		Maritime Administration Regulation 2012 prior to any disturbance of the seabed.		
46	Water transport	 A Marine Traffic Control Plan would be developed and implemented in consultation with the Harbour Master, Transport for NSW and other relevant stakeholders to accommodate the works, vessel movements and safety requirements. This plan would: Ensure that vessel speeds would comply with the Harbour Master requirements within Circular Quay and Sydney Harbour. Vessels within the proposal footprint would also be restricted in speed. Respond to the navigational requirements set out in the Port Information for Sydney Harbour & Botany Bay (Port Authority of NSW, 2015). Include the requirement of the maritime navigational exclusion zone established before starting construction in accordance with the Harbour Master approval. Include the required methods of communication with the Harbour Master to manage the additional vessel movements within the Shipping Channels. Shipping schedules would be forwarded and agreed in advance. 	Contractor	Pre- construction/c onstruction
47	Waste	The SWMP would include measures to ensure the dredged material is correctly stored in the barges when they are being transported either to Glebe Island or offshore to limited overspill impacts.	Contractor	Pre- construction/ construction
48	Waste	Waste management, littering and general tidiness would be monitored during routine site inspections.	Contractor	Construction
49	Waste	Appropriate measures to avoid and minimise waste associated with the project should be investigated and implemented where possible.	Contractor	Construction

Ref	Impact	Environmental safeguard	Responsibility	Timing
50	Waste	Waste would be classified before being disposed offsite to an appropriately licenced facility in accordance with Waste Classification Guidelines: Part 1 Classifying Waste (DECCW, 2014). Where necessary, this would include sampling and analysis. Where possible the material to be dredged will be classified prior to dredging based on sampling data and confirmation from NSW EPA that the dredged material meets general solid waste criteria. A waste classification report would include an unexpected finds protocol requiring further sampling and analysis should this occur.	Contractor	Construction
51	Waste	The dredged sediment would be kept on a barge while a polymer is added to reduce its water content if it is being disposed on land. The material transfer between the barge and quayside would be carefully managed to limit spill back into the marine environment. A pre and post hydrographic survey would be carried out to ensure the overall depth has not been impacted. The difference would be confirmed with Port Authority of NSW and if unacceptable additional levelling or dredging would be needed to prevent future operational performance.	Contractor	Construction
52	Hazards and risks	Marine spill kits would be kept within the construction and compound area.	Contractor	Construction
53	Hazards and risks	Emergency equipment such as first aid kits and flotation devices would be kept within the construction and compound area.	Contractor	Construction
54	Hazards and risks	Work Safety Method Statements or similar would be used to manage any health and safety risks associated with the works.	Contractor	Construction
55	Hazards and risks	A Safety Plan would be put in for extreme weather conditions this would involve measures to safely close- down the site, secure/remove all equipment and machinery and demobilise offsite.	Contractor	Construction

Ref	Impact	Environmental safeguard	Responsibility	Timing
56	Hazards and risks	Barge loading activities would be closely monitored.	Contractor	Construction
57	Air quality	The CEMP would consider and address management measures for air quality during construction. The plan would outline procedures for work during various weather conditions.	Contractor	Construction

8 Justification and conclusion

This Chapter provides the justification for the proposal considering its biophysical, social and economic impacts, the suitability of the site and whether the proposal is in the public interest. The proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

8.1 Justification

Initial justification for the proposal was provided through an assessment of the existing wharf, which was identified as needing dredging due to the need for the OPT to operate as efficiently and safely as possible to ensure ongoing operation of the OPT. Recent investigation has identified that scouring is occurring and loss of existing scour protection.

Consideration of alternatives and options was then carried out, with the preferred design of the proposal selected to best achieve the objectives outlined in section 2.3, which include preventing erosion and damage of the embankment wall, maintaining stability, and providing sufficient depth in the berth pocket. This was compared to the option of doing nothing, installing only a sheet pile retaining wall at the southern end of the OPT berth, dredging and options for disposing the dredged materials.

Potential environmental and social impacts resulting from construction of the proposal would be minimised through the safeguards and management measures outlined in Chapter 7.

The following sub-headings consider the proposal's justification in the context of the impacts and benefits of the proposal.

8.1.1 Social factors

The proposal would result in temporary social impacts whilst being built. Notably, this would include temporary disruption to private commercial vessel users at Commissioners Steps and Campbells Cove due to the requirement to temporarily close the wharf during works. Minor disruption to surrounding land uses would also occur. Noise and visual impacts would also be generated. However, all construction related impacts would be appropriately managed prior to and during construction.

8.1.2 Biophysical factors

As discussed in Chapter 6, no significant impacts have been identified. Minor impacts would be managed through the safeguards and management measures outlined in these sections.

8.1.3 Economic factors

The proposed works to the OPT berth would facilitate the continued safe berthing of cruise ships at the OPT, contributing to the local economy.

Design of the dredging and scour protection works has also incorporated measures to decrease the maintenance required for ongoing operations.

8.2 Objects of the EP&A Act

Table 44: Objects of the EP&A Act

Object	Comment
5(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.	Through the assessment in chapter 6, it has been identified that the proposal would not significantly impact on any natural or artificial resources. The proposal facilitates the continued use of the OPT as a cruise ship terminal.
5(a)(ii) To encourage the promotion and co- ordination of the orderly economic use and development of land.	The proposal facilitates the continued use of the OPT as a cruise ship terminal.
5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.	There will be no impacts to communication or utility services.
5(a)(iv) To encourage the provision of land for public purposes.	The proposal facilitates the continued use of the OPT as a cruise ship terminal.
5(a)(v) To encourage the provision and co- ordination of community services and facilities.	There will be no impact to community services and facilities.
5(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	An assessment of impacts on the aquatic environment was carried out. The assessment concluded that no significant impact to aquatic ecology would be caused by the proposal.
5(a)(vii) To encourage ecologically sustainable development.	Ecologically sustainable development is considered in Sections 8.2.1 to 8.2.4 below.
5(a)(viii) To encourage the provision and maintenance of affordable housing.	This object is not relevant to the proposal

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Object	Comment
5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	This object is not relevant to the proposal
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	Community consultation has not been undertaken as part of this REF.

8.2.1 The precautionary principle

The precautionary principle includes the premise that full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.

Through the assessment of the potential impacts of the proposal in Chapter 6, it has been demonstrated that threats of serious or irreversible environmental damage do not exist for the proposal.

Notwithstanding, to account for the subjectivity of professional judgement applied in environmental assessment and modelling uncertainty, worst-case assumptions have been incorporated into the assessment, including the following:

- Specialist assessments of noise and vibration, aboriginal and non-aboriginal heritage have been completed.
- The worst-case assumption of all noise generating construction equipment operating at the same time, at its maximum output, at a location closest to the nearest of the sensitive receivers.
- Assessing impacts and including safeguards for impacts which are exceptionally unlikely to happen such as major spills.

8.2.2 Intergenerational equity

To achieve intergenerational equity, the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The proposal facilitates the continued use of the OPT as a cruise ship terminal, which generates significant economic benefits for State.

No potential impacts to future generations would be generated by the proposal.

8.2.3 Conservation of biological diversity and ecological integrity

Conservation of biological diversity and ecological integrity has been considered through the assessment of aquatic ecology provided in section 6.2.

Providing the safeguard measures are implemented, the proposal would not have a material or significant impact on biological diversity and ecological integrity within the proposal footprint or surrounds.

8.2.4 Improved valuation, pricing and incentive mechanisms

This principle includes integrating long-term and short-term economic, environmental, social and fairness considerations into decision-making. This principle requires that environmental resources should be appropriately valued.

Environmental, economic and social issues were considered in the rationale for the proposal and design options. Construction planning for the proposal would also be progressed in the most cost-effective way.

Safeguards and management measures detailed in Chapter 6, including avoiding, reusing, recycling, managing waste during construction and operation, would be implemented.

8.3 Conclusion

The proposed dredging works at the OPT is subject to assessment under Part 5 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

This has included consideration (where relevant) of conservation agreements and plans of management under the NPW Act, joint management and biobanking agreements under the BC Act, wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the Federal EPBC Act.

Several potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the REF best meets the project objectives but would still result in some minor impacts. Safeguards and management measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would also have positive impacts of improving safety for cruise ships berthing at the OPT, improving the resilience of existing assets and socio-economic benefits of facilitating the continuation of cruise ship related tourism within the city. On balance the proposal is considered justified and the following conclusions are made.

Significance of impact under NSW legislation

The proposal would be unlikely to cause a significant impact on the environment. Therefore, it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Public Spaces under Division 5.1 of the EP&A Act. A Species Impact Statement is not required. The proposal is subject to assessment under Division 5.1 of the EP&A Act. Consent from Council is not required.

9 Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Insert name Position title, eg Environmental Officer Company name Date:

10 References

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NSW Heritage Office, (2001), Assessing Heritage Significance

NSW Heritage Office and Department of Urban Affairs and Planning (DUAP), (2002), Statements of Heritage Impact

Appendix A– Proposal Drawings



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Appendix B– Consideration of Clause 228(2) Factors and Matters of National Environmental Significance

Clause 228(2) checklist

In addition to the requirements of the *Is an EIS required?* (DUAP 1995/1996) guideline and the *Marinas and Related Facilities EIS Guideline* (DUAP 1996) as detailed in the REF, the following factors, listed in clause 228(2) of the Environmental Planning and Assessment Regulation 2000, have also been considered to assess the likely impacts of the proposal on the natural and built environment.

Impact	Level of impact		
a. Any environmental impact on a community?			
There would be noise impacts to residents during night-time works, which have been considered in section 6.3.4 of this REF.	Minor impacts with the implementation of the environmental safeguards noted in Table 43		
b. Any transformation of a locality?			
Works are within the harbour. The operation of the OPT would remain the same.	No impact		
c. Any environmental impact on the ecosystems of the locality?			
The proposal is unlikely to cause significant impact to any threatened aquatic or terrestrial species, populations or ecological communities or their habitats, as discussed in section 6.2.3 of this REF.	Minor impacts with the implementation of the environmental safeguards noted in Table 43.		
d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?			
There would be temporary visual impacts during the construction of the works from barges and backhoe dredgers at the OPT and Glebe Island, which have been considered in section 6.4.3 of this REF.	Minor impacts with the implementation of the environmental safeguards noted in Table 43.		
e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?			
There would be an impact to the remains of buried material associated with Wharf No.7 within Campbell's Cove, which have been considered in section 6.6.3 of this REF and Appendix F.	This is not considered to be a major impact as the remainder of the site located in Campbells Cove would remain unaffected including its heritage significance. A permit would be required from Heritage NSW prior to any construction works commencing.		

Impact	Level of impact		
f. Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?			
Proposal footprint and compound are not located within or near any protected areas, and no threatened or key habitat is expected to occur locally, as discussed in section 6.2.3.	No impact		
g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?			
The proposal is unlikely to cause significant impact to any threatened aquatic or terrestrial species, populations or ecological communities or their habitats, as discussed in section 6.2.3 of this REF.	Minor impacts with the implementation of the environmental safeguards noted in Table 43.		
h. Any long-term effects on the environment?			
Potential impacts are considered temporary during construction works	Minor short-term impacts with the implementation of the environmental safeguards noted in Table 43.		
i. Any degradation of the quality of the environment?			
The proposed works would reduce erosion impacts due to scour protection. The works are within a highly disturbed environment and whilst there is the potential for sediment plumes during dredging however, impacts are minor and temporary. These have been considered in section 6.1.3 of this REF.	Minor impacts with the implementation of the environmental safeguards noted in Table 43.		
j. Any risk to the safety of the environment?			
A Marine Works Management Plan would be put in place in consultation with the Harbour Master to reduce risk of impacts and address safety concerns, as discussed in section 6.8.3 of this REF.	Potential impacts will be managed with the implementation of the environmental safeguards noted in Table 43.		
k. Any reduction in the range of beneficial uses of the environment?			
During works pedestrian access to the area at the OPT and vessel use of some local pick-up and drop-off locations would be temporarily affected as discussed in section 6.8.3 of this REF. The proposal facilitates the continued beneficial use of the OPT as a cruise ship terminal.	Minor impacts with the implementation of the environmental safeguards noted in Table 43		
Impact	Level of impact		
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l. Any pollution of the environment?			
In the event of a pollution accident causing pollution spills from machinery, this would be managed by a spill management plan with spill kits on site. No fuels or chemicals would be stored in the proposal footprint.	Minor impacts with the implementation of the environmental safeguards noted in Table 43		
m. Any environmental problems associated with t	the disposal of waste?		
Waste and dredging material would be removed off site via barge either for disposal at a licenced waste management facility or offshore disposal outside of State Waters	No impact		
n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?			
Works include use of 10,000 m ² of concrete for the scour protection mattress. This isn't considered significant in supply stocks.	No impact		
o. Any cumulative environmental effect with othe	er existing or likely future activities?		
During construction there are not expected to any material cumulative impacts due to the short program length and limited scale of the planned works.	Minor impacts with the implementation of the environmental safeguards noted in Table 43		
p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?			
Works are proposed to protect the OPT from erosion. During construction works would only be carried out during calm conditions to reduce impacts from weather conditions.	Minor impacts with the implementation of the environmental safeguards noted in Table 43		

Matters of national environmental significance

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of the Environment.

Impact	Level of impact			
a. Any impact on a World Heritage property?				
There would be a temporary change in setting for the Sydney Opera House. This is not considered to be a significant impact as the presence of construction equipment and vessels in the OPT would be temporary and small scale in the context of the wider landscape.	Minor and temporary			
b. Any impact on a National Heritage place?				
The Sydney Opera House and Sydney Harbour Bridge are National Heritage assets. There would be a temporary and minor change in setting during construction works at the OPT. This is not considered significant.	Minor and temporary			
c. Any impact on a wetland of international impor	rtance?			
There are no wetlands of international importance within the surrounding area	No impact			
d. Any impact on a listed threatened species or ec	ological communities?			
The proposal is unlikely to cause any impacts to any threatened aquatic or terrestrial species, populations or ecological communities or their habitats	No impacts			
e. Any impacts on listed migratory species?	e. Any impacts on listed migratory species?			
Impacts on listed migratory species are highly unlikely due to the location of the works and the nature of the highly modified environments Although highly unlikely, should aquatic megafauna be observed in the vicinity of the works, any piling work would stop until they have left the locality.	No impacts			

Impact	Level of impact			
f. Any impact on a Commonwealth marine area?				
No impacts are considered likely as the works are not within a Commonwealth marine area	No impact			
g. Does the proposal involve a nuclear action (including uranium mining)?				
Works are do not involve a nuclear action	No impact			
Additionally, any impact (direct or indirect) on Commonwealth land?				
No works in the vicinity of Commonwealth land	No impact			

Appendix C– Statutory Consultation Checklist

ISEPP consultation

Issue	Potential impact	Yes/no	If 'yes' consult with	ISEPP clause
Stormwater	Are the works likely to have a <i>substantial</i> impact on the stormwater management services which are provided by council?	No		ISEPP cl.13(1)(a)
Traffic	Are the works likely to generate traffic to an extent that will <i>strain</i> the existing road system in a local government area?	No		ISEPP cl.13(1)(b)
Sewerage system	Will the works involve connection to a council owned sewerage system? If so, will this connection have a <i>substantial</i> impact on the capacity of any part of the system?	No		ISEPP cl.13(1)(c)
Water usage	Will the works involve connection to a council owned water supply system? If so, will this require the use of a <i>substantial</i> volume of water?	No		ISEPP cl.13(1)(d)
Temporary structures	Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a <i>minor or</i> <i>inconsequential</i> disruption to pedestrian or vehicular flow?	No		ISEPP cl.13(1)(e)

Council related infrastructure or services

Issue	Potential impact	Yes/no	If 'yes' consult with	ISEPP clause
Road & footpath excavation	Will the works involve more than <i>minor or</i> <i>inconsequential</i> excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	No		ISEPP cl.13(1)(f)

Local heritage items

Issue	Potential impact	Yes/no	If 'yes' consult with	ISEPP clause
Local heritage	Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the item/area are more than <i>minor or</i> <i>inconsequential</i> ?	Yes	See Appendix F Heritage Assessment No consultation required	ISEPP cl.14

Flood liable land

Issue	Potential impact	Yes/no	If 'yes' consult with	ISEPP clause
Flood liable land	Are the works located on flood liable land? If so, will the works change flood patterns to more than a <i>minor</i> extent?	No		ISEPP cl. 15

Public authorities other than councils

Issue	Potential impact	Yes/no	If 'yes' consult with	ISEPP clause
National parks and reserves	Are the works adjacent to a national park or nature reserve, or other area reserved under the <i>National Parks and Wildlife Act 1974?</i>	No		ISEPP cl.16(2)(a)

Issue	Potential impact	Yes/no	If 'yes' consult with	ISEPP clause
Marine parks	Are the works adjacent to a declared marine park under the <i>Marine Parks Act</i> 1997?	No		ISEPP cl.16(2)(b)
Aquatic reserves	Are the works adjacent to a declared aquatic reserve under the <i>Fisheries Management Act 1994</i> ?	No		ISEPP cl.16(2)(c)
Sydney Harbour foreshore	Are the works in the Sydney Harbour Foreshore Area as defined by the Sydney Harbour Foreshore Authority Act 1998?	No		ISEPP cl.16(2)(d)
Bush fire prone land	Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?	No		ISEPP cl.16(2)(f)

Appendix D– Hydrodynamic Modelling



Hydrodynamic and Dredge Plume Modelling

Overseas Passenger Terminal

Report prepared for Port Authority NSW

June 2020



Document History

Versions

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1.Introduction

1.1 Background

Port Authority of New South Wales (PANSW) is currently planning to upgrade the Overseas Passenger Terminal berth at Circular Quay in order to accommodate for larger size cruise ships and better protect the structure against scour and undermining (Figure 1). As part of this project, dredging of the berth pocket will need to be undertaken and an assessment of the associated sediment dispersion during the dredging operation is required to inform a Review of Environmental Factors. PANSW will also require current data to be used in a ship simulator as well as current vector map to assist vessel pilots.





Figure 1.1: Sydney Harbour – Circular Quay / Overseas Passenger Terminal (OPT)



2.Sydney Harbour characterisation

The Sydney Harbour is an estuary situated on the East Coast of Australia in New South Wales. It is 30 km long, 3km wide near the entrance and 500 m wide near the Sydney Opera House. The estuary has a complex bathymetry: the mouth of the estuary has a depth of 30m whereas the main channel is around 15m deep with deeper pools up to 40 m. it is governed by semi-diurnal tides and freshwater flow from the Parramatta River (Xiao et al., 2020). During high river flow the Estuary becomes stratified. On the other hand during low/ normal condition is estuary can be classified as well-mixed estuary (Birch and Rochford, 2009). Wind has limited effect on the residual circulation within the Harbour (Das et al., 2020).



3.Hydrodynamic model

3.1 Model description

The 2D and 3D baroclinic hydrodynamics of the Sydney Harbour were modelled using the open-sourced hydrodynamic model SCHISM¹². The benefit of using open-source science models is the full transparency of the code and numerical schemes, and the ability for other researchers to replicate and enhance any previous modelling efforts for a given environment.

SCHISM is a prognostic finite-element unstructured-grid model designed to simulate 3D baroclinic, 3D barotropic or 2D barotropic circulation. The barotropic mode equations employ a semi-implicit finite-element Eulerian-Lagrangian algorithm to solve the shallow-water equations, forced by relevant physical processes (atmospheric, oceanic and fluvial forcing). A detailed description of the SCHISM model formulation, governing equations and numerics, can be found in Zhang and Baptista (2008).

The SCHISM model is physically realistic, in that well-understood laws of motion and mass conservation are implemented. Therefore, water mass is generally conserved within the model, although it can be added or removed at open boundaries (e.g. through tidal motion at the ocean boundaries) and water is redistributed by incorporating aspects of the real-world systems (e.g. bathymetric information, forcing by tides and wind). The model transports water and other constituents (e.g. salt, temperature, turbulence) through the use of quadrilateral and triangular volumes (connected 3-D polyhedrons).

The finite-element triangular grid structure used by SCHISM has resolution and scale benefits over other regular or curvilinear based hydrodynamic models. SCHISM is computationally efficient in the way it resolves the shape and complex bathymetry associated with estuaries, and the governing equations are similar to other open-source models such as Delft3D and ROMS. SCHISM has been used extensively within the scientific community^{3,4} where it forms the backbone of operational systems used to nowcast and forecast estuarine water levels, storm surges, velocities, water temperature and salinity⁵.

¹ http://ccrm.vims.edu/schism/

² http://www.ccrm.vims.edu/w/index.php/Main_Page#SCHISM_WIKI

³ http://www.stccmop.org/knowledge_transfer/software/selfe/publications

⁴ http://ccrm.vims.edu/schism/schism_pubs.html

⁵ https://tidesandcurrents.noaa.gov/ofs/creofs/creofs_info.html

3.2 Model Bathymetry

Bathymetry was sourced from a combination of sounding data and digitized electronic charts to provide suitable resolution for defining the salient bathymetric features and guiding grid resolution, including: General Bathymetric Charts of the Oceans (GEBCO) global dataset (Weatherall et al. 2015), Electronic Navigational Charts (ENCs), Wilson & Power (2018) Seamless bathymetry and topography datasets for Sydney Harbour and other available bathymetry surveys.

The dataset was also updated with a 1m gridded data set based on the latest Hydrographic surveys (up to November 2019) of Circular Quay obtained from the Port Authority of New South Wales (Figure 3.1).



Figure 3.1 Sydney Harbour – Circular Quay hydrographic survey data (Port Authority of New South Wales, Nov. 2019)

3.3 Model Domain

The model domain covers the whole of Sydney Harbour, Middle Harbour, Lave Cove Rive and Parramatta River, and extend out into the Tasman Sea to the 100 metres depth contour. The model resolution was optimised to ensure replication of the salient hydrodynamic processes. The resolution near the offshore boundary was approximately 600 m, 20 m near the coast and reduced to 2m close the Barangaroo outfall location. The triangular elements of the model domain mesh are shown in Figure 3.2 and associated bathymetries are presented in Figure 3.3.



Figure 3.2 Triangular model mesh defined for the Sydney Harbour and Barangaroo site. Left panel shows the whole domain, while the middle and right panels show zooms into the Estuary near the city centre.





Figure 3.3 Model Bathymetry for Sydney Harbour and Barangaroo site. Top panel shows the whole model domain, while the bottom panels show a zoom into the Estuary near the City centre.



3.4 Vertical discretisation

The vertical discretisation of the water column consisted of a Localised Sigma Coordinate (LSC²) system with Shaved Cell, a type of terrain-following layers described in Zhang et al. (2014).

For this study, the model was configured with bottom and surface vertical resolution (Figure 3.4). The vertical grid is constituted of sigma layer terrain-following coordinate with 15 layers in the shallow regions (<20 m) and up to 22 layers near the offshore boundary. A vertical section showing both the sigma layers and the water depths along a transect are presented in Figure 3.4.

The use of this type of vertical grid was dictated by the freshwater influence near the Parramatta river and the denser oceanic water flowing near the bottom of the as described in the literature (See section 2).



Figure 3.4 Map of the model domain showing the number of vertical levels used in the model (left). The cross section represented by the red line is shown on the right panel.

3.5 Vertical mixing/ turbulence closure

Vertical mixing was modelled using a *GLS* model with Kantha and Clayson (1994) stability function with minimum and maximum diffusivities set to 1×10^{-6} and 1 m.s^{-1} respectively, following model validation and calibration. These values were adjusted as part of the model validation and calibration process.

The constant surface mixing length was held to the recommended default value of 0.1 (i.e. 10% of the uppermost sigma layer). However, variations of the mixing length were also examined during the validating and calibration processes.



Frictional stress at the seabed was approximated with a quadratic drag law, with the drag coefficient (*CD*) determined using a bottom roughness of 0.001 m. Detailed explanations of the determination of the drag coefficient are given in Zhang and Baptista (2008).

3.6 Boundary condition

3.6.1 Hydrodynamic forcing

Tidal elevation conditions for the SCHISM model were derived from data measured at Fort Denison. The water elevation measured at this site was used to force the offshore boundary uniformly.

Tidal velocities were derived from constituents from the (Oregon State University Tidal Inverse Software) Tasmania and Southern Australia Shelf grid. This model has a horizontal resolution of ~1/30° (Egbert and Erofeeva 2002). The tidal velocities were interpolated in 3D assuming a logarithmic profile.

The open-boundary salinity and temperature were prescribed from HYCOM hydrodynamic model at 3-hour interval (Chassignet et al., 2007).

3.6.2 Atmospheric forcing

The atmospheric forcing applied to the regional model domain were extracted from the Climate Forecast System Reanalysis (CFSR) from the National Center for Environmental Prediction (NCEP) (Saha et al. 2010) at the National Oceanic and Atmospheric Administration (NOAA). This included wind speed and direction, barometric pressure , humidity, air temperature and solar radiation.

3.6.3 River forcing

Three rivers were included in the model boundaries: The Parramatta river, the Duck River, Lane Cove river and Middle harbour creek. In this study only the Parramatta river was forced with hourly river discharge (Riverside Theatre site) obtained from Manly Hydraulics Laboratory (MHL) and Parramatta Council . The other rivers were forced using the mean annual flow based on available flow data from Birch & Rochford (2010), i.e. 0.3 m³.s⁻¹ for the Duck River, 0.9 m³.s⁻¹ for the Lane Cove River and 0.72 m³.s⁻¹ for Middle Harbour Creek.

A constant salinity of 0 PSU was applied to all rivers. River temperature timeseries adopted at all rivers input boundary were based on available temperature timeseries from the Hawkesbury River near Laughtondale (40 Km north of Sydney), and whilst this estuary is directly north of the Parramatta River Estuary it is anticipated that the temperature variations will be of similar order of magnitude.



4.Model Validation

The hydrodynamic model was validated against water elevation and water velocity (Figure 4.1). Measured water elevation data available near the estuary entrance (HMAS Penguin) and near Parramatta river mouth (Silverwater bridge), were selected in order to provide a spatial variability over the model domain. Water velocity within the water column was available near Balls Head from ADCP data provided by Port Authority of New South Wales.



Figure 4.1 Aerial image showing Sydney Harbour and the location of the two tidal gauge and the ADCP (PANSW) used to validate the hydrodynamic model.

4.1 Water Elevation

Time series of measured water elevations have been processed and the residual elevations are separated from the tidal elevations.

Comparison of the modelled and measured time series of total surface elevations from the two tidal gauges (Silverwater Bridge and HMAS Penguin) are shown in Figure 4.2.

Comparisons show that the model successfully reproduces the propagation of the tidal wave through the estuary, with good agreement between both amplitudes and phases of the principal tidal constituents.



Figure 4.2 Comparison of modelled (red) and measured total surface elevation at Silverwater Bridge (top) and HMAS Penguin (bottom) in July 2018.



4.2 Current Velocities

The direct comparison of the near-surface, mid-depth and near-bottom total current speeds and direction near Balls Head are presented in Figure 4.3 and Figure 4.4, respectively.

The comparisons between measured and modelled depth-average tidal currents Balls Head are shown on Figure 4.5 .

Results shows that the modelled current speed and direction are in good agreement with the measured data. It is noted that the model slightly underestimate the current velocity near the seabed.





Figure 4.3 Measured (blue) and modelled (red) near-surface (top), mid-depth (middle) and near-bottom total current speeds at Balls Head in July 2018.





Figure 4.4 Measured (blue) and modelled (red) near-surface (top), mid-depth (middle) and near-bottom total current direction at Balls Head in July 2018.





Figure 4.5 Measured (blue) and modelled (red) depth-averaged tidal current at Balls Head in July 2018.



5.Hydrodynamic Modelling Results

A snapshot of the near-surface and near-seabed water velocities in July 2017 during peak ebb and peak flood can be seen in Figure 4.6 and Figure 4.7. A zoom near the city centre and Barangaroo site is presented in Figure 4.8 and Figure 4.9. This highlights the stronger velocities occurring near Goat Island and near the Sydney Harbour Bridge.

The difference between surface and bottom velocities is shown in Figure 4.8 and Figure 4.9. It is noted that near-bottom velocities are higher than near-surface velocities during peak flood at some locations.





Figure 4.6 Near -surface (top) and near -bottom (bottom) water velocities during peak flood flow on the 1st of July 2017 in Sydney harbour.







Hydrodynamic and Dredge Plume Modelling





Figure 4.8 Near -surface (top) and near -bottom (bottom) water velocities during peak flood flow on the 1st of July 2017 near Sydney City centre..








6.Dredged Sediment Plume Modelling

6.1 Proposed Dredging

GHD has undertaken a preliminary dredging and disposal strategy assessment to inform the plume dispersion numerical modelling (GHD 2020a). Following consideration of the potential impacts and construction costs associated with onshore disposal, PANSW requested that GHD prepare a revised strategy which considers in-harbour relocation of sediments (GHD 2020b).

GHD's report (2020b) provides likely plant and equipment selections, dredging methodologies and order of magnitude estimates of production rates and associated rates for release of fines.

Two dredging equipment options have been proposed: one with a BackHoe Dredger (BHD) and barge and another with a Cutter Suction Dredger (CSD). However, based on input from potential dredging contractors and concerns regarding potential impacts to water quality, the BHD option was retained as the proposed option and is the one modelled in this study. The dredging rate and release of sediments during the dredging operation have been estimated and are provided in Table 6.1. It is noted that silt curtains may be used to mitigate the plume dispersion during the dredging campaign however these are not considered in the modelling.

Material	Assumed gross quantities incl OD (m ³)*	Max- Prod/wk for turbidity input (m ³ /wk)**	Av- Prod/wk including stand-by (m ³ /wk)	Duration, including all dredging delays and standby (wks)	Fines at seabed from bucket (kg/m ³)	Fines to water column from bucket (kg/m ³)	Fines to water column at seabed during placem ent (kg/m ³)	Average Rate for dredging excludes mob and demob. (\$/m ³)
Clayey SAND	9,396	25,000	9,000	0.96	14	23	126	
Loose SAND	3,758	27,000	9,000	0.39	4	9	70	
Very soft CLAYS	5,638	20,000	7,000	0.81	36	60	375	
Firm-stiff CLAYS	620	25,000	7,000	0.09	34	51	95	
AMOUR	590	5,000	1,000	0.55	n/a	n/a	n/a	
Totals	20,000			2.81				\$200

Notes (continued on following page):

* All quantities are inclusive of over-dredging

Table 6.1: BHD Production Estimates (Table 5 GHD 2020)

6.1.1 Dredging Scenarios

The information provided GHD 2020b were used to define dredging scenario to be modelled, in consultation with GHD and ARUP. The following scenarios were considered:

Dredging frequency:

• Scenario 1: Dredging non-stop at maximum working rate.

This scenario corresponds to the longest gap between cruise vessels (occurs in July) and assesses the longest possible "continuous" plume generating dredging activities. Scenario 1 would be completed in 6 days at the maximum rate. Whilst this may not be a realistic scenario it is considered a "worst case" for plume dispersion modelling.

• Scenario 2: Dredging non-stop at average working rate (no modelled stoppages). The average working rate already include some standby allowance (GHD 2020b).

This scenario will be completed in 2.26 weeks, approximately 16 days.

Dredger position:

In both scenarios considered, the total dredging time is split into three equal time periods during which the dredger is successively positioned at location 1, then 2 then 3 (see locations in Figure 6.1).

- Scenario 1: BHD Dredging at location 1 (2 days), location 2 (2 days) and location 3 (2 days)- 1 disposal per day
- Scenario 2: BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days) -1 disposal every 2.66 days



Figure 6.1: Position for numerical modelling sediment releases: Dredger position= locations 1, 2 and 3, Barge/Pipe Disposal = location 4

6.1.2 Sediment Releases

Coffey's geotechnical and Geophysical investigation report (2019) provides data on the particle size distribution of the sediment to be dredged. The relative proportions of gravel, sand, silt and clay for each of sediment "types" considered in Table 6.1 are summarized in Table 6.2. These were obtained by averaging the distributions of individual sample considered for each Sediment Type considered in Table 6.1: Type 1 = Clayey sand, Type 2 : Loose sand, Type 3: Very Soft Clay, Type 4: Firm Stiff Clay.

For each sediment class, we assumed a representative median size d_{50} in middle of the size range to determine the associated settling velocities used in the simulations. For clay we used the upper limit of the size range at 2 µm. Settling velocities were computed equations by Van Rijn (1993). The slowest settling velocity was limited to 0.2 mm/s for the clay fraction to account for the expected flocculation of the fine cohesive sediment (Table 6.3).

These sediment distributions of Table 6.2 were used to convert the source terms *per type* (Table 6.1) to source term *per sediment class.* This was undertaken by summing the contributions of each *type* to the sand, silt and clay sediment *classes*. Results are summarized in Table 6.4. Note the gravel class is shown in the table but was not included in the simulation due to its fast settling and low proportion.

Table 6.2Mean sediment distribution of Sediment Types considered in Table 6.1. (Type 1 = Clayey sand, Type 2 :
Loose sand, Type 3: Very Soft Clay, Type 4: Firm Stiff Clay), based on spreadsheet data provided by
Coffey.

	Samples considered	Cobbles (>6cm)	Gravel (>2mm)	Sand (0.06-2.00 mm)	Silt (2- 60 μm)	Clay (<2 μm)
Type 1	VC03,VC07,VC12,VC01	0.00	1.25	67.00	8.25	23.5
Type 2	VC01	0.00	0.00	72.00	8	20
Туре3	VC02,VC10	0.00	0.00	39.00	32	29
Type4	VC08	0.00	0.00	48.00	19	33

Table 6.3Sediment settling velocities considered for the simulations.

	Gravel (>2mm)	Sand (0.06-2.00 mm)	Silt (2-60 µm)	Clay (<2 µm)
Representative	2000	130	31	2
d50 [microns]				
Settling velocity	1.94E-01	9.20E-03	6.06E-04	2.00E-04
(Van Rijn) [m/s]				

Table 6.4 BHD estimates for each sediment class considered.

	Assumed gross quantities incl OD	Max-Prod/wk for turbidity input 24/7	Av- Prod/wk including stand-by	Duration, including all dredging delays and standby	Fines at seabed from bucket	Fines to water column from bucket	Fines to water column at seabed from Disposal
	(m3) to remove	(m3/wk)	(m3/wk)	(wks)	kg/m3	kg/m3	kg/m3
Clay	4799.28	25325.00	8255.00	0.57	25.75	41.44	183.71
Silt	2997.77	15372.50	5032.50	0.39	19.46	31.51	154.05
Sand	11497.50	55990.00	18600.00	1.28	42.62	69.77	326.67
Cobble	117.45	312.50	112.50	0.01	0.18	0.29	1.58

6.2 Sediment Dispersion Modelling

6.2.1 OpenDrift Model description

The dispersion of sediment discharged in the harbour during the dredging operations was simulated using the ocean trajectory modelling framework OpenDrift⁶ (Dagestad K.F et al. 2018).OpenDrift is an open-source Python-based framework for Lagrangian particle tracking developed by the Norwegian Meteorological Institute, where it is notably used operationally for emergency response for oil spill and search and rescue events. The framework is highly modular and can be used for any type of drift calculations in the ocean or atmosphere. A number of modules have already been developed, including an oil drift module (see Röhrs et al., 2019), a stochastic search-and-rescue module, a pelagic egg module, a plastic drift module.

The sediment dispersion simulations described in the study were undertaken using a modified version of the generic OceanDrift3D⁷ module that allows specification of settling velocities.

The sediment dispersion modelling consists of a trajectory tracking scheme applied to discrete particles in time and space-varying 3D oceanic currents.

$$\frac{dx_p}{dt} = \tilde{u}(x, y, z, t) + u_t$$
$$\frac{dy_p}{dt} = \tilde{v}(x, y, z, t) + v_t$$
$$\frac{dz_p}{dt} = w_t + w_s$$

(6.1 a,b,c)

where (x_p, y_p, z_p) are particle 3D coordinates, $\tilde{u}_{(x,y,z,t)}$, $\tilde{v}_{(x,y,z,t)}$ are horizontal ocean currents, (u_t, v_t, w_t) are the diffusion components representing turbulent motions, and w_s is the sediment settling velocity.

⁶ <u>https://github.com/OpenDrift/opendrift</u>

⁷ <u>https://github.com/OpenDrift/opendrift/blob/master/opendrift/models/oceandrift3D.py</u>

Hydrodynamic and Dredge Plume Modelling

In the horizontal plane, particles were advected by ocean currents using a 4th order Runge-Kutta tracking scheme, and subject to additional displacement by horizontal diffusion.

In the OpenDrift framework, the horizontal diffusion is included by applying an uncertainty to the horizontal current magnitudes. The magnitude of the current uncertainty was estimated using the general diffusion equation (eqn 2.2)

$$\int_{t}^{t+\Delta t} u_{t} dt = \sqrt{6.K_{u,v} \Delta t} \cdot \theta(-1,1)$$
(3.2)

where $\theta(-1,1)$ is a random number from a uniform distribution between -1 and 1, Δt is the time-step of the model in seconds (900 sec. used here) and K_{u,v} is the *horizontal* eddy diffusivity coefficient in m²·s⁻¹.

In the vertical plane, particles are subject to both vertical settling (w_s) and diffusive displacement (w_t) due to vertical turbulent motion through the water column. In OpenDrift, the vertical mixing process is parameterised in using a numerical scheme described in Visser (1997) which is similar to equation 6.2 when using a constant vertical diffusion coefficient K_z (as employed here).

The horizontal and vertical diffusion are included in the dispersion modelling account for the mixing and diffusion caused by sub grid scale turbulent processes, such as eddies, that are not explicitly resolved by the hydrodynamic models.

For dispersion at oceanic scales, (Okubo, 1974; Okubo, 1971) proposed that $k_{u,v}$ varies approximately as equation 2.3, which is close to the general 4/3 power law often considered for atmospheric (Richardson, L.F, 1962) and oceanic diffusions (Batchelor (1952), Stommel, 1949)) (equation 2.4).

$k_{u,v} = 0.103. L^{1.15}$	(3.3)
$k_{\mu,\nu} = \alpha . L^{4/3}$	(3.4)

where L is the horizontal scale of the mixing phenomena and
$$\alpha$$
 indicates proportionality.

These equations relate the magnitude of the eddy diffusivity $k_{u,v}$ to the length scale of the phenomena and this 4/3 power relationship was found to be relevant over a large range of scale (10m to 1000km) (Okubo, 1974; Okubo, 1971). A similar relationship was found by List et al. (1990) in coastal waters.

In the present study, since high resolution flows are available (Section 3), the amount of added diffusion should be limited. A generic horizontal coefficient of 0.02 m^2/s was applied which is consistent with a length scale of order 20-40 m. The spatial scales of the

vertical turbulent motions within the water column are one or several orders of magnitude smaller than horizontal ones. The vertical diffusion coefficient was set to a value of 1 cm²/s.

6.2.2 Particle release

BHD dredging consists in removing seabed sediment using a backhoe mounted on a barge (see Figure 6.2). The sources of sediment suspension when using a BHD include:

- Near seabed disturbance when loading the bucket, and
- Across the water column as the bucket is lifted to the barge.

To reproduce these processes, particles were released both in a 2m layer thick above the seabed and randomly across the water column. Particle loading was determined according the source terms magnitudes provided in Table 6.4 for each sediment classes (columns 5 and 6).

The suspended sediment plume expected during the sediment disposal were reproduced by seeding particles randomly across the water column, with mass loading according to Table 6.4 (column 7). The disposal operation was assumed to last 10 minutes and happen every 1 or 2.33 days depending on the scenario considered in deeper waters off the berth pocket (position 4 in Figure 6.1).

Individual simulations were undertaken for each sediment class and results were then combined to obtain the total sediment TSS plume and deposition fields. All simulations started on the 1st of July (2017) which is the typical winter month during which dredging is expected to occur and completed when all released particles had settled following the end dredging and disposal operations. The total number of particles released per simulation, and per sediment class, averaged around 220,000. This amounts to a total of 660,000 particles when combining the different sediment classes.

The sediment plume modelling was supplemented by a set of passive tracer simulations to assess the dispersal patterns of potential pollutants within the dredged sediment. The passive tracers were released at each dredging site over 2 days or 5.33 days consistent with the maximum and average dredging scenarios. Particles were released randomly across the water column and tracked for an additional 14 days after the end of the sediment release.

6.2.3 Post-processing

The total suspended sediment concentration and cumulative deposition fields were reconstructed from the particle clouds on a 3.2 km by 1.8 km frame centred on the dredging locations with a grid cell resolution of 10 m. Suspended sediment concentration

were computed at three 2m-thick levels in the water column, i.e. surface, mid-depth and nearbed.

TSS and deposition magnitudes were obtained by counting the number of suspended and deposited particles, which each carry a given sediment mass, in each grid cell. The total suspended sediment mass per cell [kg] was then normalized by the cell surface area [m²], and vertical depth band [m] to obtain sediment concentration in [kg/m³]. These were converted to [mg/L] which is a more common unit in a dredging context. Statistics were derived from the obtained time-varying TSS fields. The report presents the 50th, 90th and 95th percentile TSS at each level in the water column.

The deposition thickness was obtained by normalizing the total deposited mass per cell by the cell surface area. The sediment mass/m2 were then converted to volume using a wet volumic mass of 2400 kg/m³. The newly deposited sediment is expected to be less compact that *in-situ* sediment due to compact due to incorporation of water between deposited grains. A bulking coefficient of 1.5 was applied to predicted deposition thicknesses. This means 1m³ of dredged *in-situ* sediment will create a 1.5 m³ deposition volume.

For the tracer concentration assessment, gridded timeseries of depth-averaged tracer concentrations were computed over a larger grid 7.3 km by 4.4 km, with a grid cell resolution of 20 m. These were then normalized by the tracer concentration at discharge location (i.e. dredging site).



Fig. 6. Sources of a dredge plume for a Backhoe Dredger(BHD).

Figure 6.2 Sources of a dredge plume for a Back Hoe Dredger (after Becker J. et al., 2015).

Hydrodynamic and Dredge Plume Modelling

6.3 Results

The section presents the results of the dredging plume simulations considering scenarios outlined in Section 6.1.1.

- **maximum** dredging rate over a 6 day period (BHD Dredging at location 1 (2 days), location 2 (2 days) and location 3 (2 days)- 1 disposal per day)
- **average** dredging rate over a 16 day period (BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days)- 1 disposal per 2.66 day)

6.3.1 Suspended Sediment Concentration

The 50th, 90th and 95th percentile TSS concentration fields obtained of the **maximum** dredging rate scenario are provided in Figure 6.3 to Figure 6.5. The 50th, 90th and 95th percentile TSS concentration fields obtained of the **average** dredging rate scenario are provided in Figure 6.6 to Figure 6.8. TSS timeseries extracted at four references sites (e.g. see red dots in Figure 6.3) are provided in Figure 6.9 **maximum** dredging rate scenario and in Figure 6.10 for the **average** dredging rate scenario.

The TSS footprints indicate locally elevated TSS levels in the vicinity of the dredging sites, with a local hotspot at the disposal location. The nearbed TSS are generally larger than surface and mid-water levels since they include the contribution of the nearbed source term (due to the bucket on the seabed), as well as sediment released through the water column which eventually reach that bottom layer. The sediment plumes eventually connect with the ambient harbour flows out of the basin and get dispersed in the east-west axis, though with reduced TSS levels.

TSS levels expectedly larger for the shorter scenario with the **maximum** dredging rate. Largest 95th percentile TSS are typically of order 500mg/L or more close to the dredging at the surface level. Near the seabed levels in excess of 500mg/L are mostly confined within the dredge pocket except for the maximum dredging rate where the high TSS concentration can extend to Walsh Bay. Timeseries of TSS at four reference sites indicates discrete peaks above ~500+mg/L but these are very short-lived and levels fall back down very rapidly (Figure 6.9, Figure 6.10). Similar TSS levels are reached during the **average** rate scenario but over much more compact areas, in the close vicinity of the dredging location and disposal.

We note that the disposal-related TSS plume is not always evident in the 90th and 95th percentile TSS maps. This is due to the short disposal discharge, which elevates TSS levels on shorter timescales that the continuous dredging along the quay.

Figure 6.11 and Figure 6.12 shows the timeseries of total suspended sediment concentrations [mg/L] at the three dredging locations (Figure 6.1) and therefore illustrate the persistence of the TSS concentration levels at these locations. Typically, the TSS concentration drop back down to a level less than 50m/L within less than a day for both the **maximum** dredging rate scenario and the **average** dredging rate scenario.



Figure 6.3 50th total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, for the scenario assuming maximum dredging rate over a 6 day period (BHD Dredging at location 1 (2 days), location 2 (2 days) and location 3 (2 days)- 1 disposal per day). Reference locations where TSS timeseries were extracted are shown as red dots. The TSS were masked below 5 mg/L.



Figure 6.4 90th percentile total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, for the scenario assuming **maximum** dredging rate over a 6 day period (BHD Dredging at location 1 (2 days), location 2 (2 days) and location 3 (2 days)- 1 disposal per day). Reference locations where TSS timeseries were extracted are shown as red dots. The TSS were masked below 5 mg/L.



Figure 6.5 95th percentile total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, for the scenario assuming **maximum** dredging rate over a 6 day period (BHD Dredging at location 1 (2 days), location 2 (2 days) and location 3 (2 days)- 1 disposal per day). Reference locations where TSS timeseries were extracted are shown as red dots. The TSS were masked below 5 mg/L.



Figure 6.6 50th total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, for the scenario assuming **average** dredging rate over a 16 day period (BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days)- 1 disposal per 2.66 day). Reference locations where TSS timeseries were extracted are shown as red dots. The TSS were masked below 5 mg/L.



Figure 6.7 90th percentile total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, for the scenario assuming **average** dredging rate over a 16 day period (BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days)- 1 disposal per 2.66 day). Reference locations where TSS timeseries were extracted are shown as red dots. The TSS were masked below 5 mg/L.



Figure 6.8 95th percentile total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, for the scenario assuming **average** dredging rate over a 16 day period (BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days)- 1 disposal per 2.66 day). Reference locations where TSS timeseries were extracted are shown as red dots. The TSS were masked below 5 mg/L.

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Figure 6.9 Timeseries of total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, at four reference sites (see red dots in Figure 6.8), for the scenario assuming **maximum** dredging rate over a 16 day period (BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days)- 1 disposal per 2.66 day). Scale is capped at 500mg/L.





Figure 6.10 Timeseries of total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, at four reference sites (see red dots in Figure 6.8), for the scenario assuming **average** dredging rate over a 16 day period (BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days)- 1 disposal per 2.66 day). Scale is capped at 500mg/L.

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Figure 6.11 Timeseries of total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, at the three dredging locations (see red dots in Figure 6.1),for the scenario assuming **maximum** dredging rate over a 16 day period (BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days)-.



Figure 6.12 Timeseries of total suspended sediment concentrations [mg/L] at surface, mid water and nearbed levels, at the three dredging locations (see red dots in Figure 6.1), for the scenario assuming **average** dredging rate over a 16 day period (BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days)- 1 disposal per 2.66 day). Scale is capped at 500mg/L.

6.3.2 Sediment deposition

Final cumulative sediment deposition thickness maps obtained for the **maximum** and **average** dredging rate scenario are provided in Figure 6.13 and Figure 6.14, respectively.

Largest deposition thicknesses occur in the vicinity of the dredging and disposal locations with distinct mounds. Local deposition footprints patterns are similar for both scenarios. Beyond Circular Quay, the longer sediment discharge at reduced rate during the **average** rate scenario generally results in the sediment being spread over slightly larger areas. For example, the 1 mm deposition contour for the **average** dredging rate scenario can extend slightly further than for the **maximum** dredging rate (e.g. off Walsh Bay), but it is also more irregular closer to the release sites.

Figure 6.15 and Figure 6.16 present the final cumulative sediment deposition thickness [m] and volume settled in the dredge pocket for the scenario for the **maximum** and **average** dredging rate scenario, respectively. It is assumed that the sediment which deposit directly within the dredged pocket would be removed as the dredging progress through the berth pocket.

It is noted that the model does not consider the effects of prop wash from vessels which will greatly reduce sediment deposition within operational berth areas since material will be resuspended by high velocity prop-wash currents and will settle out in quieter areas of the harbour



Figure 6.13 Final cumulative sediment deposition thickness [m] for the scenario assuming **maximum** dredging rate over a 6 day period (BHD Dredging at location 1 (2 days), location 2 (2 days) and location 3 (2 days)- 1 disposal per day). The deposition thicknesses were masked below 0.1 millimetres. The 10cm and 1 mm contours are shown in black and grey respectively.





Figure 6.14 Final cumulative sediment deposition thickness [m] for the scenario assuming **average** dredging rate over a 16 day period (BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days)- 1 disposal per 2.66 day). The deposition thicknesses were masked below 0.1 millimetres. The 10cm and 1 mm contours are shown in black and grey respectively.





Figure 6.15 Final cumulative sediment deposition thickness [m] and volume settled in dredge pocket for the scenario assuming maximum dredging rate over a 6 day period (BHD Dredging at location 1 (2 days), location 2 (2 days) and location 3 (2 days)- 1 disposal per day). The deposition thicknesses were masked below 0.1 millimetres. The 10cm and 1 mm contours are shown in black and grey respectively.



Figure 6.16 Final cumulative sediment deposition thickness [m] and volume settled in dredge pocket for the scenario assuming average dredging rate over a 16 day period (BHD Dredging at location 1 (5.33 days), location 2 (5.33 days) and location 3 (5.33 days)- 1 disposal per 2.66 day). The deposition thicknesses were masked below 0.1 millimetres. The 10cm and 1 mm contours are shown in black and grey respectively.

6.3.3 Tracer Concentration

The mean normalized depth-averaged tracer concentration fields are shown in Figure 6.17 and Figure 6.18. The 95th percentile levels are shown in Figure 6.19 and Figure 6.20. The results are presented in terms of concentration ratio with the tracer release at the dredging location, that is, for example a concentration ratio of 1e-2 indicates a tracer concentration level at that location 100 times smaller than released during the dredging.

The 95th levels presented illustrate the concentration level that are exceeded only 5% of the time with the time periods considered 16-19 days considered (depending on the scenario considered).

The normalized depth-averaged tracer concentration is obtained by a) computing the particle concentration at each cell, and b) normalizing by the particle concentration at the discharge location i.e. here dredging locations. This normalized tracer concentration quantifies the relative dilution of the initial concentration at the discharge location and can provide some guidance on the dispersion of potential passive pollutants bound to the dredged sediment. The analysis has been done for each dredging site release, i.e. site 1, 2 and 3 (Figure 6.1).

Maps indicate that the tracer typically spreads within the Circular Quay around the dredging location and connects with the east-west harbour flows. There are some local concentration hotspots in some of the bays north of Circular Quay, notably in Lavender Bay.

The mean and 95th tracer concentration are generally larger and footprint contours more extended for the **average** rate scenario than for the **maximum** rate scenario. This can be attributed to the longer discharge period during the **average** rate scenario which release comparatively more tracer through the simulation and thus allows a relative concentration build-up.

Note the locally elevated tracer concentration levels observed along some coastlines are due to the shallower water depths. This result in larger concentrations relative to nearby deeper waters even though the actual amount of tracer material is comparable.



Figure 6.17 Mean normalized depth-averaged tracer concentration fields for the scenario assuming **maximum** dredging for 2 days at sites 1, 2 and 3 (top to bottom). Tracer concentration at each cell was normalized initial tracer concentration at discharge site (i.e. location of dredging). Note the colour scale is logarithmic. The 0.001, 0.01, and 0.1 normalized concentration contours are shown in grey, white and black respectively.



Figure 6.18 Mean normalized depth-averaged tracer concentration fields for the scenario assuming **average** dredging for 5.33 days at sites 1, 2 and 3 (top to bottom). Tracer concentration at each cell was normalized initial tracer concentration at discharge site (i.e. location of dredging). Note the colour scale is logarithmic. The 0.001, 0.01, and 0.1 normalized concentration contours are shown in grey, white and black respectively.



Figure 6.19 95th percentile of normalized depth-averaged tracer concentration fields for the scenario assuming **maximum** dredging for 2 days at sites 1, 2 and 3 (top to bottom). Tracer concentration at each cell was normalized initial tracer concentration at discharge site (i.e. location of dredging). Note the colour scale is logarithmic. The 0.001, 0.01, and 0.1 normalized concentration contours are shown in grey, white and black respectively.



Figure 6.20 95th percentile of normalized depth-averaged tracer concentration fields for the scenario assuming **average** dredging for 5.33 days at sites 1, 2 and 3 (top to bottom). Tracer concentration at each cell was normalized initial tracer concentration at discharge site (i.e. location of dredging). Note the colour scale is logarithmic. The 0.001, 0.01, and 0.1 normalized concentration contours are shown in grey, white and black respectively.

7.Conclusions

Hydrodynamic and dredge plume modelling has been undertaken to support the proposed dredging of the Overseas Passenger Terminal berth pocket.

MetOcean Solution Sydney Harbour SCHISM hydrodynamic model was used to prepare hydrodynamic current database for the assessment of the dispersion of the dredged sediments. The model bathymetry was updated with the latest hydrographic survey for Circular Quay/Sydney Cove from PANSW. Validation of the model has been undertaken and showed that the model captures well the propagation of the tidal wave within the estuary.

Following review of proposed dredging program and available sediment data, the dredging scenarios to be modelled were selected in consultation with GHD and ARUP and includes dredging with a Backhoe Dredger and disposal in a deeper area off the berth pocket. Two scenarios were selected to be modelled: one with dredging occurring non-stop at a **maximum** working rate and one with dredging non-stop at an **average** working rate (which already include some standby allowance). The dredger position was successively position at three locations throughout the simulations. Modelled sediments fractions were based on the analysis from Coffey (2019) and splits in three sediment classes, i.e. clay, silt and sand.

Modelling was undertaken using the hydrodynamic data from the SCHISM model from a typical winter month and the OpenDrift Lagrangian particle tracking model. Individual simulations were undertaken for each sediment class and results were then combined to obtain the total sediment TSS plume and deposition fields. The sediment plume modelling was supplemented by a set of passive tracer simulations to assess the dispersal patterns of potential pollutants within the dredged sediment.

The 50th, 90th and 95th percentile TSS concentration fields were determined for the maximum and average dredging rate scenario. TSS timeseries were also extracted at four references sites.

The TSS footprints indicate locally elevated TSS levels in the vicinity of the dredging sites, with a local hotspot at the disposal location. The TSS levels are generally larger at the seabed than at the surface and mid-water levels. The sediment plumes eventually connect with the ambient harbour flows out of the basin and get dispersed in the east-west axis, though with reduced TSS levels. TSS levels expectedly larger for the shorter scenario with the maximum dredging rate.



It is noted that once the dredging stop, the TSS concentrations at that location drop back to a level less than 50m/L within less than a day.

Final cumulative sediment deposition thickness maps were obtained for the maximum and average dredging rate scenario. Largest deposition thicknesses occur in the vicinity of the dredging and disposal locations with distinct mounds. Beyond Circular Quay, the longer sediment discharge at reduced rate during the average rate scenario generally results in the sediment being spread over slightly larger areas.

The Mean and 95th percentile normalized depth-averaged tracer concentration fields were calculated based on the release at each of the three dredger positions. Maps indicate that the tracer typically spreads within the Circular Quay around the dredging location and connects with the east-west harbour flows, some local high concentration patches are observed in some of the bay along north of Circular Quay.

It is noted that silt curtains may be used to mitigate the plume dispersion during the dredging campaign. While these curtains are not considered in the modelling, It is expected they will limit the sediment dispersion into the harbour and will assist in containing the plume and associated sedimentation within Circular Quay/Sydney Cove.



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Appendix E– Noise and Vibration Assessment

Port Authority of New South Wales Overseas Passenger Terminal

Berthing Infrastructure Project – Dredging and Scour Protection

Noise & Vibration Assessment

263976-00-RPT-0011

Issue 1 | 17 September 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Appendices

Appendix A

Glossary

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WGLOBAL ARUP.COMAUSTRALASIAISYD/PROJECTS/263000/263976-00 OPT EROSION STABILISATION/WORK/INTERNAL/REPORTS/RPT-0011 - NOISE TECHNICAL ASSESSMENT/263976-00-RPT-0011 - ISSUE 1 NOISE TECHNICAL ASSESSMENT.DOCX

1 Introduction

This acoustic assessment report summarises the noise and vibration assessment of and the associated impacts from the dredging works and scour-protection installation of the Overseas Passenger Terminal (OPT) along with the Glebe Island (GI) compound site to support the REF submission.

No changes to the everyday operation of the OPT are proposed, nor additional external mechanical plant, therefore no assessment of operational noise emissions is required.

1.1 Reference documents

The assessment has been carried out in accordance to the following policy and guidelines;

- NSW Interim Construction Noise Guideline [1]
- NSW Assessing vibration a technical guideline [2]
- BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting [3]
- BS 7385-1:1990 Evaluation and measurement for vibration in buildings. Guide for measurement of vibrations and evaluation of their effects on buildings [4]
- German Standard DIN 4150 Part 3 'Structural vibration in buildings Effects on Structure' (DIN 4150-3) [5]
- NSW Road Noise Policy [6]
- NSW Environmental Criteria for Road Traffic Noise [7]
- SEPP (Infrastructure) 2007 [8]
- AS 2436:2010 Guide to noise and vibration control on construction, demolition and maintenance sites [9]
- BS 5228 1: 2009 Code of practice for noise and vibration control on construction and open sites. Noise [10]
- NSW Construction Noise and Vibration Guideline [11]
- Environmental Planning and Assessment (Covid-19 Development Construction Work Days) Order 2020 [12]

The background noise levels are taken from previous noise assessment reports:

- Overseas Passenger Terminal Wharf Extension: Construction Noise and Vibration Assessment by AECOM, 14 May 2014 [13]
- Interim Exhibition Facility, Glebe Island, White Bay and Wharves 4 and 5, Noise Impact Assessment 610.11854-R1 by SLR Consulting Australia Pty Ltd, 2012 [14]

The traffic volumes are taken from the following reports:

- Overseas Passenger Terminal, Sydney Master Plan Traffic Report, Taylor Thomson Whitting (TTW) NSW Pty Ltd, June 2013 [15]
- White Bay Cruise Terminal Environmental Impact Statement by JBA Urban Planning Consultants Pty Ltd, 2010 [16]

2 Existing environment

2.1 Sensitive receivers

Sensitive receivers which may be affected by the proposed project were identified for the Circular Quay and Glebe Island works in accordance with the ICNG [1]. Assessment of residential and non-residential receivers presented in this report is isolated to the reasonably most-affected receivers.

2.1.1 Circular Quay

Residential receivers located within similar environments and with comparable relationship to surrounding noise sources have been grouped into Noise Catchment Areas (NCAs), also shown in Figure 1 and described in Table 1.

NCA	Description	Noise environment
NCA 1	Eastern Circular Quay	Background controlled by road traffic along Cahill Expressway, ambient levels controlled by local road traffic and surrounding local activity from entertainment venues or commercial premises.
NCA 2	Western Circular Quay	Generally controlled by local intermittent road traffic, local activity and natural surrounds

Table 1: NCAs and description

Residential receivers with the potential to be impacted by the proposed construction at the Overseas Passenger Terminal in Circular Quay are listed in Table 2. The reasonable most-affected non-residential sensitive receivers are listed in Table 2. All identified receivers are also shown in Figure 1.

Receiver ID	Address	No. of floors	Approximate distance to site [m]
R1	1-3 Macquarie Street, Sydney	12	260
R2	3-7 Macquarie Street, Sydney	12	260
R3	61-69 Macquarie Street, Sydney	15	270
R4	8 Hickson Road, Dawes Point	6	160
R5	54 Gloucester Street, The Rocks	2	250
R6	2 Phillip Street, Sydney	27	320

Table 2: Residential receivers for OPT works

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Receiver ID	Name	Address	No. of floors	Approximat e distance to site [m]
Commerc	cial			
C1	Northern Commercial Premises (Quay Restaurant, The Squire's Landing)	Overseas Passenger Terminal, The Rocks	3	<10
C2	Southern Commercial Premises (Cruise Bar, Yuki's at the Quay)	Overseas Passenger Terminal, The Rocks	3	<10
C3	Park Hyatt	7 Hickson Road, The Rocks	5	110
C4	Opera Bar	Sydney Opera House, Macquarie Street, Sydney	1	320
C5	Holiday Inn Old Sydney	55 George Street, The Rocks	5	130
Education	nal Facilities			
E1	APM College of Business and Communication, Torrens University Australia, William Blue	1-5 Hickson Road, The Rocks	5	70
E2	Julian Ashton Art School	117 George Street, The Rocks	3	140
Passive R	ecreation Area	•		
PR1	First Fleet Park	George Street, The Rocks	0	130
PR2	Hickson Road Reserve	Hickson Road, The Rocks	0	140
PR3	Foundation Park	Gloucester Walk, The Rocks	0	200
Cultural				
H1	Australian Steam Building	1-5 Hickson Road, The Rocks	5	70
H2	Cadman's Cottage	110 George Street, The Rocks	2	70
H3	Museum of Contemporary Art	136-140 George Street, The Rocks	6	50
H4	The Rocks Discovery Museum	Kendall Lane, The Rocks	3	130
Н5	Susannah Place	58/64 Gloucester Street, The Rocks	2	260

Table 3: Reasonabl	y most-affected	non-residential	sensitive	receivers	for	OPT	works
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Figure 1: Noise sensitive receiver locations surrounding the OPT site and NCAs

2.1.2 Glebe Island Site

Residential receivers located within similar environments and with comparable relationship to surrounding noise sources have been grouped into Noise Catchment Areas (NCAs), also shown in Figure 2 and described in Table 4.

NCA	Description	Noise environment
NCA 1	Pyrmont	Generally controlled by local intermittent road traffic, local activity and natural surrounds
NCA 2	Balmain	Generally controlled by local intermittent road traffic, local activity and natural surrounds
NCA 3	White Bay Cruise Terminal	Generally controlled by local intermittent road traffic, local activity, activity from White Bay Cruise Terminal and Sydney Harbour Boat Storage, and natural surrounds

Table 4: NCAs and description

Residential receivers with the potential to be affected by construction works occurring at the Glebe Island compound site were identified. The identified receivers are representative of the residential areas in Pyrmont and Balmain that are nearest to the site. The approximate distance from the site was determined for each receiver and is presented in Table 5 and Figure 2.

Receiver ID	Address	Approximate distance to Glebe Island site [m]
R1	24 Refinery Drive, Pyrmont	230
R2	1-25 Bowman Street, Pyrmont	320
R3	81 Point Street, Pyrmont	520
R4	40 Stephen Street, Balmain	490
R5	1 Buchanan Street, Balmain	510

Table 5: Reasonably most-affected residential receivers for the GI site



Figure 2: Noise sensitive receivers and NCAs surrounding Glebe Island Site

2.2 Noise Monitoring Locations

2.2.1 Circular Quay

Background noise data for Circular Quay was sourced from the noise monitoring results presented in the Overseas Passenger Terminal Wharf Extension: Construction Noise and Vibration Assessment by AECOM, 14 May [13]. The noise monitoring was undertaken from 23 July 2013 to 1 August 2013 at the first two locations and further logging was conducted at two additional locations from 8 November 2013 to 2 November 2013. There has been no significant development in the Circular Quay since 2013. Therefore, Arup considers it reasonable to assume that ambient noise levels have not altered significantly since 2013 and have used this data to nominate the construction management levels.

Manitaning Logation	RBL ¹ [dB(A)]			
Monitoring Location	Day	Evening	Night	
Holiday Inn, 55 George Street, The Rocks	61	60	57	
Quay Grand, 61 Macquarie Street, East Circular Quay	63	62	52	
Destination NSW Office, Level 2, 88 Cumberland St.	61	61	57	
Park Hyatt, 7 Hickson Rd, The Rocks	61 ²	59	56	

 Table 6:
 Existing ambient acoustic noise environment for Circular Quay

1 - Day is defined as the period from 7 am to 6 pm Monday to Saturday; or 8 am to 6 pm on Sundays and Public Holidays. Evening is the period from 6 pm to 10 pm. Night is the remaining period.

2 - Denotes results in which all periods were affected by rain or wind noise.

It was noted that three locations, the Holiday Inn, Destination NSW office and the Park Hyatt are near each other and measured daytime, evening and night-time results are within 1 dB or each other. Therefore, measurement results from the Holiday Inn have been used to represent the background noise at all receivers on the western side of Circular Quay. Measurement results from the Quay Grand have been used to represent background noise at receivers east of Circular Quay.

2.2.2 Glebe Island

Background noise data for Glebe Island was sourced from the noise monitoring results presented in the Interim Exhibition Facility, Glebe Island, White Bay and Wharves 4 and 5, Noise Impact Assessment 610.11854-R1 prepared by SLR Consulting Australia Pty Ltd [14].

Unattended noise monitoring was conducted by SLR from 17 September 2012 and 25 September 2012. There has been no significant development in the Balmain and Pyrmont areas since 2012. Therefore, Arup considers it reasonable to assume that ambient noise levels have not changed since 2012 and have used this data to nominate the construction management levels.

A summary of the noise monitoring results is presented in Table 7.

Manitaning Lagation	Rating Background Level (RBL) ¹ [dB(A)]			
Monitoring Location	Day	Evening	Night	
24-36 Refinery Drive, Pyrmont ²	50	49	47	
17 Donnelly Street, Balmain	47	45	40	
1 Batty Street, Balmain	51	48	45	

Table 7: Existing ambient acoustic noise environment for Glebe Island

1 - Day is defined as the period from 7 am to 6 pm Monday to Saturday; or 8 am to 6 pm on Sundays and Public Holidays. Evening is the period from 6 pm to 10 pm. Night is the remaining period.

2 - This monitoring location is labelled as 22 Refinery Drive, Pyrmont in the SLR 2012 report.

3 Assessment criteria

3.1 Construction noise criteria

The ICNG provides recommended noise levels for airborne construction noise at sensitive land uses. The guideline provides construction management noise levels above which all 'feasible and reasonable' work practices should be applied to minimise the construction noise impact. The ICNG works on the principle of a 'screening' criterion – if predicted or measured construction noise exceeds the ICNG levels then the construction activity must implement all 'feasible and reasonable' work practices to reduce noise levels.

The ICNG sets out management levels for noise at sensitive receivers and how they are to be applied. For residential receivers, the rating background level (RBL) is used when determining the management level. The management level for residential receivers is reproduced in Table 8. For other sensitive land uses, the management levels are reproduced in Table 9.

Time of day	Management level ¹ L _{Aeq (15 min)}	How to apply
Recommended standard hours: Monday to Friday	Noise affected RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise.
7am to 6pm Saturday 8am to 1pm No work on		Where the predicted or measured $L_{Aeq (15 min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.
holidays		The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise.
		Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:
		times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences
		if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5dB	A strong justification would typically be required for works outside the recommended standard hours.

Table 8: Construction noise management levels at residential receivers

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Time of day	Management level ¹ L _{Aeq (15 min)}	How to apply
		The proponent should apply all feasible and reasonable work practices to meet the noise affected level.
		Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should negotiate with the community.
		For guidance on negotiating agreements see section 7.2.2 of the ICNG.

1 - Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Land use	Where objective applies	Management level ¹
		LAeq (15 min)
Passive recreation areas	External noise level	60 dB(A)
Active recreation areas	External noise level	65 dB(A)
Educational institutions	Internal noise level	45 dB(A)
Museums	Internal noise level	$45 \text{ dB}(\text{A})^2$
Commercial premises	External noise level	70 dB(A)

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1 – Noise management levels apply when properties are in use.

2 - Based on AS/NZS2107:2016 max design level for Public Buildings - Museums (exhibition space)

3.1.1 Sleep disturbance

Where construction works are planned to extend over more than two consecutive nights, the ICNG recommends that an assessment of sleep disturbance impacts should be undertaken.

The ICNG refers to the NSW Environmental Criteria for Road Traffic Noise [7] for assessing the potential impacts, which notes that to limit the level of sleep disturbance the $L_{AF1,(1 \text{ minute})}$ level (equivalent to the L_{Amax}) of a noise event which should not exceed the ambient L_{A90} noise level by more than 15 dB is not applied to traffic noise.

3.1.2 Project construction noise management levels

Overseas Passenger Terminal

Noise criteria at residential receivers for construction works proposed at the OPT site were derived from noise monitoring data from the AECOM report [13]. The RBL from a monitoring location in close proximity to the residential receivers was used to determine the NML for the Day, Evening and Night-time periods.

Receiver	NCA	Standard Hours ¹	Out of Hours ²			Sleep disturbance
Ш		Day	Day	Evening	Night	(RBL + 15 dB)
R1	1	73	68	67	57	67
R2	1	73	68	67	57	67
R3	1	73	68	67	57	67
R4	2	71	66	65	62	72
R5	2	71	66	65	62	72
R6	1	73	68	67	57	67

Table	10:	Noise	Management	Levels	for re	esidential	receivers	at the	OPT	site
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1 - Standard hours are Monday to Friday 7 am to 6 pm and Saturday from 8 am to 1 pm.

2 - Out of Hours during the different time periods:

Day are Saturday 7 am to 8 am and 1 pm to 6 pm; Sunday and public holidays 8 am to 6 pm; Evening hours are 6 pm to 10 pm,

Night-time hours are 10 pm to 7am.

Usage	Receiver ID	Name	Time period	NML,
Commercial premise	C1	Northern Commercial Premises (Quay Restaurant, The Squire's Landing)	When in use	70
	C2	Southern Commercial Premises (Cruise Bar, Yuki's at the Quay)	When in use	70
	C3	Park Hyatt	When in use	70
	C4	Opera Bar	When in use	70
Educational institution	E1	APM College of Business and Communication, Torrens University Australia, William Blue	When in use	45 (Internal)
	E2	Julian Ashton Art School	When in use	45 (Internal)
Passive	PR1	First Fleet Park	When in use	60
recreation area	PR2	Hickson Road Reserve	When in use	60
	PR3	Foundation Park	When in use	60
Museums	H1	Australian Steam Building	When in use	45 (Internal)
	H2	Cadman's Cottage	When in use	45 (Internal)
	H3	Museum of Contemporary Art	When in use	45 (Internal)
	H4	The Rocks Discovery Museum	When in use	45 (Internal)
	H5	Susannah Place	When in use	45 (Internal)

Table 11: Non-residential Noise Management Levels at OPT site during working hour

Glebe Island

Construction noise criteria for residential receivers at for the GI site were set based on the noise catchment areas relative to the proposed works. The catchment areas are defined for the GI site in Section 2.1.2. Measured noise data obtained from the SLR 2012 report [14] were used to derive the appropriate noise management level for the project based on the ICNG. The results are summarised in Table 12.

Dessiner ID	NCA	Standard Hours ¹	Out of Hours ²	
Keceiver ID	NCA	Day	Day	
R1	1	60	55	
R2	1	60	55	
R3	1	60	55	
R4	3	57	52	
R5	2	61	56	

Table 12: Noise Management Levels for residential receivers at the GI site

1 - Standard hours are Monday to Friday 7am to 6pm and Saturday from 8am to 1pm.

2 - Out of Hours during the Day are Saturday 7am to 8am and 1pm to 6pm, Sunday and public holidays 8am to 6pm

3.2 Construction traffic criteria

Increased traffic generated on the surrounding road network due to the construction activities in OPT and Glebe Island is assessed in accordance with the NSW *Road Noise Policy* (RNP) [6]. Table 3 of the RNP which sets out the assessment criteria for types of project, road category and land use, shown in Table 13 below.

 Table 13: Road traffic criteria for traffic generating development - residential receivers

D 1		Assessment criteria – dBL _{Aeq}			
Koad category	Type of project / land use	Day	Night		
cutegory		(7:00am-10:00pm)	(10:00pm-7:00am)		
Freeway/ arterial/sub- arterial roads	Existing residences affected by additional traffic on existing freeways / arterial / sub-arterial roads generated by land use developments	L _{Aeq,(15 hour)} 60 (external)	L _{Aeq,(9 hour)} 55 (external)		

Note: These criteria are for assessment against façade corrected noise levels when measured in front of a building façade.

Regarding the application of the assessment, the RNP states:

In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

3.3 Construction vibration criteria

Vibration criteria for construction works are established in the following sections.

3.3.1 Human comfort

The NSW EPA's *Assessing Vibration – A Technical Guideline* [2] provides vibration criteria for maintaining human comfort within different space uses. The guideline recommends 'preferred' and 'maximum' weighted vibration levels for both continuous vibration sources, such as steady road traffic and continuous construction activity, and for impulsive vibration sources. The weighting curves are obtained from BS 6472-1:2008 [3].

For intermittent sources (e.g. passing heavy vehicles, impact pile driving, intermittent construction), the guideline uses the vibration dose value (VDV) metric to assess human comfort effects of vibration. VDV considers both the magnitude of vibration events and the number of instances of the vibration event. Intermittent events that occur less than 3 times in an assessment period (either day, 7 am to 10 pm, or night, 10 pm to 7 am) are counted as 'impulsive' sources for the purposes of assessment.

As noted in the Guideline, situations exist where vibration above the preferred values can be acceptable, particularly for temporary disturbances, such as a construction or excavation projects. Notwithstanding, the recommended vibration limits for maintaining human comfort in residences and other relevant receiver types are given for continuous/impulsive and intermittent vibration in Table 14 and Table 15 respectively.

		Preferred	Values	Maximum Values	
Location	Period	z-axis	x- and y-axes	z-axis	x- and y-axes
Continuous Vibration					
Critical areas1	Day- or Night-time	0.005	0.0036	0.01	0.0072
Residences	Daytime 0700-2200h	0.010	0.0071	0.020	0.014
	Night-time 2200- 0700h	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship		0.020	0.014	0.040	0.028
Impulsive Vibration					
Critical areas1	Day- or Night-time	0.005	0.0036	0.01	0.0072
Residences	Daytime 0700-2200h	0.30	0.21	0.60	0.42
	Night-time 2200- 0700h	0.10	0.071	0.20	0.14

Table 14: Preferred and maximum weighted root-mean-square (rms) values for continuous and impulsive vibration acceleration (m/s²) 1-80 Hz

		Preferred	Values	Maximum Values	
Location	Period	z-axis	x- and y-axes	z-axis	x- and y-axes
Offices, schools, educational institutions and places of worship	Day- or Night-time	0.64	0.46	1.28	0.92

1 - Criteria for sensitive areas are only indicative, and have been provided as guidance to acceptable vibration levels for the use of sensitive equipment, eg. camera equipment at Fox Studios.

	Daytime 0700-2	200 h	Night-time 2200-0700 h		
Location	PreferredMaximumValueValue		Preferred Value	Maximum Value	
Critical areas1	0.10	0.20	0.10	0.20	
Residences	0.20	0.40	0.13	0.26	
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80	

Table 15: Acceptable vibration dose values for intermittent vibration (m/s1.75)

1 - Criteria for sensitive areas are only indicative, and there may be a need to assess intermittent vibration against impulsive or continuous criteria.

3.3.2 Building damage

Potential structural or cosmetic damage to buildings as a result of vibration is typically assessed in accordance with British Standard 7385 Part 2-1993 and/or German Standard DIN4150-3. British Standard 7385 Part 1: 1990 defines different levels of structural damage as:

- Cosmetic The formation of hairline cracks on drywall surfaces, or the growth of existing cracks in plaster or drywall surfaces; in addition, the formation of hairline cracks in mortar joints of brick/concrete block construction.
- *Minor The formation of large cracks or loosening of plaster or drywall surfaces, or cracks through bricks/concrete blocks.*
- *Major Damage to structural elements of the building, cracks in supporting columns, loosening of joints, splaying of masonry cracks, etc.*

Table 1 of BS7385-2 sets limits for the protection against cosmetic damage, however the following guidance on minor and major damage is provided in Section 7.4.2 of the Standard:

7.4.2 Guide values for transient vibration relating to cosmetic damage

Limits for transient vibration, above which cosmetic damage could occur are given numerically in Table 1 and graphically in Figure 1 [Not reproduced].

In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the guide values for the building types corresponding to line 2 are reduced. Below a frequency of 4 Hz, where a high

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\\GLOBALARUP.COMAUSTRALASIA\SYD/PROJECTS\263000\263976-00 OPT EROSION STABILISATION\WORK\INTERNAL\REPORTS\RPT-0011 - NOISE TECHNICAL ASSESSMENT\263976-00-RPT-0011 - ISSUE 1 NOISE TECHNICAL ASSESSMENT.DOCX *displacement is associated with a relatively low peak component particle velocity value a maximum displacement of 0.6 mm (zero to peak) should be used.*

Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 1, and major damage to a building structure may occur at values greater than four times the tabulated values.

Within DIN4150-3, damage is defined as "any permanent effect of vibration that reduces the serviceability of a structure or one of its components" (p.2). The Standard also outlines:

"that for structures as in lines 2 and 3 of Table 1, the serviceability is considered to have been reduced if cracks form in plastered surfaces of walls; existing cracks in the building are enlarged; partitions become detached from loadbearing walls or floors.

These effects are deemed 'minor damage." (DIN4150.3, 1990, p.3)

While the DIN Standard defines the above damage as 'minor', the description aligns with BS7385 cosmetic damage, rather than referring to structural failures.

British Standard BS7835-2

BS 7385-2:1993 is based on peak particle velocity and specifies damage criteria for frequencies within the range 4–250 Hz, and a maximum displacement value below 4 Hz is recommended. Table 16 sets out the BS7385 criteria for cosmetic, minor and major damage. Regarding heritage buildings, British Standard 7385 Part 2 (1993, p.5) notes that "*a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive*".

			Peak component particle velocity, mm/s ¹				
Group	Type of structure	Damage level	4 Hz to 15 Hz	15 Hz to 40 Hz	40 Hz and above		
1	Reinforced or	Cosmetic	50				
	framed structures Industrial and heavy commercial buildings	Minor ²	100				
		Major ²	200				
2	Un-reinforced or	Cosmetic	15 to 20	20 to 50	50		
	light framed	Minor ²	30 to 40	40 to 100	100		
	Residential or light commercial type buildings	Major ²	60 to 80	80 to 200	200		

Table 16: BS 7385-2 structural damage criteria

1 - Peak Component Particle Velocity is the maximum Peak particle velocity in any one direction (x, y, z) as measured by a tri-axial vibration transducer.

2 - Minor and major damage criteria established based on British Standard 7385 Part 2 (1993) Section 7.4.2

All levels relate to transient vibrations in low-rise buildings. Continuous vibration can give rise to dynamic magnifications that may require levels to be reduced by up to 50%.

German Standard DIN 4150-3

German Standard DIN 4150 - Part 3 'Structural vibration in buildings - Effects on Structure' (DIN 4150-3) are generally recognised to be conservative. DIN 4150-3 presents the recommended maximum limits over a range of frequencies (Hz), measured in any direction, and at the foundation or in the plane of the uppermost floor of a building or structure. The criteria are presented in Table 17.

		Vibration velocity, mm/s					
Group	Type of structure	At founda	Plane of floor uppermost storey				
		1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz	All frequencies		
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40		
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15		
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Group 1 or 2 and have intrinsic value (eg buildings under a preservation order)	3	3 to 8	8 to 10	8		

Table 17: DIN 4150-3 structural damage criteria

3.3.3 Buried services

DIN 4150-2:1999 sets out guideline values for vibration effects on buried pipework and reproduced in Table 18 below.

Table 18: Guideline values for short-term vibration impacts on buried pipework

Pipe material	Guideline values for vibration velocity measured on the pipe, mm/s
Steel (including welded pipes)	100
Clay, concrete, reinforced concrete, pre-stressed concrete, metal (with or without flange)	80
Masonry, plastic	50

Note:

For gas and water supply pipes within 2m of buildings, the levels given above should be applied. Consideration must also be given to pipe junctions with the building structure as potential significant changes in mechanical loads on the pipe must be considered.

In addition, specific limits for vibration affecting high-pressure gas pipelines is provided in the UK National Grid's Specification for Safe Working in the Vicinity of National Grid High Pressure Gas Pipelines and Associated Installations – Requirements for Third Parties (report T/SP/SSW/22, UK National Grid, Rev 10/06, October 2006). This specification states that no piling is allowed within 15 m of a pipeline without an assessment of the vibration levels at the pipeline. The PPV at the pipeline is limited to a maximum level of 75 mm/s, and where PPV is predicted to exceed 50 mm/sec the ground vibration is required to be monitored.

Other services that may be encountered include electrical cables and telecommunication services such as fibre optic cables. While these may sustain vibration velocity levels from between 50 mm/s and 100 mm/s, the connected services such as transformers and switchgear may not. Where encountered, site specific vibration assessment in consultation with the utility provider should be carried out.

3.3.4 Heritage structures

Heritage structures which have been identified within 100 m from the OPT project and the distance of these heritage structures from the project site is provided in Table 19.

Heritage Item	Address	Distance to site [m]
Australian Steam Navigation Building	1-5 Hickson Road, The Rocks	70
Cadman's Cottage	110 George Street, The Rocks	70
Museum of Contemporary Art	136-140 George Street, The Rocks	50
Railings, Sydney Cove	Circular Quay Concourse, Circular Quay East	<10
Sailors Home	106-108 George Street, The Rocks	50
Coroner's Court	102-104 George Street, The Rocks	60
Mariners Church	98-100 George Street, The Rocks	60
Old Bushells Factory	86-88 George Street, The Rocks	90
Ken Duncan Gallery	73 George Street, The Rocks	90
Samson's Cottage (wall remains)	8 Kendall Lane, The Rocks	90
Unwin's Stores	77-85 George Street, The Rocks	90
Orient Hotel	87-89 George Street, The Rocks	90

Table 19: Heritage items within 100 metres of the Circular Quay site

Regarding heritage buildings, BS7385-2 notes that 'a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive'. As all the above sites are considered to be structurally sound, these heritage structures are not considered to be more vibration sensitive than other surrounding structures. Further, based on the proposed construction equipment and the distance of the heritage items from the project site, vibration is not anticipated to be an issue for all heritage structures in the above table as well as the other Heritage items in Circular Quay which fall above the 100m radius.

4 Construction site noise assessment

4.1 **OPT activities**

Proposed construction equipment and activities to be used for dredging and scour protection have been provided by TLM Project Services and are summarised in Table 20.

Equipment sound power levels have been determined by reference to AS2436 [9], BS 5228-1:2009 [10], and Arup's measurement database. The equipment below has been assumed to operate concurrently and continuously over a full 15-minute period (a typical worst-case assumption).

The locations of equipment have been based the construction works areas in and around the OPT as shown in Figure 3.



Figure 3: Construction work areas in the OPT site

		Operating	Sound Power Level, L _w		
Item / Description	Quantity	duration in 15min [min]	dBL _{Aeq} (15min) ¹	dBL _{Amax} ²	
ENABLING WORKS					
AREA 3					
Piling (vibratory)	1	5	116	137	
Piling (impact sheet)	1	10	126	134	
Barge Mounted Crane	1	15	100	108	
Dive Boat	1	15	81	89	
Generator	1	15	93	101	
Lighting – Day Maker	2	15	98	106	
Tug Boat	2	15	106	114	
SOUTHERN EMBANKMENT S	TABILIZAT	ION WORKS			
AREA 3					
Option 1: Land-based Excavator					
Long-reach Excavator	1	15	110	118	
Dive Boat	1	15	81	89	
Option 2: Backhoe Dredger					
Barge-mounted Backhoe Dredger	1	15	119	127	
Tug Boat	2	15	106	114	
Dive Boat	1	15	81	89	
AREA 2					
Diesel Generator	1	15	93	101	
Lighting – Day Maker	2	15	98	106	
Truck	1	15	103	111	
Concrete Boom Pump	1	15	109	117	
Concrete Agitator Truck	2	15	107	115	
DREDGING					
AREA 4A/B/C					
Option 1: Land Based Disposal D	redging				
Barge-mounted Backhoe Dredger	1	15	119	127	
Tug Boat	2	15	106	114	
Barge	4	15	100	108	
Dive Boat	1	15	81	89	
Option 2: Marine Based Disposal	Dredging				
Barge-mounted Backhoe Dredger	1	15	119	127	
Tug Boat	2	15	106	114	

Table 20: Construction equipment and associated sound power levels at the OPT	site
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		Operating	Sound Power Level, Lw		
Item / Description	Quantity	duration in 15min [min]	dBL _{Aeq} (15min) ¹	dBL _{Amax} ²	
Split Barge	2	15	100	108	
Dive Boat	1	15	81	89	
AREA 5A/B/C					
Lighting – Day Maker	2	15	98	106	
Generator	1	15	93	101	
SCOUR MATTRESS WORKS					
Option 1: Articulated Concrete M	lattress (ACN	(I)			
AREA 4A/B/C					
Barge-mounted Crawler Crane	1	15	113	121	
Dive Boat	1	15	81	89	
Tug Boat	2	15	106	114	
Lighting – Day Maker	2	15	98	106	
Generator	1	15	93	101	
Forklift	1	15	106	114	
AREA 5A/B/C					
Lighting – Day Maker	2	15	98	106	
Generator	1	15	93	101	
Forklift	1	15	106	114	
Option 2: Grouted Mattress					
AREA 4A/B/C					
Dive Boat	1	15	81	89	
AREA 5A/B/C					
Concrete Agitator Delivery Truck	2	15	107	115	
Lighting – Day Maker	2	15	98	106	
Concrete Pump	2	15	109	117	
Generator	1	15	93	101	

1 - Sound power level of 1 item of equipment

 $2 - L_{Max}$ is 8 dB above the L_{Aeq} value, except for impact piling which is 21 dB (exact level is dependent on a number of factors, so a conservative estimate has been utilised based on maximum levels)

4.1.1 Hours of work

Due to the location and quantity of passing vessel traffic at the OPT, it is considered that the safest and most productive working hours will be at night-time outside of the ferry curfew periods. Typically, this would be between 9:00 pm and 5:30 am when the berth at OPT will be clear and the passing vessel traffic is low.

However, given the current environment brought about by the COVID-19 situation, the lack of maritime vessel traffic may allow significant works to occur during the day. Nevertheless, the proposed hours of construction for the OPT site is 24/7 to allow appropriate flexibility.

The Environmental Planning and Assessment (COVID-19 Development – Construction Work Days) Order 2020 [12] specifies the conditions construction work days and the construction activities allowed.

The conditions specified for the development are that the development must

- (a) Be the subject of a development consent, and
- (b) Comply with all conditions of the consent other than any condition that restricts the hours of work or operation on a Saturday, Sunday or public holiday, and
- (c) For work or operation on a Saturday, Sunday or public holiday
 - *i.* Comply with the conditions of the consent that restrict the hours of work or operation on any other day as if the conditions applied to work or operation on a Saturday, Sunday or public holiday, and
 - *ii.* Not involve the carrying out of rock breaking, rock hammering, sheet piling, pile driving or similar activities during the hours of work or operation that would not be permitted but for this Order, and
 - *iii.* Take all feasible and reasonable measures to minimise noise.

From the above order, no sheet piling or pile driving will be carried out during Saturdays, Sundays or public holidays.

	Proposed construction hours	Comments
Monday to Friday	24 hours	-
Sundays or Public Holidays	24 hours	No sheet piling, pile driving

Table 21:Proposed hours of construction for the OPT site

4.2 Glebe Island activities

Proposed construction equipment and activities to be used for transferring of dredged soil for land disposal have been provided by TLM Project Services and are summarised in Table 22.

Equipment sound power levels have been determined by reference to AS2436,

BS5228, and Arup's measurement database. The equipment below has been assumed to operate concurrently and continuously over a full 15-minute period (a typical worst-case assumption).

Description of works	Equipment in operation	Quantity [15-min]	Operating duration [min]	Sound Power dBLAeq (15min)
Transfer of dredged	Truck (heavy)	2	15	108
soil to land for disposal	Barge	2	15	100
	Tug boat	1	15	106
	Long-reach excavator	2	15	108
Casting of Articulated	Crawler crane	1	15	113
Concrete Mattresses (ACM)	Forklift	1	15	106
	Concrete vibrator	1	15	113
	Concrete pump	1	15	109
	Concrete agitator delivery truck	2	15	107
Delivery and load out	Crawler crane	1	15	113
of Articulated Concrete Mattresses (ACM)	Truck (heavy)	1	15	108
()	Barge	1	15	100
	Tug Boat	1	15	108

Table 22: Construction equipment usage and associated sound power levels at the Glebe Island site $\left(L_{w}\right)$

4.2.1 Hours of work

For the works in Glebe Island, the working hours are limited during the day due to the proximity of private residences.

The construction works in the Glebe Island compound site are proposed to occur every day between 7:00 am to 6:00 pm as outlined in Table 23.

Table 23: Proposed hours of construction for the Glebe Island compound site

Day	Proposed construction hours
Monday to Friday	7.00 am to 6:00 pm
Saturdays, Sundays and Public Holidays	7.00 am to 6:00 pm

4.3 Assessment methodology

4.3.1 **OPT**

Noise emissions from construction activities associated with the OPT site have been assessed to criteria outlined in Section 3.1.

Noise emissions have been modelled using SoundPlan 8 in accordance with ISO9613-2 algorithms. The model included:

• Construction noise sources listed in Table 20;

- OPT and surrounding buildings;
- Receivers listed in Table 2 and Table 3; and,
- Ground terrain and absorption.

Noise emissions have been modelled on the following conservative assumptions:

- Equipment, staging and durations are based on information provided by Table 20. A review of predicted emissions should be conducted when final construction details are available as part of the development of a Construction Noise and Vibration Management Plan.
- The equipment Table 20 have been assumed to operate concurrently and continuously over a full 15-minute period for each construction stage.

4.3.2 Glebe Island

An assessment has been completed to calculate the noise emissions from construction activities associated with the Glebe Island compound site against the criteria outlined in Section 3.1. The calculation included:

- Construction noise sources listed in Table 22;
- Glebe Island and surrounding buildings;
- Receivers listed in Table 5; and

Noise emissions have been modelled on the following conservative assumptions:

- Equipment, staging and durations are based on information provided by Table 22. A review of predicted emissions should be conducted when final construction details are available as part of the development of a Construction Noise and Vibration Management Plan.
- The equipment Table 22 have been assumed to operate concurrently and continuously over a full 15-minute period for each construction stage.

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4.4 **Noise prediction results**

Construction noise has been assessed in accordance with the NSW Roads and Maritime's Construction noise and vibration guideline [17] (CNVG). Table C.1 of the guideline presents categories of perceived noise level according to the level of exceedance above the RBL for each receiver and additional mitigation measures to be triggered at each category. This is reproduced in Table 24.

The prediction results presented in this section identifies the exceedances of CNVG criteria and form the basis of recommendations for mitigation discussed in Section 8.

Predicted airborne La receiver	Aeq(15min) noise	Additional mitigation	Mitigation Levels ²	
Perception ³ dB ab RBL		dB above NML		
All hours				
75dBA or greater	-	-	N, V, PC, RO	HA
Standard Hours: Mor	n – Fri (7am –	- 6pm), Sat (8a	am – 1pm), Sun/Pub Hol (Ni	l)
Noticeable	5 to 10	0	-	NML
Clearly Audible	10 to 20	<10	-	NML
Moderately intrusive	20 to 30	10 to 20	N, V	NML+10
Highly intrusive>30>20		>20	N, V	NML+20
OOHW Period 1: Mo	n – Fri (6pm -	– 10pm), Sat ((1pm – 10pm), Sun/Pub Hol	(8am – 6pm)
Noticeable	5 to 10	<5	-	NML
Clearly Audible	10 to 20	5 to 15	N, R1, DR	NML+5
Moderately intrusive	20 to 30	15 to 25	V, N, R1, DR	NML+15
Highly intrusive	>30	>25	V, IB, N, R1, DR, PC, SN	NML+25
OOHW Period 2: Mo	n – Fri (10pm	1 – 6am), Sat ((10pm – 8am), Sun/Pub Hol ((6pm – 7am)
Noticeable	5 to 10	<5	Ν	NML
Clearly Audible	10 to 20	5 to 15	V, N, R2, DR	NM+5
Moderately intrusive	20 to 30	15 to 25	V, IB, N, PC, SN, R2, DR	NML+15
Highly intrusive	>30	>25	AA, V, IB, N, PC, SN, R2, DR	NML+25

Table 24: Triggers for Additional Mitigation Measures - Airborne Noise

Notes (refer to detailed descriptions):

1	AA = Alternative Accommodation	R1 = Respite Period 1
	V = Verification	R2 = Respite Period 2
	IB = Individual briefings	DR = Duration Respite
	N = Notification	PC = Phone calls
		SN = Specific notifica
2	NML = Noise Management Level	HA = Highly Affected

- ite
- ations

ed (>75 dBA) applies to residences only

3 Perception = relates to level above RBL

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4.4.1 **OPT**

Table 25: Predicted construction noise levels for residential receivers at the Circular Quay site, dBL_{Aeq(15min)}

		Time Period	NML	Construction Stage						
Receiver	Hours			Enabling Works ¹	Southern Embankment Stabilisation Works		Dredging		Scour Mattress Works	
					Land-based Excavator	Backhoe Dredger	Land-based Disposal	Marine- based Disposal	Articulated Concrete Mattress	Grouted Mattress
R1: 1-3	Standard Hours	Day	73	66	55	61	62	62	58	57
Macquarie Street, Sydney	OOHW	Day	68	-	55	61	62	62	58	57
5 5		Evening	67	66	55	61	62	62	58	57
		Night	57	66	55	61	62	62	58	57
R2: 3-7	Standard Hours	Day	73	66	55	61	61	61	57	55
Macquarie Street, Sydney	ООНЖ	Day	68	-	55	61	61	61	57	55
5 5		Evening	67	66	55	61	61	61	57	55
		Night	57	66	55	61	61	61	57	55
R3: 61-69	Standard Hours	Day	73	66	54	61	61	61	57	55
Macquarie Street, Sydney	OOHW	Day	68	-	54	61	61	61	57	55
5 5		Evening	67	66	54	61	61	61	57	55
		Night	57	66	54	61	61	61	57	55
R4: 8 Hickson	Standard Hours	Day	71	50	45	44	64	64	60	61
Road, Dawes Point	OOHW	Day	66	-	45	44	64	64	60	61
		Evening	65	50	45	44	64	64	60	61
		Night	62	50	45	44	64	64	60	61

	Hours	Time Period	NML	Construction Stage							
Receiver				Enabling Works ¹	Southern Embankment Stabilisation Works		Dredging		Scour Mattress Works		
					Land-based Excavator	Backhoe Dredger	Land-based Disposal	Marine- based Disposal	Articulated Concrete Mattress	Grouted Mattress	
R5: 54 Gloucester Street	Standard Hours	Day	71	59	42	52	44	44	41	41	
	ООНЖ	Day	66	-	42	52	44	44	41	41	
		Evening	65	59	42	52	44	44	41	41	
		Night	62	59	42	52	44	44	41	41	
R6: 2 Phillip	Standard Hours	Day	73	66	54	61	60	60	57	54	
Street, Sydney	OOHW	Day	68	-	54	61	60	60	57	54	
		Evening	67	66	54	61	60	60	57	54	
		Night	57	66	54	61	60	60	57	54	

1 – It is understood that sheet piling/pile driving works will not occur on Saturdays, Sundays and public holidays. Therefore, no OOHW daytime works was assessed. During weeknights, it is understood that piling works may occur during the evening and night-time periods.

2 - The results are highlighted according to the level of exceedance above the NML according to the CNVG criteria.

Standard hours:	Out of Hours Works (OOHW):			
Noticeable -0 dB above NML	Noticeable – <5dB above NML			
Clearly audible – <10 dB above NML	Clearly audible – 5 to 15dB dB above NML			
Moderately intrusive - 10 to 20dB above NML	Moderately intrusive - 15 to 25dB above NML			
Highly intrusive - >20dB above NML	Highly intrusive - >25dB above NML			

Table 26: Predicted construction noise levels for non-residential receivers at the Circular Quay site, dBL_{Aeq(15min)}

		Time Period							
Receiver	NML	Fuckling	Southern Embankment Stabilisation Works		Dredging		Scour Mattress Works		
		Works	Land-based Excavator	Backhoe Dredger	Land-based Disposal	Marine-based Disposal	Articulated Concrete Mattress	Grouted Mattress	
C1 – Northern Commercial OPT Premises (Quay Restaurant, The Squire's Landing)	70	63	53	58	76	76	74	78	
C2 - Southern Commercial OPT Premises (Cruise Bar, Yuki's at the Quay)	70	68	60	64	77	77	75	79	
C3 – Park Hyatt	70	57	45	52	64	64	60	59	
C4 – Opera Bar	70	60	50	55	57	57	53	52	
C5 – Holiday Inn Old Sydney	70	69	61	64	63	63	61	61	
E1 – APM College of Business and Communication	65	69	61	64	59	59	57	58	
E2 – Julian Ashton Art School	65	54	45	47	48	48	45	45	
H1 – Australian Steam Building	65	66	57	61	63	63	61	65	
H2 – Cadman's Cottage	65	73	67	69	66	66	63	64	
H3 – Museum of Contemporary Art	65	81	69	76	70	70	67	67	
H4 - The Rocks Discovery Museum	65	70	60	64	62	62	58	58	
H5 – Susannah Place	65	46	38	40	45	45	41	39	
PR1 – First Fleet Park	60	73	58	67	65	65	61	58	
PR2 – Hickson Road Reserve	60	44	33	39	64	64	60	59	
PR3 – Foundation Park	60	51	41	45	45	45	41	41	

	NML Time Period NML Enabling Works Works	Time Period							
Receiver		Southern Emba Stabilisation W		nkment orks	Dredging		Scour Mattress Works		
		Land-based Excavator	Backhoe Dredger	Land-based Disposal	Marine-based Disposal	Articulated Concrete Mattress	Grouted Mattress		

1 – The results are highlighted according to the level of exceedance above the NML according to the CNVG criteria.

Standard hours:

Out of Hours Works (OOHW):

Noticeable - <5dB above NML

Noticeable – 0 dB above NML Clearly audible – <10 dB above NML

Clearly audible – 5 to 15dB dB above NML

Moderately intrusive – 10 to 20dB above NML

Highly intrusive - >20dB above NML

Moderately intrusive – 15 to 25dB above NML Highly intrusive - >25dB above NML Table 27: Predicted sleep disturbance noise levels for residential receivers at the Circular Quay site, dBL_{Amax}

		Construction Stage							
Receiver	Sleep Disturbance	Enchling	Southern Embankment Stabilisation Works		Dredging		Scour Mattress Works		
	Level (SDL)	Works	Land-based Excavator	Backhoe Dredger	Land-based Disposal	Marine- based Disposal	Articulated Concrete Mattress	Grouted Mattress	
R1: 1-3 Macquarie Street, Sydney	67	87	63	69	70	70	66	65	
R2: 3-7 Macquarie Street, Sydney	67	87	63	69	69	69	65	63	
R3: 61-69 Macquarie Street, Sydney	67	87	62	69	69	69	65	63	
R4: 8 Hickson Road, Dawes Point	72	71	53	52	72	72	68	69	
R5: 54 Gloucester Street	72	80	50	60	52	52	57	49	
R6: 2 Phillip Street, Sydney	67	87	62	69	69	69	65	62	

1 - Levels shaded in grey indicate a notional exceedance of SDLs based on the worst-case assumptions noted above

Glebe Island 4.4.2

Receiver	Hours	Period	NML	Transfer of dredged spoil to land for disposal	Casting of ACMs	Delivery and load out of ACMs
R1: 24 Refinery Drive, Pyrmont	Standard Hours	Day	60	60	63	59
	Out of Hours	Day	55	60	63	59
R2: 1-25 Bowman Street, Pyrmont	Standard Hours	Day	60	57	60	56
	Out of Hours	Day	55	57	60	56
R3: 81 Point Street, Pyrmont	Standard Hours	Day	60	53	56	52
	Out of Hours	Day	55	53	56	52
R4: 40 Stephen St, Balmain	Standard Hours	Day	57	53	56	53
	Out of Hours	Day	52	53	56	53
R5: 1 Buchanan St, Balmain	Standard Hours	Day	61	53	56	52
	Out of Hours	Day	56	53	56	52

Table 28: Predicted construction noise levels for residential receivers at the Glebe Island site, dBL_{Aeq(15min)}

1 – The results are highlighted according to the level of exceedance above the NML according to the CNVG criteria.

Standard hours: Noticeable - 0 dB above NML

Clearly audible – <10 dB above NML

Highly intrusive - >20dB above NML

Out of Hours Works (OOHW): Noticeable – <5dB above NML Clearly audible – 5 to 15dB dB above NML Moderately intrusive – 10 to 20dB above NML Moderately intrusive – 15 to 25dB above NML Highly intrusive - >25dB above NML

5 Construction traffic assessment

A traffic noise assessment has been completed to determine the noise impacts of traffic generated by construction works of the OPT and compound site in Glebe Island.

5.1 **OPT**

Background traffic information has been based upon information within the Overseas Passenger Terminal, Sydney – Master Plan Traffic Report, Taylor Thomson Whitting (TTW) NSW Pty Ltd, June 2013 [15]. In the report, only peak hourly volumes were available for the morning (AM), lunchtime (Noon), afternoon and evening (PM) periods. A 10% heavy vehicle percentage has been assumed.

It is understood that the construction works in the OPT site will be a 24/7 operation. Assuming worst-case, the construction traffic generated from works during the night-time period of 10 pm to 7 am has been assessed.

The TTW report does not include traffic volumes along George Street during the night-time period. Further the traffic data is potentially outdated as it was prior to the light rail. Accordingly, a predictive assessment has been carried out based on the construction traffic alone.

A maximum of 25 daily truck movements is anticipated for construction works at OPT. A workforce of 22 has been assumed to arrive within one hour during the night-time.

Road traffic noise levels including both existing and construction generated traffic, have been predicted using the CoRTN algorithm at the nearest residential receiver, R4. The predicted external noise level at R4 is 47dB $L_{Aeq(9hr)}$ which is below the road traffic noise criteria of 50 dBL_{Aeq(9hour)} in Table 13. It is therefore expected that any increase in noise due to the additional construction traffic may be noticeable, however, noise levels are predicted to comply with criteria.

5.2 Glebe Island

The Glebe Island compound site is accessed via James Craig Road, and then through the Glebe Island port area via a marked two lane, two-way access road. James Craig Road primarily carries traffic generated by the existing port activities on Glebe Island, the White Bay Cruise Passenger Terminal (WBCT), and adjacent maritime and commercial facilities. The nearest residential receivers are bounded by Lilyfied Road and Victoria Road (A40).

A maximum of 20 daily truck movements is proposed for construction works at Glebe Island. Given the low traffic volumes generated by the construction works, and the existing high traffic volumes on the surrounding road network, nearby residents are not expected to be impacted by construction traffic.

6 Construction vibration assessment

Given the large distances between other receivers and the piling works, vibration damage is not considered a significant risk for surrounding receivers. No adverse vibration impact, either in terms of cosmetic damage or human comfort, are expected to occur at receiver buildings due to their distance from the subject works.

The following guidance provides recommended minimum working distances for vibration intensive plant. These are based on international standards and guidance and reproduced in Table 29 below for reference.

		Minimum working distance				
Plant Item	Rating / Description	Cosmetic damage (BS 7385)	Human response (OH&E Vibration Guideline)			
Vibratory pile driver	Sheet piles	2 m to 20 m	20 m			

Table 29: Recommended minimum working distances for vibration intensive plant

The minimum working distances presented are indicative and will vary depending on the particular item of plant and local geotechnical conditions. They apply to cosmetic damage of typical buildings under typical geotechnical conditions.

Mitigation will need to be considered where sensitive receivers are located closer to the construction work zone than these minimum working distances. It is noted that focus is on mitigating cosmetic damage.

The contractor will be required to manage vibration as well as noise and make use of best practice in the management of vibration using simple and practicable techniques such equipment selection and as avoiding dropping heavy items.

Where vibration intensive works are required within the minimum working distances outlined in Table 29, vibration monitoring at the nearest potential affected building should be considered, where real-time alerts can be generated when measured vibration levels exceed criteria.
7 Assessment summary

This section summarises the predicted noise impacts based on the construction noise assessment to the noise sensitive receivers surrounding the OPT and the Glebe Island construction sites.

7.1 OPT

Table 30: Summary of predicted noise impacts to the nearby sensitive receivers surrounding the OPT site

A	Hours ^{1,2}	Period	Predicted impacts ³		
Acuvity			Residential Receivers	Non-residential Receivers [if in use]	
ENABLING WORKS					
Enabling Works,	Standard Hours	Day	Below NML	Moderately intrusive	
Sheet Pile Installation	Out of Hours	Evening	Below NML		
		Night	Clearly audible		
	Sleep Disturbance	Night	Above SDL		
SOUTHERN EMBANKMENT STABILIZATION WORKS					
Option 1 – Land-	Standard Hours	Day	Below NML	Clearly audible	
based Excavator	Out of Hours	Day	Below NML		
		Evening	Below NML		
		Night	Below NML		
	Sleep Disturbance	Night	Below SDL		
Option 2 – Backhoe Dredger	Standard Hours	Day	Below NML	Moderately intrusive	
	Out of Hours	Day	Below NML		
		Evening	Below NML		
		Night	Noticeable		

A _4''4	H 1.2	Derited	Predicted impacts ³	
Activity	Hours',-	Period	Residential Receivers	Non-residential Receivers [if in use]
	Sleep Disturbance	Night	Above SDL	
DREDGING				
Option 1 – Land-	Standard Hours	Day	Below NML	Clearly audible
based Disposal	Out of Hours	Day	Below NML	
		Evening	Below NML	
		Night	Clearly audible	
	Sleep Disturbance	Night	Above SDL	
Option 2 – Marine-	Standard Hours	Day	Below NML	Clearly audible
based Disposal	Out of Hours	Day	Below NML	
		Evening	Below NML	
		Night	Clearly audible	
	Sleep Disturbance	Night	Above SDL	
SCOUR MATTRESS	WORKS			
Option 1 – ACM	Standard Hours	Day	Below NML	Clearly audible
	Out of Hours	Day	Below NML	
		Evening	Below NML	
		Night	Noticeable	
	Sleep Disturbance	Night	Below SDL	
Option 2 – Grouted Mattress	Standard Hours	Day	Below NML	Clearly audible
		Day	Below NML	
	Out of Hours	Evening	Below NML	
		Night	Noticeable	

Activity	Hours ^{1,2}	Period	Predicted impacts ³	
			Residential Receivers	Non-residential Receivers [if in use]
	Sleep Disturbance	Night	Below SDL	

1 - Standard hours are Monday to Friday 7am to 6pm and Saturday from 8am to 1pm.

2 - Out of Hours during the different time periods:

Day are Saturday 7am to 8am and 1pm to 6pm; Sunday and public holidays 8am to 6pm;

Evening hours are 6pm to 10pm,

Night-time hours are 10pm to 7am.

3 – The predicted impacts show the worst case impact for the nearest receiver.

4 - The NML exceedance bands according to the CNVG criteria and their corresponding subjective response to impacts

Standard hours:

Noticeable – 0 dB above NML Clearly audible – <10 dB above NML Moderately intrusive – 10 to 20dB above NML Highly intrusive - >20dB above NML Out of Hours Works (OOHW): Noticeable – <5dB above NML Clearly audible – 5 to 15dB dB above NML Moderately intrusive – 15 to 25dB above NML Highly intrusive - >25dB above NML

7.2 Glebe Island

Activity	Hours	Period	Predicted impacts to residential receivers
Transfer of dredged soil	Standard Hours	Day	Below NML
	Out of Hours	Day	Clearly audible
Casting of ACM	Standard Hours	Day	Below NML
	Out of Hours	Day	Clearly audible
Delivery and load out of ACM	Standard Hours	Day	Below NML
	Out of Hours	Day	Clearly audible

Table 31: Summary of predicted noise impacts to the nearby sensitive receivers surrounding the Glebe compound site

1 - Standard hours are Monday to Friday 7am to 6pm and Saturday from 8am to 1pm.

2 - Out of Hours during the different time periods:

Day are Saturday 7am to 8am and 1pm to 6pm; Sunday and public holidays 8am to 6pm;

Evening hours are 6pm to 10pm,

Night-time hours are 10pm to 7am.

3 – The NML exceedance bands according to the CNVG criteria and their corresponding subjective response to impacts

Standard hours:	Out of Hours Works (OOHW):	
Noticeable – 0 dB above NML	Noticeable – <5dB above NML	
Clearly audible – <10 dB above NML	Clearly audible – 5 to 15dB dB above NML	
Moderately intrusive – 10 to 20dB above NML	Moderately intrusive – 15 to 25dB above NML	
Highly intrusive - >20dB above NML	Highly intrusive - >25dB above NML	

8 Mitigation measures

8.1 Standard Mitigation Measures

A summary of recommended mitigation measures is presented in Table 32.

Table 32: Recommended noise mitigation and management measures

Item No.	Item	Detail
1	Noise and vibration management plan	A Construction Noise and Vibration Management Plan shall be prepared prior to the issuing of a Construction Certificate. This will specify the actual plant to be used and will include updated estimates of the likely levels of noise and the scheduling of activities.
2	Equipment selection	Equipment shall be selected to have Sound Power Levels (Lw) to be the same or quieter as the levels used in this assessment.
		Where possible stationary equipment should be located behind structures such as demountable buildings or stockpiles to maximise shielding to receivers.
		Consider using electric / hydraulic equipment where possible.
		Use only the necessary size and power equipment
		All plant and equipment used on site must be:
		• maintained in a proper and efficient condition; and
		• operated in a proper and efficient manner.
		Turn off all vehicles, plant and equipment when not in use.
		Ensuring that the Responsible Person checks the conditions of the powered equipment used on site daily to ensure plant is properly maintained and that noise is kept as low as practicable.
		If rental equipment are to be used, the noise levels of plant and equipment items are to be considered in rental decisions.
3	Location of plant	The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers. Only have necessary equipment on site. Plan truck movements to avoid residential streets where possible.
4	Non-tonal and ambient sensitive reversing alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work. Consider the use of ambient sensitive alarms that adjust output relative to the ambient noise level.
5	Hours of work	Where noise intensive equipment is to be used near sensitive receivers, the works should be scheduled for Standard Construction Hours, where possible. If it is not possible to restrict the works to the daytime then they should be completed as early as possible in each work shift. Appropriate respite should also be provided to affected receivers in accordance with the CNVG and/or the project's conditions of approval.

8.2 Additional Construction Mitigation Measures

The CNVG defines how additional mitigation measures are applied to airborne noise impacts. The approach has been provided in Table 24 and the measures triggered from the results of the assessment in Section 4.4 are given below.

Item No.	Item	Detail
1	Notification (N)	Advanced warning of works and potential disruptions can assist in reducing the impact on the community. The notification may consist of a letterbox drop (or equivalent) detailing work activities, time periods over which these will occur, impacts and mitigation measures. Notification should be a minimum of 5 working days prior to the start of works. The approval conditions for projects may also specify requirements for notification to the community about works that may impact on them.
2	Verification (V)	As part of routine checks of noise levels or following reasonable complaints. This verification should include measurement of the background noise level and construction noise. Note this is not required for projects less than three weeks unless to assist in managing complaints.
3	Respite Offer 2 (R2)	Night-time construction noise in out of hours period 2 $(OOHW 2)^1$ shall be limited to two consecutive nights except for where there is a Duration Respite. For night work these periods of work should be separated by not less than one week and 6 nights per month. Where possible, high noise generating works shall be completed before 11pm.
4	Duration Respite (DR)	Respite offers and respite periods 1 and 2 may be counterproductive in reducing the impact on the community for longer duration projects. In this instance and where it can be strongly justified it may be beneficial to increase the work duration, number of evenings or nights worked through Duration Respite so that the project can be completed more quickly. The project team should engage with the community where noise levels are expected to exceed the NML to demonstrate support for Duration Respite. Where there are few receivers above the NML each of these receivers should be visited to discuss the project to gain support for Duration Respite.

Table 33: Additional mitigation measures from CNVG

1 - OOHW Period 2: Mon – Fri (10pm – 6am), Sat (10pm – 8am), Sun/Pub Hol (6pm – 7am)

9 Conclusions

Noise generated from the different construction phases of the OPT capital dredging works and scour-protection works and the Glebe Island compound site have been predicted at surrounding noise sensitive receivers. This has been informed by guidance from the project Construction Consultant.

The noise impacts from the OPT works to residential receivers are predicted to be marginal to minor during the Enabling works and Dredging works, where the use of equipment such as the vibratory and sheet pile drivers and the dredging machine are predicted to generate noise impacts above construction NMLs. Non-residential receivers near OPT are also predicted to have minor to moderate impacts during all the construction stages when they are in use.

For the works in Glebe Island, the impacts to the nearby residential receivers are minor during the Out of hours period.

The likelihood of adverse vibration impacts as a result of proposed construction works is low. It is recommended to have some construction monitoring during vibration works to ensure compliance of the vibration criteria.

The original proposal for the OPT works was to be undertaken during the nighttime period given the marine vessel traffic during the day. While the proposal seeks approval for 24/7 construction hours and has been assessed accordingly, given the current environment in light the COVID-19 situation, it may be practicable to carry out more work during standard hours. Where noise intensive equipment is to be used near sensitive receivers, the works should be scheduled for Standard Construction Hours, where possible. If it is not possible to restrict the works to the daytime, then they should be completed as early as possible in each work shift.

Preliminary recommendations are given for the control of construction noise for the periods where exceedances are predicted of relevant Noise Management Levels. The construction contractor should be required to prepare a detailed Construction Noise and Vibration Management Plan which reviews the modelled construction details and noise and vibration impacts presented in Section 7, along with development of more detailed mitigation and management strategies.

Appendix A

Glossary

Term	Definition
Ambient noise level	The ambient noise level is the overall noise level measured at a location from multiple noise sources. When assessing noise from a particular development, the ambient noise level is defined as the remaining noise level in the absence of the specific noise source being investigated. For example, if a fan located on a building is being investigated, the ambient noise level is the noise level from all other sources without the fan operating, such as traffic, birds, people talking and other noise from other buildings.
Background noise level	The background noise level is the noise level that is generally present at a location at all or most times. Although the background noise may change over the course of a day, over shorter time periods (e.g. 15 minutes) the background noise is almost-constant. Examples of background noise sources include steady traffic (e.g. motorways or arterial roads), constant mechanical or electrical plant and some natural noise sources such as wind, foliage, water and insects.
	Assessment Background Level (ABL)
	A single-number figure used to characterise the background noise levels from a single day of a noise survey. ABL is derived from the measured noise levels for the day, evening or night time period of a single day of background measurements. The ABL is calculated to be the tenth percentile of the background LA90 noise levels – i.e. the measured background noise is above the ABL 90% of the time.
	Rating Background Level (RBL / minLA90,1hour)
	A single-number figure used to characterise the background noise levels from a complete noise survey. The RBL for a day, evening or night time period for the overall survey is calculated from the individual Assessment Background Levels (ABL) for each day of the measurement period, and is numerically equal to the median (middle value) of the ABL values for the days in the noise survey.
Decibel (dB)	The logarithmic scale used to measure sound and vibration levels.
	Human hearing is not linear and involves hearing over a large range of sound pressures, which would be unwieldy if presented on a linear scale. Use of a logarithmic scale allows all sound levels to be expressed based on how loud they are relative to a reference sound (typically 20 μ Pa, which is the approximate human threshold of hearing). For sound in other media (e.g. underwater noise) a different reference level (1 μ Pa) is used instead.
	An increase of approximately 10 dB corresponds to a subjective doubling of the loudness of a noise. The minimum increase or decrease in noise level that can be noticed is typically 2 to 3 dB.
dB weighting curves	The frequency of a sound affects its perceived loudness and human hearing is less sensitive at low and very high frequencies. When seeking to represent the summation of sound pressure levels across the frequency range of human hearing into a single number, weighting is typically applied. Most commonly, A-weighting, denoted as dB(A), is used for environmental noise assessment. This is often supplemented by the linear or C-weighting curves, where there is the potential for excess low-frequency sound at higher sound pressure levels.



dB(A) dB(A) denotes a single-number sound pressure level that includes a frequency weighting ('A-weighting') to reflect the subjective loudness of the sound level.

The frequency of a sound affects its perceived loudness. Human hearing is less sensitive at low and very high frequencies, and so the A-weighting is used to account for this effect. An A-weighted decibel level is written as dB(A).

Some typical dB(A) levels are shown below. _

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	Sound Pressure Level dB(A)	Example
	130	Human threshold of pain
	120	Jet aircraft take-off at 100 m
	110	Chain saw at 1 m
	100	Inside nightclub
	90	Heavy trucks at 5 m
	80	Kerbside of busy street
	70	Loud stereo in living room
	60	Office or restaurant with people present
	50	Domestic fan heater at 1m
	40	Living room (without TV, stereo, etc)
	30	Background noise in a theatre
	20	Remote rural area on still night
	10	Acoustic laboratory test chamber
	0	Threshold of hearing
dBrms	The root mean squared (rms variation and energy conten times the peak value	s) value takes into account both time history t. The rms value is typically equal to 0.707 $(1/\sqrt{2})$
Frequency	Frequency is the number of In musical terms, frequency end of the human hearing fr pitched' and sounds with a h 'high pitched'.	cycles per second of a sound or vibration wave. is described as 'pitch'. Sounds towards the lower equency range are perceived as "bass" or 'low- nigher frequency are perceived as 'treble' or

Term

Definition While single weighted sound pressure levels provide benefits in simplifying the assessment and evaluation of sound levels, further detailed evaluation of the frequency content is often undertaken. While this could be done based on individual frequencies (all ~20,000 Hz), the analysis is often grouped into bands, or 'octave bands'. 1/1 octave or 1/3 octave bands are most commonly utilised in environmental noise assessment, and while referred to by a single Hz based on the nominal centre frequency of the band (e.g. 31.5 Hz), are a summation of all frequencies between a defined lower and upper frequency.

Frequency is the rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the hertz (Hz), which is identical to cycles per second. A 1000Hz is often denoted as 1 kHz, eg 2 kHz = 2000 Hz. Human hearing ranges approximately from 20 Hz to 20 kHz. For design purposes the octave bands between 63 Hz to 8 kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or in some cases, narrower frequency bands.



L10(period)	The sound level exceeded for 10% of the measurement period, or alternatively, the sound levels would be lower for 90% of the time.
	The L10 is often defined as the 'average maximum' sound levels, as in AS1055-2018 with the advent of statistical sound level meters.
L90(period)	The sound level exceeded for 90% of the measurement period.
	The L90 is often defined as the 'average minimum' or 'background' noise level for a period of measurement. For example, 45 dBLA90,15min indicates that the sound level is higher than 45 dB(A) for 90% of the 15-minute measurement period.
Leq(period)	The equivalent ('eq') continuous sound level, used to describe the level of a time-varying sound or vibration measurement.
	The Leq is often defined as the 'average' level, and mathematically, is the energy-average level over a measurement period $-$ i.e. the level of a constant sound that contains the same sound energy as the measured sound.
Lmax	The Lmax is the 'absolute maximum' level of a sound or vibration recorded over the measurement period.
	As the Lmax is often caused by an instantaneous event, it can vary significantly between measurements.

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Term	Definition
Peak Particle Velocity (PPV)	The highest velocity of a particle (such as part of a building structure) as it vibrates. PPV is commonly used as a vibration criteria, and is often interpreted as a PPV based on the Lmax or Lmax,spec index.
Sound Power and Sound Pressure	The sound power level (Lw) of a source is a measure of the total acoustic power radiated by a source. The sound pressure level (Lp) varies as a function of the environment and distance from a source.
	The sound power level is an intrinsic characteristic of a source (analogous to its mass), which is not affected by the environment within which the source is located.
Vibration	Waves in a solid material are called 'vibration', as opposed to similar waves in air, which are called 'sound' or 'noise'. If vibration levels are high enough, they can be felt; usually vibration levels must be much higher to cause structural damage.
	A vibrating structure (e.g. a wall) can cause airborne noise to be radiated, even if the vibration itself is too low to be felt. Structureborne vibration limits are sometimes set to control the noise level in a space.
	Vibration levels can be described using measurements of displacement, velocity and acceleration. Velocity and acceleration are commonly used for structureborne noise and human comfort. Vibration is described using either metric units (such as mm, mm/s and mm/s2) or else using a decibel scale.

Appendix F– Maritime Archaeological and Indigenous Heritage Assessment and Statement of Heritage Impacts



Capital Dredging and Scour Protection Works at the Overseas Passenger Terminal



Maritime Archaeological and Indigenous Heritage Assessment and Statement of Heritage Impact

Capital Dredging and Scour Protection Works at the Overseas Passenger Terminal

Maritime Archaeological and Indigenous Heritage Assessment and Statement of Heritage Impact

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Port Authority of New South Wales (NSW) proposes to undertake capital dredging and scourprotection works at the Overseas Passenger Terminal (OPT) on the western side of Circular Quay in Sydney Harbour. A compound location to facilitate the works is proposed at Berth 2 on Glebe Island. The proposal dredging location and compound site at Glebe Island.

The project driver is to deepen the OPT berth pocket to increase the underkeel clearance to allow cruise ships to safely berth. Scour protection would be installed along the whole length of the quay wall to prevent undermining from hydraulic instability. Currently, there is a risk of incoming cruise ships having less than 0.5 metres (m) underkeel clearance, which is a clear safety concern.

The proposal's key features are:

- Installing a sheet pile retaining wall of about 65 m long at the southern end of the OPT berth pocket.
- Dredging approximately 20,000 m³ of sediment to deepen the berth pocket.
- Installing scour protection of about 12,000 m² in the form of pumped concrete mattress or articulated concrete mattresses.

AECOM has been commissioned by Port Authority of NSW to undertake a maritime archaeological assessment that includes a Statement of Heritage Impact (SoHI), and a Indigenous heritage Due Diligence Assessment for any known or potential impacts to cultural heritage remains that may be present within the Project area. This includes known and potential impacts to Indigenous and non-Indigenous heritage and archaeological sites.

Cosmos Archaeology Pty Ltd (Cosmos Archaeology) were engaged separately by Port Authority of NSW to undertake an underwater survey of the Project area, the results of which were to be used in this AECOM report. The results of the underwater survey are used in the Section 7.0 of this report, and the whole report added as an appendix to this report.

This assessment has identified the proposed capital dredging works and scour protection works at the OPT are likely to have an impact on historical archaeological remains present at the northern end of the berth pocket, and potential impacts to Aboriginal objects within a former estuarine environment that has since become submerged.

The Aboriginal due Diligence report has assessed the impact from dredging works to be rated as Moderate, however, it has also been assessed as a low to moderate potential to impact any intact Aboriginal sites.

Impacts have also been indented to occur to remains associated with the former Wharf No. 7 built in Campbells Cove in 1901 and removed from the site in 1980. The wharf was constructed after the resumption of wharves in Sydney Harbour in 1900 and is believed to have been built under the new standard for wharf construction.

Opportunities to relocate the proposed works are not possible as the OPT is required to function as the overseas passenger terminal for curse ships entering Sydney Harbour. Impact to the former Wharf No. 7 cannot be avoided, and the impacts need to be mitigated.

Proposed mitigation measures include undertaking a controlled maritime archaeological program that would include recording, testing and the sieving of any dredge deposit remains that are present within the location of the former wharf. As the project has been assessed as impacting on potential archaeological (relic) remains associated with the former Wharf No. 7, the following recommendations can be made.

Aboriginal Heritage Recommendations

In light of the above key findings and Due Diligence Process Questions presented in Table 4, this Aboriginal Heritage Due Diligence Assessment provides the following management recommendations

1. This assessment has determined that Aboriginal objects may be encountered during the proposed works. Investigations of Aboriginal cultural heritage undertaken in accordance with

the requirements of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010b) however, are impractical within submerged contexts. Therefore, a robust unexpected finds procedure for Aboriginal heritage should be developed prior to commencement of works. The procedure should be developed to run concurrently with historic investigations (refer below) and include protocols for identifying and managing Aboriginal cultural heritage.

- 2. Should any Aboriginal objects be identified at any stage of the project, Port Authority of New South Wales may be required to apply for an Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the National Parks and Wildlife Act 1974 (NPW Act 1974). Generally, applications for AHIPs must be supported by an Aboriginal Cultural Heritage Assessment Report (ACHAR) compiled in accordance with Section 3 of the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011). A process of Aboriginal community consultation should be carried out accordance with OEH's Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a) must also be demonstrated.
- 3. In the event that human skeletal material (remains), are identified at any point during the Project, the procedure outlined in Appendix B should followed.
- 4. In the event that Aboriginal objects, including possible human skeletal material (remains), are identified at any point during the Project, the procedure outlined in Appendix B should followed.

Maritime Archaeological Recommendations

- 5. A Section 140 permit application should be submitted to Heritage NSW, Department of Premier and Cabinet, prior to the commencement of works. The application must include a maritime archaeological research design and methodology must be prepared that details the methodology for how the maritime archaeologist works would be conducted in conjunction with the proposed works. The document should include
 - Principal heritage specialists working on the project;
 - Details regarding the stages of works to be conducted on site, include methodology for each site;
 - How the works would be undertaken;
 - Recording methods for each stage of works, ;
 - Method for collecting and location for the storage of relics collected from the site which the artefact analysis is under taken; and,
 - Reporting at the conclusion of the project.

1.0 Introduction

1.1 Background

Port Authority of New South Wales (NSW) proposes to undertake capital dredging and scourprotection works at the Overseas Passenger Terminal (OPT) on the western side of Circular Quay in Sydney Harbour. A compound location to facilitate the works is proposed at Berth 2 on Glebe Island. The proposal dredging location and compound site at Glebe Island is presented on Figure 1, and proposed dredging area is presented on Figure 2.

The project driver is to deepen the OPT berth pocket to increase the underkeel clearance to allow cruise ships to safely berth. Scour protection would be installed along the whole length of the quay wall to prevent undermining from hydraulic instability. Currently, there is a risk of incoming cruise ships having less than 0.5 metres (m) underkeel clearance, which is a clear safety concern.

The proposal's key features are:

- Installing a sheet pile retaining wall of about 65 m long at the southern end of the OPT berth pocket.
- Dredging approximately 20,000 m³ of sediment to deepen the berth pocket.
- Installing scour protection of about 12,000 m² in the form of pumped concrete mattress or articulated concrete mattresses.

AECOM has been commissioned by Port Authority of NSW to undertake a maritime archaeological assessment that includes a Statement of Heritage Impact (SoHI) for any known or potential impacts to cultural heritage remains that may be present within the Project area. This includes known and potential impacts to Indigenous and non-Indigenous heritage and archaeological sites.

Cosmos Archaeology Pty Ltd (Cosmos Archaeology) were engaged separately by Port Authority of NSW to undertake an underwater survey of the Project area, the results of which were to be used in this AECOM report. The results of the underwater survey are used in the Section 7.0 of this report, and the whole report added as an appendix to this report.

AECOM has also been commissioned to prepare a separate Indigenous heritage Due Diligence Assessment. This assessment has been prepared by Luke Wolfe, Senior Heritage Specialist at AECOM, and the results of this assessment have been included and added as an appendix to this report.

1.2 Site location

The OPT is situated on the western side of Sydney Cove (Circular Quay). The investigation for this project is confined to the seabed in front of the wharf at the OPT (Figure 1).

This report includes a general history of the reclamation and seawall development in Darling Harbour and Cockle Bay (to the south of the Project area) to further understand the development phases of wharves within the Project area.

1.3 **Project justification**

The capital dredging works are required to maintain a safe depth of water below the current keel of vessels berthed at the OPT. Scour protection would be installed along the whole length of the quay wall to prevent undermining from hydraulic instability. Currently, there is a risk of incoming cruise ships having less than 0.5 m underkeel clearance, which is a clear safety concern.

1.4 Scope of work

The objectives of this investigation are to:

 Review geotechnical data, including borehole investigations and geophysical survey data of the Project area;

- Prepare an Aboriginal heritage due diligence report to assess the potential for submerged cultural • landscapes within the Project area;
- Undertake a maritime archaeological assessment, incorporating site inspection data collected by Cosmos Archaeology, to assess the potential for maritime archaeological remains to be present within the Project area; and
- Prepare a SoHI, which includes statements of significance for any known or potential maritime • archaeological remains, assessing the impact of the proposed works on the archaeological potential in the Project area.

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Figure 1: Location of the proposed capital dredging works and rock armour protection work

1.5 Report methodology

This heritage assessment has been undertaken in accordance with the NSW Heritage Division guidelines Assessing Heritage Significance (NSW Heritage Office, 2001) and Statements of Heritage Impact (NSW Heritage Office & Department of Urban Affairs & Planning, 2002) and includes:

- desktop searches of relevant heritage registers;
- review of Project drawings and concept design reports;
- review of the following key documents:
 - Cosmos Archaeology 2014 maritime archaeological assessment,
 - heritage register listings for the Project area,
 - relevant historic shipwreck databases,
 - review of borehole data and Port Authority of NSW Hydrographic Survey data,
- assessment of the Project against the heritage significance of all known and potential maritime archaeological remains within the Project area. The assessment has been undertaken in light of the conservation processes and principles found in *The Burra Charter: The Australian ICOMOS Charter for Places of Cultural Significance* (2013). *The Burra Charter* is considered to be the preeminent guidance document for the management of change for places of heritage significance within Australia.

1.5.1 Report authorship and acknowledgements

The maritime archaeological component of this report has been prepared by Chris Lewczak (Principal Heritage Specialist and Maritime Archaeologist). Luke Wolfe (Senior Heritage Specialist) has prepared the Aboriginal heritage due diligence assessment. Dr Darran Jordan (Principal Heritage Specialist) provided a technical review of the content.

Section 7.0 has been prepared using the assessment data provided by Cosmos Archaeology. The entirety of the Cosmos Archaeology site inspection report has been included in Appendix A.

1.6 Report limitations

The purpose of this report is to identify and assess historic/maritime heritage and archaeological potential which might be impacted by the Project. Predictions have been made within this report about the probability of archaeological materials occurring within the site, based on landform indications and environmental contexts. However, it is possible that materials may occur in areas without landform indications and in any context. This report is based on the design for the Project made available at the time of assessment; it is noted that details of the Project may change or be refined.

A summary of the statutory requirements regarding historical heritage is provided in Section 2.0. The summary is provided based on the experience of the authors with the heritage system in Australia and does not purport to be legal advice. It should be noted that legislation, regulations and guidelines change over time and users of the report should satisfy themselves that the statutory requirements have not changed since the report was written.

2.0 Statutory legislation

2.1 Commonwealth legislation

2.1.1 Environmental Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) defines the 'environment' as both natural and cultural environments and therefore includes Aboriginal and non-Aboriginal historic cultural heritage items. Under the EPBC Act, protected heritage items are listed on World Heritage List (WHL); the National Heritage List (NHL) (items of significance to the nation) or the Commonwealth Heritage List (CHL) (items belonging to the Commonwealth or its agencies). These two lists replaced the Register of the National Estate (RNE). The RNE has been suspended and is no longer a statutory list; however, it remains as an archive.

If proposed works are situated within the designated area or buffer zone of an item or place listed on the WHL, a referral must be made under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) if proposed action has, will have, or is likely to have a significant impact on the world heritage values of a declared World Heritage property.

The NHL is a register of natural and cultural places with outstanding heritage significance to the Australian nation. Each entry to the NHL is assessed by the Australian Heritage Council as having exceptional heritage value and is protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The Act requires that approval is obtained from the Australian Government Minister for the Environment Protection, Heritage and the Arts before any action takes place that has, will have, or is likely to have, a significant impact on the national heritage values of a listed place.

Under Part 9 of the EPBC Act, any action that is likely to have a significant impact on a matter of National Environmental Significance (known as a controlled action under the EPBC Act), may only progress with approval of the Commonwealth Minister for the Department of the Environment and Energy (DoEE). An action is defined as a project, development, undertaking, activity (or series of activities), or alteration. An action would also require approval if:

- it is undertaken on Commonwealth land and would have or is likely to have a significant impact on the environment on Commonwealth land; and
- it is undertaken by the Commonwealth and would have or is likely to have a significant impact.

2.2 State legislation

2.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act), administered by the NSW Department of Planning and Environment (DP&E), requires that consideration be given to environmental impacts as part of the land use planning process in NSW. In NSW, environmental impacts include impacts to Aboriginal and non-Aboriginal (i.e., European) cultural heritage.

2.2.2 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act), administered by OEH, is the primary legislation for the protection of Aboriginal cultural heritage in NSW. The NPW Act gives the Director General responsibility for the proper care, preservation and protection of 'Aboriginal objects' and 'Aboriginal places', defined under the Act as follows:

- an *Aboriginal object* is any deposit, object or material evidence (that is not a handicraft made for sale) relating to Aboriginal habitation of NSW, before or during the occupation of that area by persons of non-Aboriginal extraction (and includes Aboriginal remains); and
- an Aboriginal place is a place declared so by the Minister administering the NPW Act because the place is or was of special significance to Aboriginal culture. It may or may not contain Aboriginal objects.

Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm them and includes a 'strict liability offence' for such harm. A 'strict liability offence' does not require someone to know that it is an Aboriginal object or place they are causing harm to in order to be prosecuted. Defences against the 'strict liability offence' in the NPW Act include the carrying out of certain 'Low Impact Activities', prescribed in Clause 80B of the *National Parks and Wildlife Amendment Regulation 2010* (NPW Regulation), and the demonstration of due diligence.

An Aboriginal Heritage Impact Permit (AHIP) issued under Section 90 of the NPW Act is required if impacts to Aboriginal objects and/or places cannot be avoided. An AHIP is a defence to a prosecution for harming Aboriginal objects and places if the harm was authorised by the AHIP and the conditions of that AHIP were not contravened. Applications for an AHIP must be accompanied by assessment reports compiled in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010b). Applications must also provide evidence of consultation with the Aboriginal communities. Consultation is required under Part 8A of the NPW Regulation and is to be conducted in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a). AHIPs may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects. Section 89A of the NPW Act requires notification of the location of Aboriginal sites within a reasonable time, with penalties for non-notification. Section 89A is binding in all instances.

2.2.3 Sydney Regional Environmental Plan (SREP) – Sydney Harbour Catchment (2005)

NSW Regional Environmental Plans (REPs) are plans drafted by the Department of Planning and apply to a nominated "region," covering broad issues such as urban growth, commercial centres, extractive industries, recreational needs, rural lands, heritage and conservation. They provide the framework for detailed local planning by councils. The local council of the area in which development is proposed to be carried out is usually the consent authority for that development for the purposes of the Sydney Regional Environmental Plan (SREP), unless the Department of Planning selects to substitute the Minister or Director General of Planning as the consent authority in respect to particular forms of development.

The stated objectives of the *SREP* – *Sydney Harbour Catchment (2005)* with regards to foreshores and waterways areas are as follows (Section 53);

- a. to conserve the environmental heritage of the land to which this Part applies, and
- b. to conserve the heritage significance of existing significant fabric, relics, settings and views associated with the heritage significance of heritage items, and
- c. to ensure that archaeological sites and places of Aboriginal heritage significance are conserved, and
- d. to allow for the protection of places which have the potential to have heritage significance but are not identified as heritage items.

Note: Attention is drawn to the provisions of the Heritage Act 1977 and the National Parks and Wildlife Act 1974 under which an approval or permit under either or both of those Acts may be required for certain activities, whether or not development consent is required by this clause.

Part 5 of the *SREP* – *Sydney Harbour Catchment (2005)* contains provisions for the protection and conservation of cultural heritage sites, items and values – both Aboriginal and non-Aboriginal.

Under the SREP, a "heritage item" is defined as:

- a. a building, work, archaeological site or place:
 - *i.* that is specified in an inventory of heritage items prepared for the purposes of this plan, being an inventory that is available at the head office of the Department, and

- *ii.* that is situated on a site described in Schedule 4 and identified on the Heritage Map, or
- b. a place:
 - *i.* that is specified in an inventory of heritage items prepared for the purposes of this plan, being an inventory that is available at the head office of the Department, and
 - ii. that is described in the inventory as a place of Aboriginal heritage significance.

Clause 55 of the SREP provides protection for heritage items. Under this clause, the following development may be carried out only with development consent:

- a. demolishing or moving a heritage item,
- b. altering a heritage item by making structural or non-structural changes to its exterior, including changes to its detail, fabric, finish or appearance,
- c. altering a heritage item by making structural changes to its interior,
- d. disturbing or damaging a place of Aboriginal heritage significance or an Aboriginal object,
- e. erecting a building on, or subdividing, land on which a heritage item is located.

(2) Development consent is not required by this clause if:

- a. in the opinion of the consent authority:
 - *i.* the proposed development is of a minor nature or consists of maintenance of the heritage item, and
 - *ii.* the proposed development would not adversely affect the significance of the heritage item, and
 - iii. the proponent has notified the consent authority in writing of the proposed development and the consent authority has advised the applicant in writing before any work is carried out that it is satisfied that the proposed development will comply with this subclause and that development consent is not otherwise required by this plan.

(4) Before granting development consent as required by this clause, the consent authority must assess the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item concerned.

(5) The assessment must include consideration of a heritage impact statement that addresses at least the following issues (but is not to be limited to assessment of those issues, if the heritage significance concerned involves other issues):

- a. the heritage significance of the item as part of the environmental heritage of the land to which this Part applies, and
- b. the impact that the proposed development will have on the heritage significance of the item and its setting, including any landscape or horticultural features, and
- c. the measures proposed to conserve the heritage significance of the item and its setting, and

- d. whether any archaeological site or potential archaeological site would be adversely affected by the proposed development, and
- e. the extent to which the carrying out of the proposed development would affect the form of any historic subdivision.

(6) The consent authority may also decline to grant development consent until it has considered a conservation management plan, if it considers the development proposed should be assessed with regard to such a plan.

Clause 59 – Development in Vicinity of Heritage Items:

- 1. Before granting development consent to development in the vicinity of a heritage item, the consent authority must assess the impact of the proposed development on the heritage significance of the heritage item.
- 2. This clause extends to development:
 - a. that may have an impact on the setting of a heritage item, for example, by affecting a significant view to or from the item or by overshadowing, or
 - b. that may undermine or otherwise cause physical damage to a heritage item, or
 - c. that will otherwise have any adverse impact on the heritage significance of a heritage item.
- 3. The consent authority may refuse to grant development consent unless it has considered a heritage impact statement that will help it assess the impact of the proposed development on the heritage significance, visual curtilage and setting of the heritage item.
- 4. The heritage impact statement should include details of the size, shape and scale of, setbacks for, and the materials to be used in, any proposed buildings or works and details of any modification that would reduce the impact of the proposed development on the heritage significance of the heritage item.

2.2.4 Heritage Act 1977

The NSW *Heritage Act 1977* (as amended) was enacted to conserve the environmental heritage of NSW. Under Section 32, places, buildings, works, relics, movable objects or precincts of heritage significance are protected by means of either Interim Heritage Orders (IHO) or by listing on the NSW State Heritage Register (SHR). Items that are assessed as having State heritage significance can be listed on the SHR by the Minister on the recommendation of the NSW Heritage Council.

Proposals to alter, damage, move or destroy places, buildings, works, relics, movable objects or precincts protected by an IHO or listed on the SHR require an approval under Section 60. The 'relics provision' requires that no archaeological relics be disturbed or destroyed without prior consent from the Heritage Council of NSW. Therefore, no ground disturbance works may proceed in areas identified as having archaeological potential without first obtaining an excavation permit pursuant to Section 60 of the *Heritage Act 1977* or an archaeological exemption.

For the purposes of this Act, the State of NSW includes the seabed and the water column up to 3 nautical miles (nm) from the coast. The NSW *Heritage Act 1977* therefore, within 3 nm of the NSW coast, can protect shipwrecks. Shipwrecks currently under the jurisdiction of the NSW *Heritage Act* are identified in the Historic Shipwrecks Register, maintained by the NSW Heritage Council.

Part 3C of the Act contains provisions for the protection of shipwrecks over 75 years old. This section is included in the Act to provide a link to and consistency with the (Commonwealth) *Historic Shipwrecks Act 1976.* In NSW the 'relics' provision takes precedence over Part 3C when it comes to determining the legal and protected status of a wreck and associated artefacts.

Under Section 170 of the *Heritage Act 1977*, NSW Government agencies are required to maintain a register of heritage assets. The register places obligations on the agencies, but not on non-government proponents, beyond their responsibility to assess the impact on surrounding heritage items.

Archaeological features and deposits are afforded statutory protection by the 'relics provision'. Section 4(1) of the *Heritage Act 1977* (as amended 2009) defines 'relic' as follows:

any deposit, artefact, object or material evidence that:

- a. relates to the settlement of the area that comprises NSW, not being Aboriginal settlement, and
- b. is of State or local heritage significance.

2.3 Local legislation

2.3.1 Sydney Local Environmental Plan 2012

The Project area is located within the City of Sydney Local Government Area (LGA).

Part 5, Section 5.10 of the Sydney Local Environmental Plan (LEP) 2012 deals with heritage conservation within the area covered by this LEP. All heritage items listed on the LEP are included in Schedule 5. The Sydney LEP states:

- (1) The objectives of this clause are as follows:
 - a. to conserve the environmental heritage of the City of Sydney,
 - b. to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views,
 - c. to conserve archaeological sites,
 - d. to conserve Aboriginal objects and Aboriginal places of heritage significance.

(2) Development consent is required for any of the following:

- a. demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):
 - i. a heritage item,
 - ii. an Aboriginal object,
 - iii. a building, work, relic or tree within a heritage conservation area,
- b. altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,
- c. disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,
- d. disturbing or excavating an Aboriginal place of heritage significance,
- e. erecting a building on land:
 - i. on which a heritage item is located or that is within a heritage conservation area, or
 - ii. on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,
- f. subdividing land:

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- i. on which a heritage item is located or that is within a heritage conservation area, or
- ii. on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.

2.4 Heritage register searches

In NSW the types of statutory listings for non-indigenous cultural heritage sites, objects and places are:

- WHL
- NHL;
- NSW SHR;
- REP;
- LEP; and
- Section 170 Heritage and Conservation Register.

Heritage register searches were undertaken 24 March 2020 for the Project area with the following results.

2.4.1 World Heritage List

The proposed works are situated within the buffer zone associated with Sydney Opera House. The impact of the works against the *Significant Impact Guidelines 1.1* (Department of the Environment, 2013:17) have been assessed in the Section 9 of this report.

2.4.2 National Heritage List

There are no items listed on the NHL or CHL within the Project area.

The Sydney Harbour Bridge is listed on the NHL and the closest point from the Harbour Bridge listing to the Project area is 130m to the northwest. As the works would be contained to below the water level, there is not expected to be any direct or indirect impact to this heritage listing.

The Sydney Opera House is listed on the NHL and is located 370 m to the east of the Project area. As the works would be contained to below the water level, there is not expected to be any direct or indirect impact to this heritage listing.

2.4.3 NSW State Heritage Register

There are several items listed on the SHR located adjacent to the Project area. These include:

- Railings, Sydney Cove (item number 01572), located 10 m west of the Project area.
- Sydney Cove West Archaeological Precinct (item Number 01860), located 50 m west of the Project area.
- Cadman's Cottage, grounds, trees, space (item number 00981), located approximately 70 m to the west of the Project area.
- Sailor's Home (former) (item number 01576), located approximately 70 m to the west of the Project area.
- Coroner's Court (former) Shops & offices (item number 01541), located approximately 70 m to the west of the Project area.
- Mariners' Church (item number 01559), located approximately 70 m to the west of the Project area.
- ASN Co Building (item number 01526), located approximately 70 m to the west of the Project area.
- Campbell's Stores (item number 01536), located approximately 100 m to the west of the Project area.



Figure 2: Location of nearby Heritage items listed on the NHL. SHR and LEP

2.4.4 NSW Historic Shipwreck Register

The NSW Historic Shipwreck Register is a database maintained by the NSW Heritage Division and contains upwards of 1,800 wrecks.¹ This database has been built up around historical accounts of the loss of vessels, mainly through the systematic examination of newspapers from the 1790s to the present day. The database has been augmented by other sources such as archival information from the Australian Hydrographic Office.

The database has been searched to locate any known or potential shipwrecks that have occurred in Sydney Cove. There are 112 registered vessels that are listed as wrecked in "Sydney Harbour" that have not been located. This description includes vessels that were reported lost within "Sydney Harbour Heads", or general locations such as "just outside Circular Quay" whereby the location may be further afield than the location described.

Refining the search to closer to the Project area, there was one shipwreck, *Sovereign of the Seas*, identified to have been lost at Campbell's wharf in 1861. The vessel was again refloated and it is considered unlikely that any evidence of the vessel will remain. Other vessels that had incidents in the vicinity of the Project area include *Three Bees*, *Ann Jameson* and *Princess*. These were either refloated, as was the case with the latter two, or have not been located but are unlikely to be within the Project area.

2.4.5 Sydney Local Environmental Plan 2012

Identified items of cultural heritage significance within the Project area are listed on Schedule 5 of the *Sydney Local Environmental Plan 2012.* Each item listed on Schedule 5 is subject to protection under the planning and development controls of the LEP.

There are no listings on the Sydney LEP that are located within 100 m of the Project area.

2.4.6 Sydney Regional Environmental Plan (Sydney Harbour Catchment 2005)

The Project site is located within the Foreshores and Waterways Area of Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005. Clause 15 of the SREP includes planning principles for heritage conservation relating to development within the Foreshores and Waterways Area. Part 5 of the SREP outlines the Heritage provisions that are afforded to heritage sites listed on Schedule 4 of the SREP.

Clause 53 outlines and the objectives of the SREP in relation to heritage are to:

- a) to conserve the environmental heritage of the land to which this Part applies, and
- b) to conserve the heritage significance of existing significant fabric, relics, settings and views associated with the heritage significance of heritage items, and
- c) to ensure that archaeological sites and places of Aboriginal heritage significance are conserved, and
- d) to allow for the protection of places which have the potential to have heritage significance but are not identified as heritage items.

Clause 52(2) sets out the specific objectives in the SREP that are specific to the WHL of the Sydney Opera House These are to

- to establish a buffer zone around the Sydney Opera House so as to give added protection to its World Heritage Value; and
- to recognise that views and vistas between the Sydney Opera House and other public places within that zone contribute to its World Heritage Value.

¹ **NSW Heritage Office, 2007** 'Maritime Heritage Online', NSW, available http://www.environment.nsw.gov.au/maritimeheritage/index.htm

Division 3A, Clause 58B provides for the protection of the world heritage value of the Sydney Opera House. The following

- matters are to be taken into consideration in relation to development within the Sydney Opera House buffer zone:
- - the objectives set out in clause 53 (2);
- the need for development to preserve views and vistas between the Sydney Opera House and other public places within that zone;
- - the need for development to preserve the world heritage value of the Sydney Opera House;
- - the need for development to avoid any diminution of the visual prominence of the Sydney Opera House when viewed from other public places within that zone.

Minor works that are undertaken within the Sydney Opera House buffer zone are exempt requiring approval are set out in Clause 58C. Specifically exemptions from Division 3A that are relevant this project are:

- 1) This Division does not apply to or in respect of building work that merely involves
 - a) the renovation, repair, rebuilding or demolition of a building, or
 - b) internal alterations to a building, or
 - c) external alterations to a building that are carried out below ground level.

As the proposed works are al located underwater, these would be considered works that were carried out below ground level. As such, the Project would be considered to be 'Minor Works' as defined under Division 3, Clause 58C of the SREP. Therefore, no assessment would be required under the provisions of this SREP.

2.4.7 NSW Section 170 Heritage and Conservation Register

All NSW State Government Agencies are required to keep an up to date record to assist in total asset management by providing information on their assets which have identified heritage significance. The Register has been prepared in accordance with the NSW Heritage Office guidelines and corresponds with information in the State Heritage Inventory (SHI), as managed by the NSW Heritage Office. Relevant listed Section 170 items include:

- Sydney Cove Passenger Terminal listed on Port Authority of NSW's Section 170 Heritage and Conservation Register.
- Sydney Cover Passenger Terminal Extendible Gangways listed on Port Authority of NSW's Section 170 Heritage and Conservation Register.

2.5 Summary

The table below outlines the known and potential heritage and archaeological items that are located within or immediately adjacent to the Project area.

Heritage list	Items within the Project Area	Level of significance	Items adjacent to the Project Area	Level of significa nce	Distance to Project Area (metres)
World Heritage List	Sydney Opera House Buffer Zone	World Heritage List	Sydney Opera House	World Heritage List	370
National Heritage List	Nil	n/a	Sydney Opera House	National	370
			Sydney Harbour Bridge	National	130
Commonwealth Heritage List	Nil	n/a	Nil	n/a	n/a
	age Nil	n/a	Railings, Sydney Cove (#01572)	State	10
			Sydney Cove West Archaeological Precinct (#01860)	State	50
			Cadman's Cottage, grounds, trees, space (#00981)	State	70
State Heritage Register			Sailor's Home (former) (item number 01576)	State	70
			Coroner's Court (former) - Shops & offices (#01541)	State	70
			Mariners' Church (#01559)	State	70
			ASN Co Building (#01526)	State	70
			Campbell's Stores (#01536)	State	100
Port Authority of NSW S170	Nil	n/a	Sydney Cove Passenger Terminalis	State	40
			Sydney Cover Passenger Terminal - Extendible Gangways	State	40

Table 1 Summary of listed heritage items within and/or adjacent to the Project site
Heritage list	Items within the Project Area	Level of significance	Items adjacent to the Project Area	Level of significa nce	Distance to Project Area (metres)
Sydney LEP 2012	Nil	n/a	Nil	n/a	n/a
NSW Historic	Sovereign of the	Protected -	Three Bees	Protected	Unknown
Shipwrecks Register	Seas	re-floated	Ann Jameson	Protected	Unknown
			Princess	Protected	Unknown

3.0 Aboriginal Archaeological Context

3.1 Landscape Context

Consideration of the landscape context of the Project area is predicated on the now well-established proposition that the nature and distribution of Aboriginal archaeological materials are closely connected to the environments in which they occur. Environmental variables such as topography, geology, hydrology and the composition of local floral and faunal communities will have played an important role in influencing how Aboriginal people moved within and utilised their respective Country. Amongst other things, these variables will have affected the availability of suitable campsites, drinking water, economic² plant and animal resources, and raw materials for the production of stone and organic implements. At the same time, an assessment of historical and contemporary land use activities, as well as geomorphic processes such as soil erosion and aggradation, is critical to understanding the formation and integrity of archaeological deposits.

For the current Project, consideration of the paleo-landscape and environs of the Sydney foreshore area is pertinent to determining the potential for submerged, formally-terrestrial Aboriginal sites. The terms 'submerged' and 'formally-terrestrial' site in this context refer to those Aboriginal sites that may have been inundated around 15,000 to 18,000 B.P.³ during the last major phase of maximum glaciation and marine transgression (Nutley, 2006). It is now widely accepted that fluctuations of sealevel associated with glacial - interglacial phases would have resulted in a maximum sea-level variation of approximately 120 m. Additionally, relatively short phases would have occurred in which sea levels were at or above the present level (Lewis et al., 2013). While the body of submerged archaeological research in Australia remains at present, relatively scarce, several studies suggest the potential for survival of such sites associated with these phases of environmental change (C. Dortch, 2002; C. E. Dortch & Morse, 1984; Westley et al., 2011; Yanko-Hombach, Valentina Mudie & Gilbert, 2011). The potential for these sites however, remains largely hypothetical, complicated by the need of both specialised equipment and personnel to investigate underwater environments. Physical evidence (i.e., artefacts, intact middens etc) has yet to been identified in Australia, so archaeological investigations must, for the time being, rely on secondary evidence including bathymetrical, geotechnical and environmental data to identify the presence of Potential Archaeological Deposits (PADs) in submerged environs. It follows however, that a degree of interpretation is required to determine the prehistorical environs of the Project area prior to inundation. A summary of key observations and predictions regarding the landscape context of the Project area are presented in Table 2.

Table 2 Review of landscape context of the Project Area

Environment al Variable	Key Observations
Topography	The terrestrial morphology of Sydney Harbour (also 'Port Jackson'), prior to inundation, is described as a series of deep and steep-sided river valleys controlled by the underlying geological structures of the Sydney Basin. Initially formed during the Permian-Triassic geologic period as an uplifted coastal plain, watercourses later eroded pathways into the Hawkesbury Sandstone bedrock. Throughout the Last Glacial Maximum (approximately 24,000 to 18,000 years B.P.), sea levels in the Australasian region were around 100 to 130 m below the current level. Between 19,000 to 18,000 years B.P., a climate reversal resulted in deglaciation and a subsequent rapid rise in global sea levels. By about 10,000 years B.P., sea levels in south-eastern Australia had risen and it was around this time that Port Jackson embayment was flooded, drowning the ancient valley systems underlying the current Middle Harbour, Parramatta River and Lane Cove River environs. Marine sediments and delta sands were subsequently pushed

² i.e., edible and/or otherwise useful (e.g., medicine, clothing)

³ B.P. stands for Before Present. As the present is in a constant state of flux, it was defined in relation to B.P. as being 1950 A.D. (the choice of year generally being attributed to that being when practical radiocarbon dating was developed). A.D. stands for Anno Domini which is Latin for "in the year of the Lord", referring to the Gregorian calendar which has a zero point estimated to be the year that Jesus Christ was born. The alternative term for A.D. is C.E. or Common Era.

Environment al Variable	Key Observations
	landwards, infilling Port Jackson whilst additional sedimentation occurred in the middle and upper portions of these valleys with the deposition of estuarine muds and tidal sands. Between about 7,900 to 7,700 years B.P., the sea level along south-eastern Australia reached its present level. During this phase, former overhangs and cliff lines that had previously formed within the Hawkesbury Sandstone bedrock were inundated and infilled with sediments as described above.
Hydrology	Prior to colonisation, the Tank Stream would have been the primary freshwater source for Aboriginal peoples occupying the Port Jackson area. Although now heavily modified, the Tank Stream was one of the principle influencing factors which guided Governor Arthur Phillip's decision to use Sydney Cove instead of other bays in Port Jackson for the colony in 1788 (Figure 2). A minor tributary of the Tank Stream, named in 1788 as Hospital Creek, followed a course across George Street before discharging to the Tank Stream near the area now occupied by Circular Quay. At this time, the Tank Stream itself was described as a narrow 'ferny gully' which flowed north through a small valley from the elevated ground located in the area now bounded by Market, Park, Elizabeth and Pitt Streets and discharged into Sydney Cove (Owen & Macphail, 2018).
	To accommodate the needs of the establishing colony, settlers cleared vegetation around the Tank Stream to facilitate greater access for stock grazing and to satisfy other urban requirements. Within two years the watercourse had become polluted with urban runoff, sewerage and stock-related impacts. Construction of new residential dwellings were consequently banned and tanks were built near Bridge Street to capture what little useable water remained, giving rise to the name. While a 15 m wide 'green belt' was declared in 1804, by 1826 the Tank Stream had ceased to be used as a water supply.
Geology and Soils	Reference to the Sydney 1:100,000 Geological Sheet (1983) indicates that the Project area is underlain by Quaternary-aged stream alluvium / estuarine sediments, which in turn lie on Triassic-aged Hawkesbury Sandstone bedrock, described as:
	 Stream alluvium and estuarine sediments: silty to peaty quartz sand silt and clay with common shell layers; Sandstone: medium to coarse grained with very minor shale and laminite lenses.
	As described above, around the Last Glacial Maximum, the Tank Stream channel extended northwards before draining into Sydney Cove. Reference to recent geotechnical investigations undertaken by (Coffey Pty Ltd, 2019) indicate that soils comprising clayey sands, sandy clays and clays form the deeper subsurface profile within the Project area. Where such sediments were interpreted as being intact (i.e., not impacted by previous dredging operations), these sandier soils are suggestive of marine and tidal delta sediments, while deeper clays exhibiting medium to high plasticity indicate estuarine conditions.
Flora and Fauna	Vegetation records of the vicinity of the Project area may be interpreted from a variety of sources, including both historical ethnographic literature and pictorial representations, as well as palynological ⁴ data. For instance, on 22 January 1788, sailor James Nagle observed vegetation <i>"comprising all bushes but a small distance at the head of the cove was level and large trees but scattering and no underwood worth mentioning</i> ". Palynological analysis undertaken by McPhail and Owen (2018) for a site located approximately 150 m from the Project area, indicate the pre-1788 vegetation community in the area was dominated by

⁴ Being the study of plant pollen, spores and certain microscopic plankton organisms.

Environment al Variable	Key Observations
	Rainbow Fern and Casuarina, associated with a relatively diverse sclerophyll shrub flora. Rarer evidence of tree ferns and fern species common to wet gully environs were also identified, though species suggestive of mangrove conditions at 1788 were absent. While these observations provide a relative indication for pre-1788 conditions, a greater deal of interpretation is required to estimate conditions during post-Last Glacial Maximum (LGM) conditions when sea levels were lower. To date, no palynological studies have been undertaken on sediments in the Project area. However, it is feasible to surmise that mangrove or similarly-deltaic conditions may have existed based on observed estuarine soils encountered at depth within the Project area.
	As with vegetation, determining with any certainty the pre-European faunal landscape of the Project area and environs is difficult to determine from post-LGM conditions. However, consideration of pre-European vegetation regimes and local archaeo-faunal assemblages suggests that a range of marine and terrestrial faunal resources would have been present in the area. Locally occurring marine resources, for example, are likely to have consisted of a wide range of fish and shellfish, Crustacea such as crabs and crayfish, and other marine mammals including turtles and dugongs (Etheridge, 1905). Attenbrow (V. Attenbrow, 2010) notes that the results of the excavation of Aboriginal midden sites throughout Sydney have found that shellfish harvesting generally occurred in all parts of the estuary but with most fishing conducted in the lower parts of the estuary. A diverse array of terrestrial mammals (for example, kangaroos, wallabies, possums, birds, reptiles and amphibians), would have also been available in woodland areas surrounding and including the Project area.
Historical Disturbance	A Descriptions of historical disturbances is outlined in Section 5.0 below.



Figure 3: Tank Stream and Foreshore, c. 1788

This historical background has been put together based on the previous AECOM and Cosmos Archaeology assessments that were both undertaken in 2014. Additional research has been undertaken to supplement this history.

5.1 Early European occupation

The First Fleet disembarked at the eastern end of what is today Argyle Street on 26 January 1788. The original shore line ran roughly along the current alignment of Circular Quay West Road and the western edge of the foreshore promenade. The relatively flat land along the shoreline was taken up by Government infrastructure and George Street (originally High Street) was formed to service the hospital, gaol, Government Dockyards and Commissariat Stores (Sydney Harbour Foreshore Authority, 2010). Robert Campbell was the first merchant to establish a private wharf, in Campbells Cove, but he was soon to be followed by many more. Housing for the convicts, emancipists, free-settlers and sailors was pushed up onto the sandstone outcrops that rose to the west. Houses, hotels and shops were constructed on land granted and leased from the Government, however, unofficial occupation was the most common form of tenure.

The administration of the Colony quickly moved towards providing the necessary maritime and social infrastructure. The first wharf was in operation by 1792, in the vicinity of present day First Fleet Park. On the western side of George Street was a Hospital and store (Figure 4). To the north Government dockyards were in operation from 1797 and facilities included workshops, storehouse, boat sheds, sawyers sheds, saw pits, a watch house and a room for the clerk (NSW Heritage Division, 2014). In 1816 the coxswain's barracks, now known as Cadman's Cottage was completed at the northern end of the yards (Figure 5 no.26). Between 1818 and 1822 improvements to the dockyard led to the construction of four repairing docks (Figure 5, no.29). The northern-most of these is thought to be located under the eastern end of Argyle Street and Barney and Bligh Reserve, located in the space between Argyle Street and Cadman's Cottage (NSW Heritage Division, 2014). From the 1830s the dockyards began to contract to the south. A map of the area, purported to show Sydney between 1810 and 1820, although not completed until the 1860s, indicates that the vicinity of the present day OPT was occupied by Captain Piper, whose property contained a building near the George Street frontage with a rocky foreshore and possible wharf. Moving north were Campbell's house, stables and wharf (Figure 5).

Construction of Circular Quay between 1854 and 1855 saw the Macquarie era docks in-filled and the land reclaimed. Between 1859 and 1863 Argyle Street was extended out over the reclaimed land. The extension of Argyle Street cut the Colonial Storekeepers building off from the dockyards and these were demolished, with new stores being built to the south of Argyle Street (NSW Heritage Division, 2014). The original foreshore remained evident in front of Cadman's Cottage until 1870-75, when the area was filled and raised. A plan by Henry Percy Dove, completed sometime between 1870 and 1890, indicates the extent of the land in front of Cadman's Cottage and the Sailor's Home.



Figure 4: 1807 map excerpt of the OPT area and proposed extension. (Source: James Meehan, 1807, Plan of the town of Sydney in New South Wales, National Library of Australia, MAP F 106B. Project area in red

Figure 5: Sydney from 1810 to 1820: shewing buildings erected by Governor Macquarie, National Library of Australia, MAP F 309. Project area in red

5.2 Later Developments

Following a purported outbreak of bubonic plague in 1900, large areas of The Rocks were resumed by the Government (Figure 6). Large areas were demolished and a process of redesign was undertaken that saw the realignment of some streets and the construction of terrace housing and flats in some areas. Redevelopment was slow and it was not until just before the First World War and into the 1920s that progress was made. The construction of the Sydney Harbour Bridge caused further demolitions and divided The Rocks from Millers Point. Similarly, the construction of the Cahill Expressway in the 1950s cut The Rocks off from the centre of Sydney and gave rise to further demolition.



Figure 6: Plan of the Rocks showing the resumption of land by the City of Sydney. (Source: Source: City of Sydney, 1901, Plan Showing The "Rocks" Resumption, State Records NSW, Darling Harbour Resumption Maps, 1900-1902)

In tandem with the development of the Opera House site, the Sydney Cove Redevelopment Authority was established in 1968. The purpose of the Authority was to redevelop and manage The Rocks. What little land remained in private ownership was bought and today the only property not owned by the Authority is St Patricks Church (Sydney Harbour Foreshore Authority, 2010).

In 1971 the Authority released its plan for the area, which involved high-rise development across The Rocks. The only historic buildings to be spared were Cadman's Cottage, St Patricks Church, Science House, Argyle Bond Store, the Australian Steam Navigation Company and Campbell's Storehouse. The facades of some other buildings were slated to be retained. The public were horrified at the proposed redevelopment, but their concerns were not addressed by the Government. Instead, local residents asked the building unions to impose a ban on construction, known as a 'green ban'. The green bans effectively halted the redevelopment. In the intermediary, the Authority began to refurbish some of the buildings and began to form a shopping precinct along George Street, which started to attract locals and tourists alike (Sydney Harbour Foreshore Authority, 2010).

The introduction of the *NSW Heritage Act in 1977* provided a statutory means of protecting the heritage significance of The Rocks. From the late 1980s the Authority was known as the Sydney Cove Authority, changing its name again in 1999, when it became the Sydney Harbour Foreshore Authority (SHFA). In the same year planning power for The Rocks was vested in the NSW Minister for Planning.

5.3 Overseas Passenger Terminal and Wharf

Following the Second World War, passenger movements increased from 20,000-30,000 per year to 160,000 in 1962. The increase in arrivals and departures was a result of increased immigration, tourism and short cruises. Ships were increasing in size and there were increasing needs for customs clearance and visitor facilities. The Maritime Services Board had created stop-gap measures at Pyrmont in the early 1950s, followed by Woolloomooloo from 1956. During this time the Board was investigating more permanent measures.

Sydney Cove was selected for a passenger terminal "due to its proximity to public transport; its situation in a bustling commercial centre surrounded by stately buildings and with a rich local history" (Sydney Ports Corporation, 2014). The Board was spurred into action by P&O Orient's announcement that they were to construct two super liners for the Australian route – Oriana and Canberra.

Construction of the OPT began in 1958 with the demolition of wharves and sheds (Figure 7, Figure 8 & Figure 9) on the site that had been constructed between 1900 and 1903 for use by the shipping firm Norddeutscher Lloyd (Weber Lehmann & Co.) (Conybeare Morrison International, 2005). Figure 11 shows the sheds as they existed prior to demolition, the caption for which indicates the sheds may also have been used by the E&A (England and Australia Company) and was known as Berth No. 5. The sheds were constructed on the wharf and it would appear from later images (Figure 12), that the northern-most of these sheds was retained during the construction of the OPT, but was demolished by approximately 1965 (Figure 12). The area was converted from wharf to reclaimed land in 1969 (Sydney Harbour Foreshore Authority, 2012). During the preparation works for the OPT, evidence of this earlier wharfage was uncovered and photographed (Figure 13).

The wharf for the OPT was built from 14 reinforced concrete caissons (Figure 14), which created a 720 foot long seawall (220 m). Following the construction of the seawall, the space behind was backfilled to reclaim the area. Each of the caissons was 50 feet long and surmounted by reinforced concrete seven feet high. At the northern end, steel sheet piling was used to join the new seawall to the old adjacent wharf.



Figure 7: 1933 Aerial Photograph showing the configuration of the OPT and Wharf No.7. Project Area shown in red.



Figure 8: 1960s aerial photograph showing the configuration of the OPT after the expansion works and Wharf No.7.



Figure 9: 1980 aerial photograph showing what appears to be the demolition of Wharf No.7. Project Area shown in red.



Figure 10: E&A Berth No. 5, Circular Quay, 1919. (Source: Government Printing Office, 1919, Mitchell Library, NSW, 1-25041)



Figure 11: View of northern end of the wharf and OPT in 1961 with P&O Liner Oriana. The last of the previous warehouses can be seen in the foreground. (Source: Wolfgang Sievers, 1961, National Library of Australia, 791186)



Figure 12: View of northern end of the wharf and OPT in about 1965. Note the warehouse has been removed and the shed present on Wharf No. 7 in the foreground. (Source: Anon., c. 1965, City of Sydney Archives, SRC4534)



Figure 13: Earlier wharves uncovered during construction of the Overseas Passenger Terminal. (Source: Anon., 1960, City of Sydney Archives, NSCA CRS 48/1201)



Figure 14: Detail of caissons during construction. (Graeme Andrews, 1985, 'Working Harbour' Collection, City of Sydney Archives, 80327)

The original Terminal building allowed a 40 foot (12 m) apron to the Cove and was 625 by 111 feet (190.5 by 34 m). The ground floor was dedicated to cargo, while the first floor contained customs and passenger facilities (Sydney Ports Corporation, 2014).

The Terminal was officially opened on 20 December 1960 by the Honourable J.B. Renshaw, MLA Deputy Premier, Treasurer and Minister for Lands. Ten days later the Oriana arrived on her maiden voyage. The Section 170 Register listing states:

"Over the next two decades the terminal was the arrival point of many newcomers to Australia and as such played an important role in the history of Australia of which the contribution of migrants to Australian life is a large part."

(Sydney Ports Corporation, 2014)

The advent of cheaper air travel in the 1980s, however, saw a decline in passenger numbers. By 1983 it was suggested that nearly a third of the terminal was no longer required. Between 1985 and 1987 Lawrence Nield and Partners worked on a redevelopment for the Terminal, which included the insertion of restaurants and cafes and the construction of the tower structure in the north eastern corner of the OPT. The Nield and Partners redevelopment was recognised by the Royal Australian Institute of Architects with a merit award in the Public and Commercial Buildings category for 1988 (Conybeare Morrison International, 2005). Lawrence Nield described his approach to the building thus:

"When precast panels were stripped away, that the great portals and the floating butterfly roof could become essential elements in the architectural language of the terminal. From these were developed 'figures' such as the glass butterfly roof, porte cocheres which became easily part of family of forms with the main butterfly roof. The use, reuse and adaptation of the portals made a major supporting figure. Similarly a tower was appropriate at the northern end of the building, both as an urban pivot and a reference to nearby towers at the Australian Steam Navigation building and the Mining Museum. This urban figure developed dialogue with the new lift tower at the southern end of the building.

(Conybeare Morrison International, 2005)

On completion in 1960, the northern termination of the wharf was L-shaped and contained the remnant earlier warehouse until around 1965 (see Figure 11). Following the removal of the warehouse, the space was used as a car park. The configuration of the wharf remained unchanged until the mid-1980s. In association with the construction of Nield and Partners northern tower, the wharf was reconfigured to reflect the shape of the tower and to provide a mooring point. During the revitalisation of Campbells Cove, the wharf frontage was reshaped into its current configuration. As part of this, the finger wharf that had been in existence in Campbells Cove since the 1890s, was diminished to its current stature.

Further redevelopment of the OPT was undertaken in the lead up to the 2000 Olympics in order to provide enhanced public access. This included the insertion of three new restaurants, new lifts, improved foreshore access, public viewing decks on the top two levels and the restoration of Arthur Murch's mural (Conybeare Morrison International, 2005). There were no modifications to the wharf as part of this upgrade.

5.4 Campbells Cove

Campbells Cove was initially granted to millwright John Baughan in 1794. Baughan died in 1797 and the property was sold to Robert Campbell. Campbell came to Sydney in 1798 as a representative of Campbell, Clark and Company, to finalise affairs surrounding the loss of the speculative cargo ship Sydney Cove, which had been lost in Bass Strait in 1796.

Campbell purchased the property during this trip. Campbell returned to India, where he had been based, before settling in Sydney in 1800 (Conybeare Morrison International, 2005). Following his return to Sydney, he began constructing warehousing and a wharf in what is now known as Campbells Cove. He had a minor setback due to his support of Governor Bligh, but was restored to his property and position following the arrival of Governor Macquarie (Conybeare Morrison International, 2005).

Over the next several decades Campbell and his sons continued to develop the warehousing and wharfage facilities. The family operated business struck financial difficulties in the mid-1830s, narrowly holding on to the property. In 1841 Campbell applied to the Colonial Secretary to enlarge the wharf so ships could unload at low tide. The application was granted. A large rock which was too large to be removed was incorporated into the wharf as a foundation. In 1843 the property was mortgaged to The Australian Trust Company for £10,000. It is unknown if this was a sign of further financial difficulties or the mobilisation of capital to further improve the facilities. Campbell died in 1845, leaving his property divided between six heirs.

By 1845 Campbell's Wharf contained a house, stores, warehouse and wharf, and at the northern end there were three stores plus an office and store. There was also a cottage for the overseer and an empty timber woolshed. In 1858 there were another five warehouses of stone and slate roofs and soon afterwards the construction of additional warehouse bays commenced with a total of 11 bays by 1861. The warehousing was leased to a range of tenants (Figure 15) (Conybeare Morrison International, 2005).



Figure 15: Campbells Cove and Circular Quay, Sydney from Dawes Point ca.1870. (Source: State Library of NSW SPF / 786)

There appears to have been a disagreement between Campbell's heirs and the later holders of the mortgage, as the matter was taken to the Supreme Court in 1877, where they were successful. At that time negotiations were already underway with the Australasian Steam Navigation Company (ASN Company), who were looking for new wharfage, having outgrown their Sussex Street premises. The

sale had been completed by 1876 and the ASN Company then applied to the Minister of Lands for permission to erect piled jetties in the harbour.

Approval was granted on 1 May 1876. The works included a 320 foot wharf built along the foreshore and two jetties, one of 250 feet and the other of 350 feet in length (see Figure 18). Turpentine was used for the timbers subject to the water, with ironbark and other hardwoods for braces, beams and planking (Conybeare Morrison International, 2005).

In 1878 the sandstone warehousing, formerly known as Campbell's Bonded Stores, became The Metcalfe Bond and Free Stores. Between 1882 and 1887 the third storey was added. In 1879 the southern part of the wharf was leased to the Peninsular and Oriental Steam Navigation Company. From 1880 sections of the land were sold off around the periphery, particularly that facing George Street. Despite this, the ASN Company found themselves in financial difficulty. The Company amalgamated with the Queensland Steam Navigation Company in 1886 to become the Australasian United Steam Ship Company. The Company offered the Colonial Government the wharf for £300,000. The Government made a counteroffer of £275,000 in 1887, which was accepted. Formal conveyance occurred on 28 October 1887 (Conybeare Morrison International, 2005). In the mid-1890s the Government undertook wharfage improvements, as shown in Figure 16.



Figure 16: Plan of wharfage improvements in Circular Quay showing the works completed (red), in progress (green) and proposed (yellow). (Source: Government Printing Office, 1893-1894, Plan of Circular Quay Wharfage Improvements)

The Government renounced the Peninsular and Oriental Steam Navigation Company's lease, giving it instead to Blackwall and Company. In 1901 the Sydney Harbour Trust took over management of the site and contracted Norddeutscher Lloyd to build a 1,000 by 40 foot wharf along the western side of Sydney Cove (where the current OPT wharf is located), which was located on the site of the future OPT (Conybeare Morrison International, 2005). The works also included the removal of the two 1876

jetties and the erection of a single, central wharf (Figure 17). The new wharf was known as Wharf No. 7 and was predominately used for commercial shipping. There was a decline in international commerce from the 1930s onwards, with commercial use of the area ceasing with the construction of the OPT in 1960 (Conybeare Morrison International, 2005). Around this time the wharf was taken over by the Maritime Services Board and used to station various work vessels that operated in Sydney Harbour (Figure 18 to Figure 22).



Figure 17: 1909 Royal Commission on Sydney Improvements Plan Showing the Extension of George Street to Dawes Point (Plan No.35). Note: this plan shows the newly constructed Campbells Cove Wharf (7a and 7b). (New South Wales Parliamentary Papers, 1909, Interim Report of the Royal Commission for the Improvement of the City of Sydney and its Suburbs, Vol. 5:383, Plan No. 35, available http://www.photosau.com.au/cosmaps/scripts/displayIndex.asp?Index=RC19)



Figure 18: 1980 plan of Campbells Cove showing Wharf No. 7, approximately 110 m long and 28 m wide. (Source: The Maritime Services Board of New South Wales 1980 Hydrographic Survey at Overseas Terminal Sydney Cove, Cosmos Archaeology, NSW)



Figure 19: Photograph taken of Patriarch at Campbells Wharf, Sydney Cove, ca.1930s. (Source: Cyril Hume, c. 1930, PATRIARCH at Campbells Wharf Sydney Cove, Cyril Hume Sailing Ship Collection, Sydney Heritage Fleet)



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Figure 20: Sydney Cove, Wharf No. 7 area showing the 1901-1980 wharf in 1979. (Source: Graeme Andrews 'Working Harbour' Collection: 80403 GKA in the City of Sydney Image Library)



Figure 21: 1935 photograph of Campbells Cove showing Wharf No. 7. (Source: E.W. Searle collection of photographs at National Library of Australia nla.pic-vn4655456)



Figure 22: Photograph of Campbells Cove in 1979. (Source: Graeme Andrews 'Working Harbour' Collection: 80419 GKA in the City of Sydney Image Library)

6.0 Aboriginal Archaeological Context

6.1 AHIMS Search

The AHIMS database, administered by the NSW Department of Premier and Cabinet, contains records of all Aboriginal objects in accordance with Section 89A of the NPW Act. It also contains information about Aboriginal places, which have been declared by the Minister to have special significance with respect to Aboriginal culture. Previously recorded Aboriginal objects and declared Aboriginal places are known as 'Aboriginal sites'.

A search of the AHIMS database on 4 March 2020 for an approximate 2 x 2 kilometre (km) area centred on the Project area (AHIMS search area) returned 27 site entries (Figure 23). Of these, four sites were listed as 'destroyed' and a further two listed as 'Not a Site' (being registrations which on further investigation have proven not to be of Aboriginal origin). Of the remaining 21 sites, open artefact sites and areas of Potential Archaeological Deposit (PAD) were equally the most common, both representing 42.5% (n=9) respectively, for the total AHIMS search area. Other, comparatively poorly represented types include one Ancestral Burial/Aboriginal Ceremony and Dreaming site, one rock art site and one midden containing shell material. No registered Aboriginal sites are located within the Project area, though it is noted that AHIMS sites are typically only located on terrestrial environs. The closest registered site however, is 'Harrington IFS01' (AHIMS #45-6-3762), located approximately 280 m south west of the Project area. The prevalence of open artefact sites attests to the practical nature of Aboriginal occupation within the AHIMS search area. It is noted that a number of these sites (n=4) are located on the northern foreshore area of Sydney, near Balls Head. Areas of PAD, meanwhile, suggest the limited intrusive investigations of Aboriginal heritage within the Central Business District (CBD) area of Sydney, likely owing to access limitations. Summary details of the sites, the location of which is shown on Figure 23 (in addition to other sites in the search area), are provided in Table 3.

Site type	AHIMS feature(s)	n	%
Midden	Artefact/s, Shell material	1	5%
Art	Art (Pigment or Engraved)	1	5%
Burial	Ancestral Burial; Aboriginal Ceremony and Dreaming; Artefact/s	1	5%
Open Artefact Site	Artefact/s	9	42.5%
PAD	Potential Archaeological Deposit	9	42.5%
Total	-	21	100%

Table 3 AHIMS Search Results



Figure 23: AHIMS Search Results

6.2 Native Title

A search of the National Native Title Register (NNTR) and Register of Native Title Claims (RNTC) administered by the National Native Title Tribunal (NNTT) was undertaken for the City of Sydney Council LGA, inclusive of land within and surrounding the Assignment Area. No current Native Title listings or claims were identified within the City of Sydney LGA.

6.3 Aboriginal Archaeological Context

Available archaeological data indicate that Aboriginal people have occupied the Sydney region⁵ for at least 36,000 years (Jo McDonald CHM 2005b). Late Pleistocene/early Holocene occupation of the Greater Sydney region is evidenced by radiometric dates from both coastal and hinterland sites (Val Attenbrow, 2010) (Table 3.1). The Project area is located within the traditional lands of the Cadigal Aboriginal people, a member of the Eora language group (Horton, 1994), who referred to Sydney Cove as 'Warrane' (Sydney Harbour Foreshore Authority, 2014). There has been debate regarding the use of the name Eora as a separate language group, with its use only introduced in later sources and not contained in the earliest ethnographic recordings. This suggests that the Eora area was either part of the Kuring-Gai area or the Darug area (Val Attenbrow, 2010) based on the available linguistic evidence (Ross, 1988). Some studies have argued that the Darug territory extended to the coastline between Port Jackson and Botany Bay, based on the ethnographic observations of explorers and settlers (J. Kohen, 1985, 1988; J. Kohen & Lampert, 1987). Darug is believed to have been spoken from the Hawkesbury River in the north, to Appin in the south, and from the coast west across the Cumberland Plain into the Blue Mountains. Early sources (Collins, 1798; Dawes, 1790; Hunter, 1793; Tench, 1793) and more recent linguistic research (Troy, 1994) indicate that two distinct dialects of Darug were spoken at the time of European contact, a coastal dialect, spoken on the Sydney peninsula and the country to the north of Port Jackson, and a hinterland dialect, spoken on the Cumberland Plain from Appin in the south to the Hawkesbury River in the north (Val Attenbrow, 2010). This linguistic division is thought to correspond to a broader economic division between 'coastal' and 'hinterland' Darug-speaking peoples, with the accounts of several early observers (V. Attenbrow, 2010; Bradley, 1792; Collins, 1798, 1802; Tench, 1793) suggestive of a 'coastal', marine-oriented subsistence economy and contrasting 'inland' economy focused on the exploitation of land mammals, plant foods and freshwater faunal resources. Some idea of population size for the coastal Darug at contact is provided by (Val Attenbrow, 2010), who suggests that the area around Port Jackson likely supported a minimum population density of 0.75 persons per square kilometre (i.e.1 person/1.3 square kilometre). Attenbrow's estimate is based on Governor Phillip's own estimate of the Aboriginal population of this area, made in 1788. Phillip, reporting to Lord Sydney on 15 May 1788, estimated a total population of not "less than one thousand five hundred" ((Val Attenbrow, 2010)). Attenbrow (2010:17), citing Hunter (1793 [1968]: 62), notes that "population densities for the hinterland (west of Parramatta) were initially assessed by the colonists as being less than those along the coast" but urges interpretive caution given the deleterious effects of the 1789 smallpox epidemic, which "had killed many people living to the west of Rose Hill before Phillip's 1791 expedition crossed the Cumberland Plain to the Hawkesbury-Nepean River". More recently, (James Kohen, 1995) has estimated a minimum overall density of around 0.5 persons per square kilometre for the hinterland zone. Individual band sizes notwithstanding, much larger groups of Aboriginal people, numbering in the hundreds, are known to have come together for events such as corroborees, ritual combats and feasts (V. Attenbrow, 2010; J. Kohen et al., 1999).

Available historical records indicate that a wide range of marine and freshwater fauna were exploited by Darug-speaking peoples for food and other resources (See (Val Attenbrow, 2010). Along the coast, an emphasis on the exploitation of marine resources, principally fish and shellfish, is attested in the writings of several early observers (e.g., (V. Attenbrow, 2010; Bradley, 1792; Collins, 1798, 1802; Tench, 1793)). Compared with their faunal counterparts, the plant food resources of coastal Darugspeaking peoples are poorly represented in the writings of early colonial observers. Nonetheless, available descriptions do suggest that plants formed a regular part of the diets of groups in the area (V. Attenbrow, 2010). Along the coast, a "vegetable catalogue" consisting of "a few berries, the yam

⁵ Following Attenbrow (2012a), the land bounded by the coast on the east, by the Hawkesbury-Nepean River on the north and west, and by a line running east-west through Picton and Stanwell Park in the south.

and fern root, the flowers of the different Banksia, and at times some honey" is reported by Collins (Collins, 1798)(1798 [1975:462-63]). A wide range of hunting and gathering 'gear' was employed by Darug speaking peoples, with distinctive repertoires for men and women (McDonald, 2008: 24). Men's gear included several different forms of spears (variously barbed), spear throwers, clubs, 'swords', boomerangs, shields and hafted stone hatchets. Women's toolkits, in contrast, included fishing hooks, lines and sinkers, digging sticks and various containers (shell and wood). Net bags made from plaited wood fibre appear to have been used by both men and women (Val Attenbrow, 2010). Bark canoes were also widely used (Val Attenbrow, 2010)).

6.4 Submerged Site Preservation

As stated by Nutley (2006:1), the survival of Aboriginal sites within submerged contexts is a factor of the interplay between the environment and the composition of the physical evidence itself. Likewise, the characteristics of the submerged landform itself (width, depth and slope and the interplay of coastal and riverine hydrology and sediment transportation) are critical to site survival. For the current Project area, consideration of estuarine and coastal systems with backwater environs, mud flats, swamp, mangrove and marshland environments are capable of retaining cultural materials in ever-increasing layers of sedimentation. Nutley (2006) suggests that stone artefacts, quarry sites, and, in some areas, stone fish traps may be preserved in such inundated environments since they are relatively durable cultural material items.

Open artefact sites (comprising flaked or ground lithic objects) for example, that either settle into, or are inundated by anaerobic environments, are likely to avoid the abrasive, chemical and biological attack otherwise endured during gradual inundation, though not all site types provide such clear evidence. Rockshelters, for example, are landscape features that are quite likely to remain in situ, though the mere presence of the latter in underwater environs, as Nutley suggests, cannot provide a reliable indication of actual habitation by Aboriginal peoples, and further investigation is required to determine the presence or absence of archaeological deposit.

In the Greater Sydney context, this is best demonstrated by the Aboriginal resource and gathering site registered as AHIMS #45-6-0751, identified during the construction of the Alexandra Canal in the 1890s. Located in Alexandria approximately 7 km south of the current Project area, both Aboriginal edge ground stone hatchets and dugong (*Dugong dugon*) skeletal remains were identified, the latter showing indications of butchering. The investigation documented a 5 m deep sedimentary sequence comprising alternating layers of estuarine sands, shelly sands and peat containing terrestrial plant remains including in situ roots and stumps, suggesting that the site alternated between sub-aerial exposure and submergence throughout the Holocene (Figure 24). Conventional radiocarbon (C14) dating from a sample of the dugong bones produced an age of $5,520 \pm 70$ years B.P. The investigation concluded that the discovery of the terrestrial plant remains at the depth of 4.5 m below the high-water level represented a clear demonstration of climactic and environmental change during this time and evidence of past Aboriginal peoples' activity in the area.

SHEA'S CREEK CANAL . SYDNEY . N.S.W

CROSS-SECTION shewing where bones of Dugong were discovered



Figure 24: Sedimentary cross-section showing location and depth of dugong (from Etheridge, 1905)

The Alexandria site provides an indicative example of terrestrial submergence in low-energy environments, sufficient to preserve site evidence in situ. In a high dynamically-active coastal or riverine environment however, there is a strong likelihood that even robust items will eventually succumb to those forces. As Nutley (2006) suggests, in such an environment, even stone tools may become waterworn to the point where they are no longer recognisable as such.

As demonstrated above, environmental factors and artefactual composition interact to determine archaeological site survival and highlights the need for a multidisciplinary approach to investigations. In the context of the current Project however, a review of the environmental factors outlined in Section 5 is pertinent to developing a predictive model of site survival in former estuarine and tidal delta environs. Using the AHIMS search results data provided in Section 6.1 as a basis, Table 3 below provides a summary of common site types that would be anticipated in the Project environs, with the preservation potential rated against the interpreted pre-inundation environs.

Site type	Description	Preservation Potential	Likelihood
Open Artefact Sites	Objects susceptible to abrasion and translocation during slow and highly dynamic inundation but likely to survive rapid, low-energy inundation. Artefact scatter sites likely to be dispersed rather than being identified in situ.	Moderate	Moderate to High
Culturally- modified trees	Unlikely to survive in marine conditions.	Low	Low
Shell middens:	Only likely to survive rapid, low-energy inundation unless deeply buried in consolidated sediments or peat prior to inundation. Likely to be found in a dispersed condition and may be difficult to differentiate from natural shell beds.	Low to Moderate	Moderate
Fish traps	Only fish traps constructed from stone would survive inundation, more likely to survive relatively intact in low-energy environs, e.g. estuarine.	Low to Moderate	Low

Table 4 Preservatio	n Potential by	Site Type	(following	Nutley 2006)
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Site type	Description	Preservation Potential	Likelihood
Rockshelters	Moderately resistant to inundation, particularly in low- energy environs. Cultural deposit within the shelter would survive only in instances of deep stratigraphy or protection by fallen boulders in front of shelter.	Moderate	Moderate
Rock art sites	Engravings are unlikely to survive on soft sandstone where dynamic environs may result in rapid erosion. Sandstone that absorbs red ochre may retain that stain but may equally be susceptible to absorbing additional masking colouration from waterborne minerals	Low	Low

7.0 Site Inspection

Cosmos Archaeology undertook a site inspection for this current project on 29 January, 2020. The inspection was undertaken by a commercial dive team from Professional Diving Services under the direction of a Maritime Archaeologist from Cosmos Archaeology.

7.1 Weather and Tide Conditions

Diving in Sydney Harbour near Circular Quay is not heavily affected by changes in tide however, previous rainfall carrying silt from land can severely dampen visibility. Fortunately, minimal rainfall had occurred three days prior to the inspection and none had fallen on the diving day. The weather conditions that were taken into consideration in the approach to undertaking the inspection are outlined in Table 5 and Table 6.

Table 5	Tides	for the	survev	dav ⁶
1 4010 6	11400	101 1110	041109	~~,

29- Jan-2020	Time	0538	1159	1827
	Height (m LAT)	0.6	1.7	0.45

Table 6 Rain and wind conditions for the three days prior and for the day of the inspection⁷

Date	Rain (mm)	Wind 09:00 (km/h)	Wind 15:00 (km/h)
26-Jan-2020	0.2	7 E	6 ENE
27-Jan-2020	0.0	54 S	17 ESE
28-Jan-2020	0.0	44 S	6 W
29-Jan-2020	0.0	17 S	17 SSE

7.2 Conduct of Survey

The survey was conducted by a commercial diver/maritime archaeologist under the direction of the maritime archaeologist. The inspection originally consisted of four transects in the area to the north of the OPT and two circular searches to the east of the terminal wharf. However, VTS restrictions, imposed on the day due to operational reasons, did not allow the completion of either of the originally proposed and approved circular searches or the 40 m eastern transect.

The surveys were conducted using Surface Supplied Breathing Apparatus (SSBA), with helmet mounted video and video lights. The diver also carried a hand-held Sony RX100-IV camera with video lights for taking still images. The diver was in communication with the boat and this allowed the maritime archaeologist to instruct the diver and receive observations of the seabed and any finds in real time. The diver carried a 100 m transect line marked at 5 m increments and a 1.3 m fibreglass probe marked in 0.1 m increments.

For Transect 1 South, the boat was moored to the southern side of the mooring dolphin. A shot line was dropped next to the dolphin as an attachment point for the transect line. The diver ran the transect line out 40 m to the south. Following the line back towards the north, the diver took video footage of one side of the transect and then on the way back filmed the other side, thereby getting good coverage either side of the transect line. Once back at the starting point, the diver wound in the transect line, stopping to probe either side of the line at every 5 m marker.

⁶ Bureau of Meteorology, Australian Government, 2020, Sydney tide table predictions,

http://www.bom.gov.au/ntc/IDO59001/IDO59001_2020_NSW_TP007.pdf, accessed 29 January 2020.

⁷ Bureau of Meteorology, Australian Government, 2020, 'Latest weather observations for Sydney Harbour', available http://www.bom.gov.au/climate/dwo/202001/pdf/IDCJDW2124.202001.pdf, accessed 29 January 2020.

For Transect 2 North, Transect 3 South and Transect 5 West, a shot line was dropped at 33.856389° 151.210556° and the diver ran the transect line out on the cardinal points to 40 m, 40 m and 20 m respectively. As VTS had restricted diving to the east of the central position it was decided to run a 20 m transect to the North-east (Figure 25).



Figure 25: Transects run as part of the maritime archaeology survey at OPT. (Base image Google Earth)

7.2.1 Survey bias and accuracy

The following factors had an influence on the bias and accuracy of the survey.

Water visibility

The water visibility ranged from 0.2 m to 2 m which decreased as sediment was disturbed. On certain occasions during the inspection dive, the visibility dropped to 0 m due to current and direction of the dive. The water clarity had an effect on the width of the inspection corridor, which was on average, 2 m wide on either side of the baseline.

Sea bed visibility

For the majority of the survey area, the sea bed consisted of sand and silt with a covering of a shell grit and stands of kelp which reduced ground visibility dramatically. It is possible that smaller artefacts may have been overlooked.

Concretion and growth

The heavy covering of growth on many of the objects located during the survey, impeded the interpretation of the object. In particular, it was difficult to determine if there was copper sheathing on some of the recorded timber piles.

7.3 Survey results

The seabed throughout the Project area was generally sandy with a light covering of silt and shell grit. Varying densities of kelp were spread throughout the Project area. Visibility ranged mostly between 0.2 m through to 2 m throughout the diving surveys, although this was reduced depending upon the

Time start (min): 0927

Depth: 7.2 - 11.1 m

Total time (min): 14 Seabed visibility: Good

ranging between 7 m and 13 m.			
Transect 1 S			
Date: 29 January, 2020	Method: SSBA		Tide: Flooding
Distance and direction: 40 m south		Diver: Callum Ha	rvev

Time end (min): 0941

Water visibility: 0.5 – 2 m

current and the direction of the dive. The depths of all the dives were under 15 m, with the surveys ranging between 7 m and 13 m.

The diver set the transect line, running 40 m to the south from the southern side of the dolphin. The depth on the southern side of the dolphin was 7.2 m while the depth at the southern end was 11.1 m. The seabed was sandy with scattered stands of kelp, lightly covered in silt with a heavy shell grit towards the southern end which became lighter as the diver moved north.

To the west of the transect at the 1 m mark a glass tube was recorded. The tube stood proud of the seabed 0.8 m with a diameter of 0.1 m. The tube was easily removed from the seabed and was hollow (Figure 26). It's function is currently unknown.

At the 3 m mark on the eastern side of the transect, a horse shoe and a small section of copper sheathing were recorded lying adjacent to each other (Figure 27). There was one visible fastening hole in the sheathing. From the 5 m mark, a 7 m length of pile lay in a south-east to north-west direction. The pile was 0.4 m diameter. The northern end appeared broken and heavily degraded (Figure 28). The pile was heavily encrusted with growth so any presence of metal sheathing was unable to be recorded.

A glass milk bottle was recorded just after the 15 m mark and a concrete block was lying crossing the centre of the transect at the 20 m mark. This block was embedded in the seabed at a 45° angle and measured 0.7 m x 0.3 m and was 0.15 m thick. A 2 m long by 0.25 m wide plank lay across the transect in an east-west direction at the 25 m mark (Figure 29). Approximately one metre away a ceramic coffee cup was located, missing the handle (Figure 30).

On the western side of the transect a mobile piece of timber was recorded running parallel with the transect near the 30 m mark. The timber measured 0.4 m long, 0.05 m wide and 0.03 m high (Figure 31). On the eastern side of the transect between 30 m and 35 m there was brick rubble and bottles (Figure 32). On the western side there were two bricks and another bottle.

At the 40 m mark on the eastern side of the transect there was a concrete block measuring 0.3 x 0.4 m and 0.1 m thick. Immediately adjacent to the block were two links of a large chain heavily encrusted with growth (Figure 33).

No refusal was met when probing along the majority of the transect line. At the 25 m mark on the western side of the transect there was refusal at 0.9 m, while on the eastern side there was refusal between 0.4 to 0.8 m. There were no consistent depths of refusal around these points, so it is likely the obstructions were small rocks or concrete rubble. At 40 m, the probe hit refusal at 0.8 m but probing in the immediate area around this mark did not meet any further resistance.



Figure 26: Glass tube standing 800 mm proud of the seabed at 1 m mark west of transect line. (PDS OPT Transect 1 South)



Figure 28: Northern (degraded) end of 7 m pile. (PDS OPT Transect 1 South)



Figure 27: Horse shoe and sheet of copper sheathing at the 3 m mark on the east side of transect line. (PDS OPT Transect 1 South)



Figure 29: Plank crossing transect at 25 m mark. Top half of image indicated by red arrow. (PDS OPT Transect 1 South)



Figure 30: Ceramic coffee cup with no handle at the 26 m mark to the east of the transect. (PDS OPT Transect 1 South)



Figure 31: Mobile timber recorded on the western side of transect near 30 m. (PDS OPT Transect 1 South)



Figure 32: Example of bottles and brick rubble spread between 33 - 30 m. (PDS OPT Transect 1 S)



Figure 33: Chain link adjacent to concrete block to the east of the transect at 39 m. (PDS OPT Transect 1 South)

Transect 2 N						
Date: 29 January, 2020	Method: SSBA		Tide: Flooding			
Distance and direction: 40 m north	Diver: Callum Ha		rvey			
Time start (min): 1110	Time end (min): 1125		Total time (min): 15			
Depth: 8.3 – 9.9 m	Water visibility: 0.2 – 1 m		Seabed visibility: Good			

The diver set the transect line, running 40 m to the north. The seabed had a gentle slope from 8.3 m down to a depth of 9.9 m at the northern end. The seabed was sandy, lightly covered in silt and shell grit, with scattered stands of kelp, apart from the area between 15 m and 30 m, which became very silty, reducing visibility in this area (Figure 34).

A concrete block was recorded on the eastern side of the transect at the 3 m mark (Figure 35). This block was rectangular, measured 0.3×0.4 mm and 0.1 mm thick and was resting at an approximate 45° angle into the seabed. Immediately adjacent to this block was a 1.2 m long ferrous pipe with a 0.5 m diameter running in a north-east to south-west direction (Figure 36).

Immediately past the 5 m mark on the eastern side of the transect were two bottles, one broken at the neck. These appeared to be long neck beer bottles. A brick was partially buried at the base of a bottle (Figure 37). Another object, possibly a piece of concrete, was recorded at 13 m and measured 0.6 m long x 0.1 m wide and 0.1 high.

An apparent concrete object was located at the 13 m mark. This was a thin piece of concrete measuring 0.6 long x 0.1 m wide and 0.1 m deep (Figure 38). A piece of what appeared to be concrete rubble was recorded on the western side of the transect at 18 m (Figure 40). At 23 m, a square concrete block was resting on the seabed. Measuring 0.4 m square, it was 0.25 m thick (Figure 39).

The only other material recorded was a bottle and a modern plastic bag (Figure 41).

No refusal was met when probing along the transect line, except for an area to the east of the line at the 5 m mark. The probe hit refusal at 1 m but probing in the immediate area around this mark did not meet any further resistance. In another area at the 20 m mark, there was refusal between 0.3 and 0.5 m beneath the seabed. There did not appear to be any pattern to the depth of refusal.



Figure 34: Example of seabed along Transect 2. (PDS OPT Transect 2 N 0 to 40 m)



Figure 36: Ferrous pipe; 1.2 m long and 0.5 m diameter. (PDS OPT Transect 2 N 0 to 40 m)



Figure 38: Concrete block at 45 degree angle. (PDS OPT Transect 2 N 0 to 40 m)



Figure 35: Concrete block. (PDS OPT Transect N 0 to 40 m) $\,$



Figure 37: Two long neck beer bottles with brick. (PDS OPT Transect N 0 to 40 m)



Figure 39: Square concrete block (0.4 m). (PDS OPT Transect 2 N 0 to 40 m)



Figure 40: Concrete rubble. (PDS OPT Transect N 0 to 40 m)



Figure 41: Plastic shopping bag. (PDS OPT Transect N 0 to 40 m)

Transect 3 S			
Date: 29 January, 2020	Method: SSBA		Tide: slack to ebbing
Distance and direction: 40 m south	Diver: Callum Ha		rvey
Time start (min): 1147	Time end (min): 1214		Total time (min): 27
Depth: 8.2 – 13.5 m	Water visibility: 0.5 – 1.5 m		Seabed visibility: Good

The diver set the transect line, running 40 m to the south. The depth at the southern end was 13.5 m. The seabed was sandy, lightly covered in silt and shell grit, with scattered stands of kelp. The seabed had a clay like texture between the 20 m and 30 m marks.

There was a length of flat hose, similar to a dredge or fire hose lying just underneath a light silt layer, on the eastern side of the transect between 5 m and 10 m (Figure 42). A concrete block was recorded running across the transect line at 6 m in an almost east to west alignment. The block was 2 m long and 0.3 m high. Immediately adjacent to the block, was a long ferrous pipe. The pipe was on the same alignment as the block, was 8 m long and had a diameter of 0.1 m. On the western side of the transect, the pipe had a right angled ferrous bracket made of flat bar attached to the southern side (Figure 43). On the eastern side of the transect, there were two ferrous spikes attached to the northern side of the pipe. Approximately, 2 m from the eastern end the pipe was bent as if something had tried to lift it or caught and dragged it. The pipe was bent in a V-shape for an approximately 2 m section before disappearing into the seabed.

At 12 m along the transect line, to the west, a coil of lead or tin was buried in the sea bed. The material was coiled like a rope but the material acted more like a soft metal such as lead, as when bent it stayed in the bent position. The coil was heavily covered in sediment (Figure 44). Just past the coil, there was a small collection of bottles, many broken and on the western side of the transect at 15 m a modern tyre was recorded. The tyre was embedded in the seabed at a 45° angle (Figure 45).

At 16 m there was a thin strip of copper. The strip measured 0.2 m long and 0.015 m wide. There were holes at regular intervals along the strip, potentially for fastenings (Figure 46). Continuing along the transect, there was more brick rubble and broken bottles. At 19 m along the transect there was a small piece of chain link (Figure 47). At 21 m along the transect a small piece of copper sheathing was recorded. Measuring 0.1 x 0.3 m, the metal was slightly concave and fastening holes were present. No fastenings were found with the sheathing piece (Figure 48 and Figure 47). Close to the piece of sheathing, a section of what appeared to be planking was buried in the sediment. The plank was 0.02 m thick and only a 0.05 m section was exposed (Figure 49).

A green glass bottle was recorded at 26 m along the transect. The bottle had a curved body and was 0.02 m tall. The body was lightly embedded in the silt (Figure 50).

On the eastern side of the transect, between the 30 m and 35 m mark, a 4 m long piece of timber ran almost parallel with the transect line, measuring 0.25 m wide and 0.15 m thick. This is potentially a timber wale (Figure 51). A fastening hole of 3 mm diameter was recorded at the northern end. No other fastening holes or fastenings were observed along the length of timber. The southern end was squared off. Sitting on top of this timber was nother rounded timber running in a perpendicular direction (west to east). The western end was heavily degraded with a blackened appearance and the eastern end was degraded and heavily encrusted with growth. The timber was 0.3 m diameter and 2.5 m long (Figure 52).

At the 40 m mark there was brick rubble, bottles and a concrete block, resting on its edge measuring 0.6×0.7 and 0.05 m thick. There was also one bone fragment, large enough to be an animal bone such as cow or sheep.

The original probe was lost in the visibility and was replaced with a 2 m fibreglass pole marked at 0.1 m increments. No refusal was met when probing along the transect line, except for a 10 m area either side of the transect line at the 10 m mark. The probe hit refusal at 1 m but probing in the immediate area around this mark did not meet any further resistance.



Figure 42: Flat hose, potentially a dredge or fire hose recorded between 5 and 10 m along transect. (PDS OPT Transect 3 South 40 to 0 m)



Figure 43: Section of 8 m length of ferrous pipe with right angled bracket crossing the transect at 6.5 m mark. Concrete block can be seen in the background. (PDS OPT Transect 3 South 40 – 0 m)



Figure 44: Coil of soft metal material possibly lead or tin recorded 11 m along the transect. (PDS OPT Transect 3 South 40 to 0 m)



Figure 45: Tyre located 15 m along the transect. (PDS OPT Transect 3 South)



Figure 46: Short length of copper strip with fastening holes recorded at 17 m along the transect. (PDS OPT Transect 3 South 40 to 0 m)



Figure 48: Piece of metal sheathing with fastening holes. The metal was slightly concave. (PDS OTP Transect 3 South 0 to 40 m)



Figure 47: Piece of chain link lying loose on the seabed at 19 m along the transect. (PDS OPT Transect 3 South 40 to 0 m)



Figure 49: Buried timber, potentially a plank, measuring 0.02 m thick with only 0.05 m exposed. Indicated by red arrow. (PDS OTP Transect 3 South 0 to 40 m)



Figure 50: Green glass bottle with curved body at 26 m along transect. (PDS OPT Transect 3 South 0 to 40 m)



Figure 51: Timber, likely a waler, running almost parallel with the transect line between 30 and 35 m. (PDS OPT Transect 3 South 40 to 0 m)



Figure 52: Timber pile running perpendicular to wale timber (just visible underneath the pile) (PDS OPT Transect 3 South 0 to 40 m)

Transect 4 NE						
Date: 29 January, 2020	Method: SSBA		Tide: Ebbing			
Distance and direction: 20 m north east		Diver: Callum Harvey				
Time start (min): 1240	Time end (min): 1253		Total time (min): 13			
Depth: 8.2 – 11.3 m	Water visibility: 0.5 to 1.5 m		Seabed visibility: Good			

The diver set the transect line, running 20 m to the north west. The seabed was sandy, lightly covered in silt and shell grit, with scattered stands of kelp (Figure 53).

A pile stump was recorded along the transect line at the 2 m mark. The centre was heavily degraded making the top of the stump semi-circular. The pile stood 0.5 m proud of the seabed and measured 0.4 m in diameter. The pile was too degraded and heavily encrusted with growth obscuring any evidence of copper sheathing (Figure 54).

A timber branch was recorded loose on top of the seabed adjacent to this pile 1.5 m long x 50 mm diameter (Figure 55). Just past the 5 m mark on the transect a ferrous pipe, 1 m long x 80 mm in diameter. The pipe was hollow and appeared broken at both ends (Figure 56).

There was scattered concrete rubble along the rest of the transect (Figure 57) and the remnants of a shopping trolley were located on the western side of the transect just before the 15 m mark (Figure 58).

No refusal was met when probing along the transect line, except for one area to the west of the line at the 20 m mark. The probe hit refusal at 0.6 m but probing in the immediate area around this mark did not meet any further resistance.


Figure 53: Example of seabed on Transect 4. (Professional Diving Services, OPT Transect 4 NE 0 to 40 m)



Figure 55: Tree branch resting loose on seabed. Outline marked in blue. (PDS Transect OPT 4 NE 0 to 40 m)



Figure 54: Pile stump: 0.45 diameter and standing 0.5 m proud of the seabed. Very heavily eroded. (PDS OPT Transect 4 NE 0 to 40 m)



Figure 56: Ferrous pipe resting loose on seabed. (PDS OPT Transect 4 NE 0 to 40 m)



Figure 57: Concrete rubble (PDS OPT Transect 4 NE 0 to 40 m)



Figure 58: Grill from a shopping trolley, indicated with red arrow. (PDS OPT Transect 4 NE 0 to 40 m)

Transect 5 W			
Date: 29 January, 2020	Method: SSBA		Tide: Ebbing
Distance and direction: 20 m west	Diver: Callum Harvey		rvey
Time start (min): 1258	Time end (min): 1310		Total time (min): 12
Depth: 8.2 – 11.9 m	Water visibility:	0.5 – 2 m	Seabed visibility: Good

The diver set the transect line, running 20 m to the west, heading into Campbells Cove. The depth at the western end was 11.9 m. The seabed was sandy, lightly covered in silt and shell grit, with scattered stands of kelp (Figure 59).

A small scattering of concrete rubble was present near the beginning of the transect line. At the 5 m mark, a 2 m length of concrete was recorded. This concrete was a rounded triangular shape and rose 0.1 m above the seabed. It appeared relatively new with only a small amount of growth, possibly a piece of kerbing. A square potentially concrete block was located at the 11 m mark. Resting at a 45° angle, the block rose out of the seabed 0.1 m and measured 1 m x 0.3 m (Figure 60).

At the 13 m mark, a rounded object protruded 0.4 m from the seabed. Measuring 0.5 m x 0.3 m, the object appears narrow for a pile but was solidly embedded in the seabed and may have been heavily degraded (Figure 61). There was no obvious evidence of sheathing. Another potential concrete block $(0.4 \times 0.4 \times 0.3 \text{ m})$ was recorded at the 15 m mark and immediately adjacent to this block, a pile was recorded running in an approximate south-east to north-west direction (Figure 62). The pile measured 6 m long and was 0.4 m diameter. The south-east end was heavily degraded, while the north-west end appeared cut. It was heavily covered in growth obscuring any presence of copper sheathing.

No refusal was met when probing along the transect line, except for one area to the north of the line at 10 m. The probe hit refusal at 1 m but probing in the immediate area around this mark did not meet any further resistance.



Figure 59: Example of the sandy seabed, lightly silted with a covering of shell grit and scattered strands of kelp. (Professional Diving Services: OTP Transect 5 West 0 to 20 m)



Figure 60: Potential concrete block at a 45 degree angle at the 11 m south of the transect line. (Professional Diving Services: OTP Transect 5 West 0 to 20 m)



Figure 61: Potential pile stump, heavily degraded, south of the transect line at the 13 m mark. (Professional Diving Services: OTP Transect 5 West 0 to 20 m (Professional Diving Services: OTP Transect 5 West 0 to 20 m)



Figure 62: Pile recorded crossing the transect line at the 15 m mark running in a SE to NW direction. (Professional Diving Services: OTP Transect 5 West 0 to 20 m)

7.4 Interpretation of Results

This maritime archaeological survey conducted to the east of the OPT mooring dolphin located near Campbells Cove recorded items very similar in nature and variety to the maritime survey conducted in 2014 . The archaeological remains present on the seabed included in situ pile stumps, cut sections of piles lying on the seafloor and other structural timbers, including possible timber walers. The amount of growth on these timbers prohibited the identification of any remnant copper sheathing, however, two loose pieces of sheathing were recorded lying loose on the seabed. The long ferrous pipe in Transect 3 South likely carried water or other services along a structure and was attached lengthways with the angled bracket. These items are likely remains of the former Wharf No. 7 (1901-1980) in Campbells Cove. Wharf No. 7 was a longer and wider structure than the previous structure (built in 1876) in the Cove, and the location of the mooring dolphin is located at the western end of the 1901 wharf, beyond the eastern end of the previously constructed 1876 wharf.

No relics were recorded on the seabed in the survey area. Other material such as bricks, a modern tyre, concrete rubble and bottle scatters were recorded. Some of this modern material is likely to have been from the building of the OPT wharf extension.

Diver probing during the survey did not record any evidence of timbers lying underneath the seabed. Where refusal was felt underneath the seabed, it was unpredictable and random indicating rock or concrete scatter rather than lengths of timber or wharf remains.

7.5 Summary of Previous Maritime Archaeological Assessment

Cosmos Archaeology previously had undertaken a maritime archaeological survey and assessment for the proposed extension of the OPT wharf and installation of a new mooring dolphin to the north of the OPT in 2014. The diving survey was conducted over one day and identified a number of copper sheathed piles, hawser ropes, whalers and various other remains in the location of the then proposed dolphin. These remains were interpreted as the remains associated with the western end of Wharf 7 (1901 – 1980). The archaeological potential assessed in 2014 concluded that remains of the former wharf have progressively been covered over with sediment. Structural material likely to be present on the seabed would consist of remains associated with the construction, repair and maintenance of the wharf. This would include pile remains and other sub-structure wharf remains such as timber whalers, corbels and deck beams.

The assessment also identified a moderate potential for relics to be present within the footprint of the former Wharf No. 7. The location for the mooring was to impact on remains associated with the former

wharf within the footprint of the former wharf. As such, no assessment of archaeological potential that may exist within the berth pockets associated with the former wharf was made.

7.6 Bathymetric multi-beam survey and side scan sonar data

The results of a multi-beam and side scan sonar survey of the Project area was provided by Port Authority of NSW. The survey area was along the entirety of the OPT wharf, including the area up to and surrounding the mooring dolphin to the north, and the area immediately to the south of the Wharf (Figure 63).

The multi-beam and side scan sonar survey results have been reviewed by the maritime archaeologist for this report. Along the whole of the western edge of the OPT wharf area, including the area immediately beyond the southern end, the existing rock armour can be seen along the existing seawall, but also scattered out further into the existing berth pocket. A higher density of the existing rock armour can be seen at the northern end of the OPT, along the newer section of wharf constructed in 2014 (Figure 63).

At the northern end of the surveyed area, immediately around the location of the existing mooring dolphin, the remains of the 1901-1980 Wharf No. 7 can be seen. The yellow and orange extent of the wharf in the multi-beam survey depicts the height of the remains above the seabed. These results line up with the remains of the former wharf recorded by Cosmos Archaeology during the 2014 and 2020 survey of this area. The remains on the seabed appear to be very well defined within the footprint of the former wharf. The side scan sonar survey does not clearly show these remains, however, the results do show potential piles and/or other remains of the former wharf scattered further out in the berth pocket and into Sydney Cove (Figure 63).

The review of the multi-beam and side scan sonar data for the remainder of the Project area, including those areas along the OPT berth pocket where the maritime archaeological team was not able to undertake a survey, did not reveal the presence of any anomalies on the seabed that could be associated with any potential cultural heritage item.



Figure 63: Multibeam survey of the Project area undertaken by Port Authority of NSW in March 2018. Image on the left is the original image, image on the right has been marked up by the maritime archaeologist (Source: Port Authority of NSW). This information is provided courtesy of Port Authority of NSW. Copyright is owned by Port Authority of New South Wales

7.7 Maritime archaeological potential

Based on the historical research and the review of the multi-beam and side scan sonar data, as well as the results of the maritime archaeological surveys in 2014 and 2020, predictions about the maritime archaeological potential of the Project area can be made.

The maritime archaeological surveys in 2014 and 2020, and the geophysical survey results show the remains of the former Wharf No. 7 (1901-1980) present in Campbells Cove. The archaeological remains on the seabed include both *in situ* and cut sections of piles on the seabed, other structural remains including deck beams, and other metal fastening. The 2014 survey identified the presence of piles with copper sheathing attached, and the 2020 survey identified copper sheathing present on the seabed. Copper sheathing was a protective measure installed to wharf piles in the 20th century from marine borer attack. This was an expensive process, however, the sheathing of the piles meant the piles were protected and would require less maintenance.

The location of the proposed works are at the end of the former Wharf No. 7, a longer and wider wharf than the earlier 1876 wharf. As this is the case, the remains that have been identified on the seabed are likely to only be associated with the former Wharf No. 7 and are not likely to be associated with the earlier wharf in Campbells Cove.

Divers in both the 2014 and 2020 survey undertook probing to identify the presence and depth of materials that may be present below the seabed. During both surveys, divers identified that material was present below the seabed. During the 2014 survey it was noted that these were likely timbers present within the footprint of the former wharf. The 2020 maritime survey also noted material present below the seabed, but noted that this may also relate to building material associated with the construction of the OPT wharf extension and/or from the construction of the mooring dolphin. The potential for maritime archaeological remains associated with the former Wharf No. 7 (1901-1980) is considered to be *high*.

No relics were recorded on the seabed during both maritime archaeological surveys. Other material, such as a brick and tyre (modern), concrete rubble and bottle scatters were recorded. The potential for archaeological deposits associated with the shipping and transportation in front of the current wharf is affected by site formation processes that have occurred during and after the lifespan of the wharf. Typically, archaeological deposits associated with vessels berthed at a wharf are located immediately between the wharf and the vessel or on the opposite side of the vessel toward the middle of the cove. The limit of these deposits is based on the width of the vessels berthed at the wharf. Relics associated with the working life of the wharf also have the potential to be deposited immediately below the footprint of the former wharf, particularly from material that has fallen between deck planking. This material would relate directly to the working life of the wharf. The archaeological potential within this area is considered to be *moderate*.

The OPT berth pocket area has previously been dredged. The extant remains of the existing rock armour were along the western side of the surveyed area, including the area immediately to the south of the OPT wharf. The review of the multi-beam and side scan sonar survey did not reveal any anomalies on the seabed that may relate to possible cultural heritage remains within the OPT berth pocket area. The historical archaeological potential within this area is considered to be *low*.

8.0 Assessment criteria

8.1.1 Significance assessment criteria

In order to understand how a development would impact on heritage or archaeological items, it is essential to understand why an item is significant. An assessment of significance is undertaken to explain why a particular item is important and to enable the appropriate site management and curtilage to be determined. The process of assessing heritage significance is outlined in the guideline *Assessing Heritage Significance* (NSW Heritage Office, 2001) which is part of the *NSW Heritage Manual* (Heritage Branch, Department of Planning). The *Assessing Heritage Significance* guidelines establish seven evaluation criteria which reflect four categories of significance and whether a place is rare or representative.

A heritage item can be identified as being significant at a local level (i.e. to the people living in the vicinity of the site), at a State level (i.e. to all people living within NSW) or be significant to the country as a whole and be of National or Commonwealth significance. In accordance with the guideline *Assessing Heritage Significance*, an item would be considered to be of State significance if it meets two or more criteria at a State level, or of local heritage significance if it meets one or more of the criteria outlined in Table 7. The Heritage Council require the summation of the significance assessment into a succinct paragraph, known as a Statement of Significance. The Statement of Significance is the foundation for future management and impact assessment.

Criterion	Inclusions/exclusions
<i>Criterion (a)</i> – an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).	The site must show evidence of significant human activity or maintains or shows the continuity of historical process or activity. An item is excluded if it has been so altered that it can no longer provide evidence of association.
Criterion (b) – an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local to area).	The site must show evidence of significant human occupation. An item is excluded if it has been so altered that it can no longer provide evidence of association.
Criterion (c) – an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).	An item can be excluded on the grounds that it has lost its design or technical integrity or its landmark qualities have been more than temporarily degraded.
Criterion (d) – an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.	This criterion does not cover importance for reasons of amenity or retention in preference to proposed alternative.
Criterion (e) – an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area). Significance under this criterion must have the potential to yield new or further substantial information.	Under the guideline, an item can be excluded if the information would be irrelevant or only contains information available in other sources.
Criterion (f) – an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).	An item is excluded if it is not rare or if it is numerous, but under threat. The item must demonstrate a process, custom or other human activity that is in danger of being lost, is the only example of its type or demonstrates designs or techniques of interest.

Table 7 Significance assessment criteria

Criterion	Inclusions/exclusions
Criterion (g) – an item is important in demonstrating the principal characteristics of a class of NSW's (or local area's):	An item is excluded under this criterion if it is a poor example or has lost the range of characteristics of a type.
 cultural or natural places cultural; or natural environments. 	

8.2 Assessment of significance for archaeological remains associated with the former Campbells Wharf No. 7 (1901-1980)

Below is the significance assessment for the archaeological remains, including the structure and potential maritime archaeological deposits, associated with the former Campbells Wharf No. 7 (Table 8). This significance assessment is based on the assessment previously prepared by Cosmos Archaeology (Cosmos Archaeology Pty Ltd, 2014).

Table 8 Significance assessment of the former Campbells Cove Wharf No. 7 (1901-1980)

Criterion	Assessment
<i>Criterion (a)</i> – an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).	Campbells Cove has served as part of the Sydney Harbour shipping and trade hub for Sydney from 1810 when the first private wharf was constructed by Robert Campbell. Campbells Cove became part of the evolution of the wharves along the western side of Sydney Cove with the later developments made by the Australasian Steam and Navigation Company and Australasian United Steam Ship Company up until the turn of the century. Integrated as part of the larger wharfage schemes associated with both earlier shipping companies, the wharf at Campbells Cove would have been a well-known fixture of the commerce and trade in and out of Sydney. After the resumption of the wharves in Sydney Harbour, the wharf in Campbells Cove was demolished and replaced with a newer timber wharf. The wharf was 360 feet (110 m) long and 91 feet (28.5 m) wide and known as Wharf No. 7. The wharf was leased to shipping companies such as Gibbs, Bright & Co., China Navigation Company and Oceanic Company, who leased individual berths and store space on the wharf. The wharf was later used as part of the Maritime Services Board where it appears to have been used as a berth for smaller working vessels and no longer used as a warehouse. The remains of the former Campbells Cove Wharf (ca.1901-1980) is considered to be of local significance under this criterion.
Criterion (b) – an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local to area).	The 1901-1980 wharf was constructed by the shipping firm Norddeutscher Lloyd as part of the wharf upgrade works that stretched along the western side of Sydney Cove after the resumption of wharves in 1901. Berths and warehouse space were leased to individual companies until sometime after the 1960s when they were later used by the Maritime Services Board. As the ownership, and leases of the berths and warehouse, changed constantly overtime, the wharf is not considered to have had, or still have, a strong special association with the life or works of person or a group of people important to NSW. The archaeological remains of the wharf are not considered to meet the requirements of this criterion on a State or local level.
Criterion (c) – an item is important in demonstrating aesthetic characteristics and/or a high degree of	Archaeological remains associated with the ca.1901-1980 wharf are visible on the former site and there is a high potential for further maritime archaeological remains to be present below the seabed. These remains are likely to be

Criterion	Assessment
creative or technical achievement in NSW (or the local area).	associated with the structural remains of the wharf and are not unique to the former Wharf No. 7 at Campbells Cove. As such, the archaeological remains of the former wharf are not considered to demonstrate aesthetic characteristics or show a creative or technical achievement, and as such, the former wharf is <i>not considered to meet the requirements</i> of this criterion.
<i>Criterion (d)</i> – an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.	The ca.1901-1980 wharf was part of the wharfage system present in Sydney Cove and was part of the larger wharf system in operation in Sydney Harbour. While the wharf at Campbells Cove was an integral part of the goods transportation and waterside warehousing needs from the turn of the century onwards, there were no single particular community or cultural groups who were associated with the wharf. As such the wharf built at Campbells Cove is <i>not considered to meet the requirements</i> of this criterion.
Criterion (e) – an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area). Significance under this criterion must have the potential to yield new or further substantial information.	There are known and potential archaeological remains of the former Wharf No. 7 (1901-1980) expected to exist on site. The historical information relating to the construction of the wharf is limited, with only primary sources, mostly photographs and maps, which reveal the construction of the wharf. Archaeological information that has been recorded on the site has already shown that the piles associated with the former wharf were sheathed to protect the submerged timbers from marine borer attack. Physical evidence that has survived in the archaeological record has the potential to provide additional information relating to the construction techniques and materials that were used. Information relating to repair works to the wharf, such as from the driving in of repair "sister" piles or the addition of extra bracing or fastenings, can also be determined from the remains in the archaeological record on wharf site. Artefacts discarded, accidentally or deliberately, from the wharf and vessels moored alongside can contribute towards knowledge of the variety of traffic and goods that passed between Sydney and the rest of the world during the 20th century. It can also contribute to our understanding of the working operation of the wharf. The archaeological site associated with the former wharf built at Campbells Cove has the potential to contribute to a greater understanding of wharf construction, repair and upgrading that has not been documented in the archaeological record previously. As such, the archaeological site associated with both former ca. 1901-1980 wharf built at Campbells Cove is considered to be of <i>local significance</i> under this criterion.
Criterion (f) – an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).	The early 20th century wharves constructed in Sydney Harbour are associated with the post resumption development of the harbour. There are wharves still standing in Sydney Harbour that relate to the development works directly associated with this redevelopment phase. Many of these wharves are still in use today, such as Woolloomooloo, Walsh Bay and Jones Bay wharves. While not all of these wharves still exist, there are surviving examples today that can be considered to be common. The former 1901 wharf constructed at Campbells Cove is likely to have been one of the earlier wharves that were constructed as part of the post wharf resumption works in Sydney Harbour. The archaeological site has the potential to reveal early design plans that were to

Criterion	Assessment
	become standard for all wharf construction built after the resumption of the wharves. This has the potential to include remains associated with pile type and construction, timbers and other materials used and fastenings. Compared to later constructed wharves that were built as part of the same redevelopment works, such as at Walsh Bay (1911), could show the changes to wharf design after the Campbells Cove was constructed. The maritime archaeological remains of the former ca. 1901-1980s Campbells Cove wharf are considered to be of <i>local significance</i> under this criterion.
Criterion (g) – an item is important in demonstrating the principal characteristics of a class of NSW's (or local area's): • cultural or natural places cultural; or • natural environments.	The site of the former wharf at Campbells Cove is represented by the maritime archaeological remains that are present on and below the seabed and are not considered to be intact or complete. As such, the site is not considered to retain the principal characteristics of its type or design. Campbells Cove is not considered to meet the standards of this criterion.

8.2.1 Statement of significance

Campbells Cove has been associated with maritime transport in Sydney Harbour since 1810. Robert Campbell built the first private wharf in Campbells Cove in 1810 in association with other wharves being built in Sydney Cove. By the 1880s, the early wharves on the western side of Sydney Cove were bought and operated by the Australasian Navigation Company, including the wharves in Campbells Cove. The original wharves were removed and new ones built, including two new wharves in Campbells Cove. The wharves continued to operate until the resumption of wharves in 1900 by the Sydney Harbour Trust. Both of these wharves were removed and a new 110 m long by 28 m wide wharf was constructed in its place. Known as Wharf No. 7, the wharf continued operating until 1980 when the wharf was removed and replaced with a smaller finger wharf that is still present in the cove today.

Wharf No. 7 (1901-1980) was an integral part of maritime commerce and trade functioning in Sydney Harbour. Known as Wharf No. 7, the wharf was leased by international merchant shipping companies before being taken over by the Maritime Services Board.

The archaeological resource present on the seabed is considered a common resource as it relates to the early 20th century redevelopment of Sydney Harbour. The wharf was likely one of the earlier wharves constructed as part of this new development works, and the archaeological remains have the potential to further our understanding about the initial type and construction of these wharves and the evolution of the design with wharves constructed as part of the same earlier 20th century development after the initial wharves were constructed in Sydney Harbour.

9.0 Impact assessment

9.1 Proposed works

9.1.1 Overview

The proposed works at the OPT are to dredge the existing berth pocket to increase the underkeel clearance to allow cruise ships to safely berth. The depth of required capital dredging works varies across the berth pocket, with majority of the area requiring deepening less than 1.5 m. The northern portion of the existing berth pocket, in the vicinity of the mooring dolphin, would require to be deepened by up to 6 m (Figure 64).

Scour protection would be installed along the whole length of the quay wall to prevent undermining from hydraulic instability.

The proposal's key features are:

- Installing a sheet pile retaining wall of about 65 m long at the southern end of the OPT berth pocket.
- Dredging approximately 20,000 m³ of sediment to deepen the berth pocket.

Installing scour protection of about 12,000 \mbox{m}^2 in the form of pumped concrete mattress or articulated concrete mattresses.

Capital Dredging and Scour Protection Works at the Overseas Passenger Terminal – Maritime Archaeological and Indigenous Heritage Assessment and Statement of Heritage Impact



Figure 64: Proposed extent of dredging showing proposed depths to be dredged. Note: Dredging would only occur within the outlined "Provisional Berth" area

9.2 Aboriginal Heritage Assessment Key Findings

The key findings of this assessment are as follows:

- No registered Aboriginal sites are present within the Project Area; and
- Submerged environs within the Project Area were generally assessed is being of low to moderate archaeological sensitivity, with various factors influencing the survival of the various site types.

Table 4 provides a summary of the key questions asked as part of the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010:10). Should the answer to Question 4 be 'yes', further investigation and impact assessment would be required.

Table 9 Due Diligence Process Questions

1	Will the activity disturb the ground surface or any culturally modified trees?	Proceed to Question 2
	Yes. The proposed activity will require the removal of soil and sediment from a submerged context. No culturally modified trees will be impacted.	
2a	Are there any relevant confirmed site records or other associated landscape feature information on AHIMS?	Proceed to Question 2b
	Yes. The AHIMS database holds a record of known Aboriginal sites near the Project area, with a search of the AHIMS database identifying that the nearest site approximately 280 m away. Reference to available geotechnical data suggests that assessment former terrestrial soils, suggestive of tidal delta and estuarine environs, are likely within the Project area, albeit in a submerged context.	
2b	Are there any other sources of information of which a person is already aware?	Proceed to Question 2c
	Yes. AECOM has reviewed all available literature and relevant sources of information pertaining to the known Aboriginal resource of the Project area.	
2c	Are there any landscape features that are likely to indicate presence of Aboriginal objects?	Proceed to Question 3
	Yes. Geotechnical data suggests that sediment associated with tidal delta and estuarine environs are likely present within the Project area.	
3	Can harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?	Proceed to Question 4
	Impacts from dredging within the Project area is rated as Moderate. This assessed impact reflects that dredging would be relatively localised, even though any evidence surviving would be considered to be of high heritage significance due to its rarity and ability to reveal more about submerged sites and Aboriginal occupation in the Sydney area during the terminal Pleistocene.	
4	Does a desktop assessment and visual inspection confirm that there are Aboriginal objects or that they are likely?	Proposed activity can proceed subject to
	This Aboriginal Heritage Due Diligence Assessment has identified a low to moderate potential for intact Aboriginal sites.	recommendations provided below.

9.3 Heritage impact assessment

9.3.1 Summary of impacts

The Project includes undertaking capital dredging works within the existing berth pocket to increase the depth underkeel of vessels. The additional capital dredging would require deepening the existing berth pocket by approximately 1.5 m to 6 m, with the proposed works to dredge up to 6 m below the current seabed depth. These dredging works would impact on the remains of the former Campbells Cove Wharf No. 7 (1901-1980) identified to be within the Project area. These impacts would remove up to an approximate 20 m section of the remains, that include in situ piles, sections of cut piles and other timber structural remains associated with the former wharf that are present within its original footprint. The depth of the proposed dredging in the area of the former wharf would also remove material remains that are present below the current seabed. There is the potential for maritime archaeological relics associated with the use of the wharf to also be present within the footprint of the former wharf. The dredging would likely also remove these remains. The maritime archaeological site on the seabed has been assessed as being up to 3,135 m². The total area of the wharf that is likely to be impacted from these works is expected to be approximately 570 m², or 18% of the site.

The extent of the dredging in the vicinity of the former wharf may also impact on relics present on and under the seabed associated with vessels that berthed at Wharf No. 7. These relics would be located in the area between the vessel and the wharf, and, on the opposite side of the vessel toward the middle of the cove. There is not expected to be any provenance to the relics that may be present within the seabed as stratigraphic deposits are not expected to be present. Artefact movement and sorting within the seabed deposits is also likely to have occurred due to natural influences, including wave motion and currents across the site. Movement and disturbance of the seabed can affect the location and positioning of relics, both horizontally and vertically within the seabed deposit. This is likely to occur until relics penetrate further through the soft silt deposits and reach firmer silt and or clay-based deposits. The action of dredging would remove relics that are present at this level if the dredging was to occur to this depth.

There is not expected to be any additional impacts from dredging within the other areas of the berth pocket. No previous historic wharves or other structures were located within this area prior to the reclamation and construction of the OPT. There are not expected to be any shipwrecks or shipwreck related material within the area of the OPT. Historic dredging practices within the existing berth pocket are also likely to have removed any maritime archaeological potential that may have existed.

The installation of rock armour along the guay wall is not expected to have an impact. The proposed works would repair and add to the existing armour wall already present.

As there would be expected impacts to potential archaeological deposits from this Project, a permit would be required from Heritage NSW, DPC, prior to any construction works commencing. The permit may also require a Research Design and Methodology Document to be prepared that outlines how archaeological work and the recording of these remains would be undertaken before, during and after the proposed works are completed.

Impacts to significance 9.3.2

02-Jul-2020

Table 10 assesses the impact of the proposed works against each of the heritage criteria from the significance assessment undertaken in Section 8.2 of this report.

Table 10 Assessment of heritage impact of the Project against the significance assessment

Criterion	Statement
a) Historical significance: Campbells Cove has served as part of the Sydney Harbour shipping and trade hub for Sydney from 1810 when the first private wharf was constructed by Robert Campbell. Campbells Cove became part of the evolution of the wharves along the western side of Sydney Cove with the later developments made by the Australasian Steam and Navigation Company and Australasian United Steam Ship Company up until the turn of the century. Integrated as part of the larger wharfage schemes associated with both earlier shipping companies, the wharf at Campbells Cove would have been a well-known fixture of the commerce and trade in and out of Sydney.	The proposed capital dredging works and rock armour upgrade at the OPT are not expected to have an impact to the heritage significance associated with the former Wharf No. 7 at Campbells Cove. The proposed dredging would remove approximately 18% of the archaeological site on and under the seabed. The remainder of the extant site, approximately 82% of the site would remain undisturbed. This would include relics associated with the operation of the wharf, as well as relics that may be associated with vessels berthed at the former wharf.
After the resumption of the wharves in Sydney Harbour, the wharf in Campbells Cove was demolished and replaced with a newer timber wharf. The wharf was 360 feet (110 m) long and 91 feet (28.5 m) wide and known as Wharf No. 7. The wharf was leased to shipping companies such as Gibbs, Bright & Co., China Navigation Company and Oceanic Company, who leased individual berths and store space on the wharf. The wharf was later used as part of the Maritime Services Board where it appears to have been used as a berth for smaller working vessels and no longer used as a warehouse.	
e) Research significance. There are known and potential archaeological remains of the former Wharf No. 7 (1901-1980) expected to exist on site. The historical information relating to the construction of the wharf is limited, with	The Project would have an impact to the known and potential maritime archaeological resource present on and below the seabed, however, it would not result in the total loss of the archaeological resource, both in terms of its rarity or significance.
only primary sources, mostly photographs and maps, which reveal the construction of the wharf. Archaeological information that has been recorded on the site has already shown that the piles associated with the former wharf were sheathed to protect the submerged timbers from marine borer attack. Physical evidence that has survived in the	The Project would include the removal of approximately 18% of archaeological remains of the former Wharf No. 7. This impact is considered to be a major impact, however, the remainder of the site located in Campbells Cove would remain unaffected.
archaeological record has the potential to provide additional information relating to construction techniques and materials that were used. Information relating to repair works to the wharf, such as	The impact to the archaeological remains could be mitigated by a maritime archaeological program that allowed for research relating to the construction and operation of the former wharf to be assessed. This would be done through a

Criterion	Statement
from the driving in of repair "sister" piles or the addition of extra bracing or fastenings, can also be determined from the remains in the archaeological record on the wharf site. Artefacts discarded, accidentally or deliberately, from the wharf and vessels moored alongside can contribute towards knowledge of the variety of traffic and goods that passed between Sydney and the rest of the world during the 20th century. It can also contribute to our understanding of the working operation of the wharf. The archaeological site associated with the former wharf built at Campbells Cove has the potential to contribute to a greater understanding of wharf construction, repair and upgrading that has not been documented in the archaeological record previously.	 combination of a recording of the <i>in situ</i> remains, an archaeological monitoring and test excavation program to understand the site formation, artefact patterning and distribution across the site. Sieving of the dredge spoil would allow for any relics across the impact area to be recovered from the site. Through this program a better understanding could be made of the working operation of the wharf and a better understanding the remaining archaeological site. Repair of the existing scour protection would not have an impact to the heritage significance associated with this heritage criterion. The proposal; includes the installation of additional scour protection works along the western side of the OPT. There are no maritime archaeological areas of potential identified within this area.
f) Rarity significance. The early 20th century wharves constructed in Sydney Harbour are associated with the post resumption development of the harbour. There are wharves still standing in Sydney Harbour that relate to the development works directly associated with this redevelopment phase. Many of these wharves are still in use today, such as Woolloomooloo, Walsh Bay and Jones Bay wharves. While not wharves from the post resumption era still exist, there are surviving examples today that can be considered to be common. The former 1901 wharf constructed at Campbells Cove is likely to have been one of the earlier wharves that was constructed	The Project would include the removal of a portion of the archaeological site associated with former Wharf No. 7. The dredging works would remove those remains currently visible on the seabed and below. This total impact is expected to be less than 20% of the total archaeological site on the seabed and concentrated only to the seaward end of the wharf. The remainder of the site would remain <i>in situ</i> . The impact could be mitigated by undertaking a maritime archaeological program across the area of the site that would be impacted. This would include <i>in situ</i> recording of the structure on the seabed to better understand the post demolition
as part of the post wharf resumption works in Sydney Harbour. The archaeological site has the potential to reveal early design plans that were to become standard for all wharf construction built after the resumption of the wharves. This has the potential to include remains associated with pile type and construction, fastenings, timbers and other materials. Compared to later constructed wharves that were built as part of the same redevelopment works, such as at Walsh Bay (1911), the site could show the changes to wharf design after the Campbells Cove was constructed.	site formation processes. Archaeological monitoring of the seabed surface remains would be used to assist with answering wharf construction techniques used for post resumption wharves in Sydney Harbour. Archaeological test excavations in a number of locations across the seabed would be carried out to understand artefact density, distribution and patterning that may exist within the seabed deposit. At the conclusion of the testing, dredged material removed from specific locations around the former wharf site would be undertaken to record the remainder of the maritime archaeological remains that may be present.

Criterion	Statement
	Archaeological monitoring of the surface timbers that have been removed would contribute to our understanding of the construction techniques, a series of test excavations would reveal any artefact patterning or distribution across the site and sieving the dredged material removed from this section of the site, in association with the archaeological test excavation, would reveal relics that relate to the use of the wharf, including relics associated with berthed vessels. Project works associated with the installation of the scour protection along the western side of the OPT would not be placed over the remains of the former Wharf No.7. As such, these works would not have an impact to this heritage criterion.

10.0 Statement of heritage impact

The objective of a Statement of Heritage Impact is to evaluate and explain how the proposed development, rehabilitation or land use change would affect the heritage value of the site and/or place. A Statement of Heritage Impact should also address how the heritage value of the site/place can be conserved or maintained, or preferably enhanced by the Project.

10.1 Sydney Opera House World Heritage Listing

A heritage impact assessment is required to be undertaken for works within the buffer zone associated with the Sydney Opera House on the WHL, as protected under the EPBC Act 1999. The guidelines for undertaking this assessment are outlined in the *Significant Impact Guidelines 1.1* prepared by the Commonwealth Government (Department of the Environment, 2013:17). The assessment determines if the proposed works (the action) is likely to have a significant impact on cultural heritage values of a World Heritage property. This assessment is detailed in Table 11 below.

Impact. Is there a real chance or possibility that the action will	Discussion
Permanently remove, destroy, damage or substantially alter the fabric of a World Heritage property	NO The proposed capital dredging and scour protection works would be undertaken within the buffer zone associated with the Sydney Opera House listing, but will not have a direct impact to the Sydney Opera House itself
Extend, renovate, refurbish or substantially alter a World Heritage property in a manner which is inconsistent with relevant values	NO The proposed works would take place within the buffer zone associated with the Sydney Opera House listing, but would not directly impact on the Sydney Opera House. All works would be contained underwater and would not be visible from the Opera House itself.
Permanently remove, destroy, damage or substantially disturb archaeological deposits or artefacts in a World Heritage property	NO The proposed works would take place within the buffer zone associated with the Sydney Opera House listing, but would not directly impact on the Sydney Opera House. This assessment has identified maritime archaeological relics and potential for relics to be present on and under the seabed that are not associated with the Sydney Opera House.
Involve activities in a World Heritage property with substantial and/or long-term impacts on its values	NO The proposed works would take place within the buffer zone associated with the Sydney Opera House listing, but would not directly impact on the Sydney Opera House. All works would be contained underwater and would not be visible from the Opera House itself.
Involve construction of buildings or other structures within, adjacent to, or within important sight lines of, a World Heritage property which are inconsistent with relevant values	NO The proposed works would take place within the buffer zone associated with the Sydney Opera House listing, but would not directly impact on the Sydney Opera House. All works would be contained underwater and would not be visible from the Opera House itself.

Table 11: World Heritage properties impact assessment

Based on the assessment made in Table 11, the proposed capital dredging works and scour protection would not have any direct or indirect impacts to the Sydney Opera House, relics, views or vistas to and from the World Heritage Listed property. As such, no referral under the EPBC Act is required for this project.

10.2 Maritime archaeological remains assocated with Wharf No.7

This statement of heritage impact has been prepared in accordance with the *NSW Heritage Office & Department of Urban Affairs and Planning NSW Heritage Manual* (1996) and *NSW Heritage Office Statements of Heritage Impact* (NSW Heritage Office & Department of Urban Affairs & Planning, 2002). The guidelines pose a series of questions as prompts to aid in the consideration of impacts based on the type of Project. The Project involves a major addition adjacent to an area of known and potential maritime archaeological remains. The guideline suggests the following questions be used to direct discussion in relation to the Project.

These questions are addressed, based on the impacts to the heritage significance of the maritime archaeological site at Wharf No. 7 at Campbells Cove, as outlined in Section 9.2.

Development	Discussion
How is the impact of the new development on the heritage significance of the item or area to be minimised	The proposed rock armour works would not have an impact to the heritage significance or any archaeological potential present within the Project area. The works would be undertaken within the area already containing scour protection and would not be added to any areas where potential historical archaeological remains have been assessed to be present.
	The capital dredging works would increase the depth of the berth pocket at the northern end by up to 6 m, removing the known archaeological remains associated with the former Wharf No. 7 (1901-1980). This impact would remove up to 18% of the archaeological site from the seabed. Physical impacts would be minimised by containing the dredge area to within the Project area only, leaving the remainder of the site <i>in situ</i> .
	The archaeological site located outside of the Project area would retain the site's current heritage significance, including research potential, as over 80% of the site would be retained.
	Timber remains associated with the former wharf are defined as 'works' under the <i>Heritage Act 1977</i> , however, there is potential for relics associated with the operation of the wharf, including from vessels berthed there, to be present within and adjacent to the wharf remains. As such, a permit would be required prior to the commencement of any project works.
	The impact would also be minimised by undertaking maritime archaeological investigation for the area that would be impacted. The maritime archaeological investigation would work towards answering questions related to the heritage significance associated with the former wharf, including construction techniques used in the early post resumption of wharves in Sydney Harbour.
Why is the new development required to be adjacent to a heritage item?	The OPT is the only capable wharf in Sydney Harbour that can berth the larger sized overseas cruise passenger ships. The project is required to deepen the berth pocket at the OPT to provide safe clearance underkeel of cruise ships.

Table 12 Statement of heritage impact for the remains of Wharf No. 7 at Campbells Cove

Development	Discussion
Development	Discussion
Is the development sited on any known, or potentially significant archaeological deposits? If so, have alternative sites been considered? Why were they rejected?	Archaeological remains associated with the former Wharf No. 7 (1901-1980) have been identified on the seabed within Campbells Cove. Approximately 18% of the archaeological site is located with the Project area. Alternate locations for these works were not investigated as the OPT is the international cruise ship terminal wharf and the dredging works are required to maintain a safe depth of water underkeel.
Is the new development sympathetic to the heritage item? In what way (e.g. form, siting, proportions, design)	Rock armour works would not be visible as the scour protection would be placed along the western side of the OPT. As it would be hidden under water, there is not expected to have any direct or indirect impacts to any heritage items within the Project area. The capital dredging works cannot be modified as the size of
	vessels using the OPT require safe underkeel clearance within the whole of the berth pocket. The impact to the archaeological remains associated with the former Wharf No. 7 are limited to those that are present within the Project area only, and the remainder of the site would be left <i>in situ</i> .

10.3 Summary

The capital dredging works would require various depths of dredging below the current seabed within the existing berth pocket. At the northern end, adjacent to the mooring dolphin, the proposed works would dredge up to 6 m below the current seabed depth. Archaeological remains of the former Wharf No. 7 are present in this area, and the proposed dredging would directly impact on those remains that are within the project area.

This dredging would remove approximately 18% of the archaeological site associated with the former Wharf No. 7. The archaeological site within the project area include both *in situ* and cut sections of piles, timber substructure remains that include whalers. Relics associates with the use of the wharf, and relics deposited from berthed vessels are also predicted to be within the Project area, and the dredging works will impact on these.

The impact to the heritage significance and archaeological remains of the former Wharf No. 7 can be mitigated by undertaking a program of maritime archaeological work before and during construction works on the site. These include

- Recording the remains of the wharf on the seabed prior to impact works, which would help understand the site formation processes associated with the demolition of the wharf.
- During the removal of timbers on the seabed, an archaeologist would inspect and record elements associated with the timbers to better understand the construction techniques used.
- Once the timbers on the seabed had been removed from the Project area, a series of maritime archaeological test trenches should be excavated to understand the potential for relics, patterning and dispersal of relics across the site.
- At the conclusion of the archaeological works, and during dredging works, the spoil bright up from the dredge within the area of the former wharf would be sieved by archaeologists to collect any remaining relics that may be present.

This archaeological program of works would help better understand the technical building techniques used in the post resumption and construction of wharves in Sydney Harbour in 1900. Archaeological test excavation and sieving of material would help understand the potential for relics to be present, but also allows for an assessment of whether artefact patterning is occurring and what the dispersal of relics is across the site. The results of this work would provide an insight in understanding the

As the proposed works have been assessed as having a direct impact to an archaeologist site assessed as potentially containing relics, a Section 140 permit would be required prior to the Project commencing.

The rock armour scour protection works would be located along the western side of the OPT berth pocket, and would repair the existing scour protection already installed. The works would be contained to areas already impacted by the existing scour protection. This work is not expected to have any impact to the heritage significance or historical archaeological potential that has been identified in this report.

The proposed capital dredging works and scour protection works at the OPT are likely to have an impact on archaeological remains present at the northern end of the berth pocket, in the area adjacent to the mooring dolphin. The additional depth of dredging required to provide a safe depth underkeel of vessels berthed at the OPT is up to 6m. The archaeological site relates for the former Wharf No. 7 built in Campbell Cove in 1901 and removed from the site in 1980. The wharf was constructed after the resumption of wharves in Sydney Harbor in 1900 and is believed to have been built under the new standard for wharf construction.

Opportunities to relocate the proposed works are not possible as the OPT is required to function as the overseas passenger terminal for curse ships entering Sydney Harbour. Impact to the former Wharf No. 7 cannot be avoided, and the impacts need to be mitigated.

Proposed mitigation measures include undertaking a controlled maritime archaeological program that would include recording, testing and the sieving of any dredge deposit remains that are present within the location of the former wharf. As the project has been assessed as impacting on potential archaeological (relic) remains associated with the former Wharf No. 7, the following recommendations can be made.

Aboriginal Heritage Recommendations

In light of the above key findings and Due Diligence Process Questions presented in Table 4, this Aboriginal Heritage Due Diligence Assessment provides the following management recommendations

- 1. This assessment has determined that Aboriginal objects may be encountered during the proposed works. Investigations of Aboriginal cultural heritage undertaken in accordance with the requirements of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010b) however, are impractical within submerged contexts. Therefore, a robust unexpected finds procedure for Aboriginal heritage should be developed prior to commencement of works. The procedure should be developed to run concurrently with historic investigations (refer below) and include protocols for identifying and managing Aboriginal cultural heritage.
- 2. Should any Aboriginal objects be identified at any stage of the project, Port Authority of New South Wales may be required to apply for an Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the National Parks and Wildlife Act 1974 (NPW Act 1974). Generally, applications for AHIPs must be supported by an Aboriginal Cultural Heritage Assessment Report (ACHAR) compiled in accordance with Section 3 of the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011). A process of Aboriginal community consultation should be carried out accordance with OEH's Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a) must also be demonstrated.
- 3. In the event that human skeletal material (remains), are identified at any point during the Project, the procedure outlined in Appendix B should followed.
- 4. In the event that Aboriginal objects, including possible human skeletal material (remains), are identified at any point during the Project, the procedure outlined in Appendix B should followed.

Maritime Archaeological Recommendations

- 5. A Section 140 permit application should be submitted to Heritage NSW, Department of Premier and Cabinet, prior to the commencement of works. The application must include a maritime archaeological research design and methodology must be prepared that details the methodology for how the maritime archaeologist works would be conducted in conjunction with the proposed works. The document should include
 - Principal heritage specialists working on the project;

- Details regarding the stages of works to be conducted on site, include methodology for each site;
- How the works would be undertaken;
- Recording methods for each stage of works, ;
- Method for collecting and location for the storage of relics collected from the site which the artefact analysis is under taken; and,
- Reporting at the conclusion of the project.

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Appendix A – Cosmos Report

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Berthing Infrastructure Project Overseas Passenger Terminal



Maritime Archaeological Survey

DRAFT

Circular Quay NSW

February 2020

Berthing Infrastructure Project – Overseas Passenger Terminal Maritime Archaeological Survey Draft

Prepared for: Ports Authority of NSW

By: Jane Mitchell

February 2020

Cosmos Archaeology Job Number 20/01

Cover image: Anon, 1860. Panorama of Circular Quay and Campbell's Cove from Dawes Point Battery, ca. 1860s, Dixson Library, State Library of New South Wales, available at http://digital.sl.nsw.gov.au/delivery/DeliveryManagerServlet?embedded=true&toolbar=fals e&dps_pid=IE8795447&_ga=2.37822311.573868018.1580606235-1962520728.1528873966

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1 DIVE INSPECTION

1.1 Dates and Personnel

The archaeological dive inspection was carried out on 29th January, 2020. The inspection was undertaken by a commercial dive team from Professional Diving Services under the direction of a Maritime Archaeologist from Cosmos Archaeology. The team was made up of the following people:

Jane Mitchell	Maritime Archaeologist	Cosmos Archaeology Pty Ltd
Mal Venturoni	Supervisor	Professional Diving Services
Felix Venturoni	Supervisor/Diver	Professional Diving Services
Kent Clifton-Bligh	Supervisor/Diver	Professional Diving Services
Callum Harvey	Diver/Maritime Archaeologist	Professional Diving Services

1.2 Weather and Tide Conditions

Diving in Sydney Harbour near Circular Quay is not heavily affected by changes in tide however, previous rainfall carrying silt from land can severely dampen visibility. Fortunately minimal rainfall had occurred three days prior to the inspection and none had fallen on the diving day. The weather conditions that were taken into consideration in the approach to undertaking the inspection are outlined in Table 1 and Table 2.

Table 1: Tides for the survey day. ¹

20- Ian-2020	Time	0538	1159	1827
29-Jan-2020	Height (m LAT)	0.6	1.7	0.45

Table 2: Rain and wind conditions for the three days prior and for the day of the inspection.²

Date	Rain (mm)	Wind 09:00 (km/h)	Wind 15:00 (km/h)
26-Jan-2020	0.2	7 E	6 ENE
27-Jan-2020	0.0	54 S	17 ESE
28-Jan-2020	0.0	44 S	6 W
29-Jan-2020	0.0	17 S	17 SSE

¹ Bureau of Meteorology, Australian Government, 2020, Sydney tide table predictions, http://www.bom.gov.au/ntc/IDO59001/IDO59001_2020_NSW_TP007.pdf, accessed 29 January.

² Bureau of Meteorology, Australian Government, 2020, 'Latest weather observations for Sydney Harbour', available <u>http://www.bom.gov.au/climate/dwo/202001/pdf/IDCJDW2124.202001.pdf</u>, accessed 29 January, 2020

1.3 Conduct of Survey

The survey was conducted by a commercial diver/maritime archaeologist under the direction of the maritime archaeologist. The inspection originally consisted of four transects in the area to the north of the overseas passenger terminal and two circular searches to the east of the terminal wharf. However, VTS restrictions, imposed on the day due to operational reasons, did not allow the completion of either of the originally proposed and approved circular searches or the 40 m eastern transect.

The surveys were conducted using Surface Supplied Breathing Apparatus (SSBA), with helmet mounted video and video lights. The diver also carried a hand-held Sony RX100-IV camera with video lights for taking still images. The diver was in communication with the boat and this allowed the maritime archaeologist to instruct the diver and receive observations of the seabed and any finds in real time. The diver carried a 100 m transect line marked at 5 m increments and a 1.3 m fibreglass probe marked in 0.1 m increments.

For Transect 1 South, the boat was moored to the southern side of the mooring dolphin. A shot line was dropped next to the dolphin as an attachment point for the transect line. The diver ran the transect line out 40 m to the south. Following the line back towards north, the diver took video footage of one side of the transect and then on the way back filmed the other side, thereby getting good coverage either side of the transect line. Once back at the starting point, the diver wound in the transect line stopping to probe either side of the line at every 5 m marker.

For Transect 2 North, Transect 3 South and Transect 5 West, a shot line was dropped at 33.856389°, 151.210556° and the diver ran the transect line out on the cardinal points to 40 m, 40 m and 20 m respectively. As VTS had restricted diving to the east of the central position it was decided to run a 20 m transect to the North-east (Figure 1).



Figure 1: Transects run as part of the maritime archaeology survey at OPT. (Base image Google *Earth*).

1.3.1 Survey bias and accuracy

The following factors had an influence on the bias and accuracy of the survey:

Water visibility

The water visibility ranged from 0.2 m to 2 m which decreased as sediment was disturbed. On certain occasions during the inspection dive, the visibility dropped to 0 m due to current and direction of the dive. The water clarity had an effect on the width of the inspection corridor, which was on average, 2 m wide on either side of the baseline.

Sea bed visibility

For the majority of the survey area, the sea bed consisted of sand and silt with a covering of a shell grit and stands of kelp which reduced ground visibility dramatically. It is possible that smaller artefacts may have been overlooked.

Concretion and growth

The heavy covering of growth on many of the objects located during the survey, impeded the interpretation of the object. In particular, it was difficult to determine if there was copper sheathing on some of the recorded timber piles.



2 SURVEY RESULTS

The seabed throughout the study area was generally sandy with a light covering of silt and shell grit. Varying densities of kelp was spread throughout the study area. Visibility ranged mostly between 0.2 m through to 2 m throughout the diving surveys, although this was reduced depending upon the current and the direction of the dive. The depths of all the dives was under 15 m, with the surveys ranging between 7 m and 13 m.

Transect 1 S			
Date: 29 January, 2020	Method: SSBA		Tide: Flooding
Distance and direction: 40 m south		Diver: Callum Harvey	
Time start (min): 0927	Time end (min): 0941		Total time (min): 14
Depth: 7.2 - 11.1 m	Water visibility: 0.5 – 2 m		Seabed visibility: Good

The diver set the transect line, running 40 m to the south from the southern side of the dolphin. The depth on the southern side of the dolphin was 7.2 m while the depth at the southern end was 11.1 m. The seabed was sandy with scattered stands of kelp, lightly covered in silt with a heavy shell grit towards the southern end which became lighter as the diver moved north.

To the west of the transect at the 1 m mark a glass tube was recorded. The tube stood proud of the seabed 0.8 m with a diameter of 0.1 m. The tube was easily removed from the seabed and was hollow (Figure 2). It's function is currently unknown.

At the 3 m mark on the eastern side of the transect, a horse shoe and a small section of copper sheathing were recorded lying adjacent to each other (Figure 3). There was one visible fastening hole in the sheathing. From the 5 m mark, a 7 m length of pile lay in a SE to NW direction. The pile was 0.4 m diameter. The northern end appeared broken and heavily degraded (Figure 4). The pile was heavily encrusted with growth so any presence of metal sheathing was unable to be recorded.

A glass milk bottle was recorded just after the 15 m mark and a concrete block was lying crossing the centre of the transect at the 20 m mark. This block was embedded in the seabed at a 45° angle and measured 0.7 m x 0.3 m and was 0.15 m thick. A 2 m, 0.25 m wide plank lay across the transect in an east-west direction at the 25 m mark (Figure 5). Approximately one metre away a ceramic coffee cup was located, missing the handle (Figure 6).

On the western side of the transect a mobile piece of timber was recorded running parallel with the transect near the 30 m mark. The timber measured 0.4 m long, 0.05 m wide and 0.03 m high (Figure 7). On the eastern side of the transect between 30 m and 35 m there was brick rubble and bottles (Figure 8). On the western side there were two bricks and another bottle.

At the 40 m mark on the eastern side of the transect a concrete block measuring 0.3 x 0.4 m and 0.1 m thick. Immediately adjacent to the block were two links of a large chain heavily encrusted with growth (Figure 9).

No refusal was met when probing along the majority of the transect line. At the 25 m mark on the western side of the transect there was refusal at 0.9 m, while on the eastern side there was refusal between 0.4 to 0.8 m. There were no consistent depths of refusal around these points, so it is likely the obstruction was small rocks or concrete rubble. At 40 m, the probe hit refusal at 0.8 m but probing in the immediate area around this mark did not meet any further resistance.



For a digital representation of the transect see Figure 10.



Figure 2: Glass tube standing 800 mm proud of the seabed at 1 m mark west of transect line. (PDS OPT Transect 1 South.)



Figure 4: Northern (degraded) end of 7 m pile. (PDS OPT Transect 1 South).



Figure 3: Horse shoe and sheet of copper sheathing at the 3 m mark on the east side of transect line. (PDS OPT Transect 1 South).



Figure 5: Plank crossing transect at 25 m mark. Top half of image indicated by red arrow. (PDS OPT Transect 1 South).



Figure 6: Ceramic coffee cup with no handle at the 26 m mark to the east of the transect. (PDS OPT Transect 1 South).



Figure 7: Mobile timber recorded on the western side of transect near 30 m. (PDS OPT Transect 1 South).



Figure 8: Example of bottles and brick rubble spread between 33 - 30 m. (PDS OPT Transect 1 S).



Figure 9: Chain link adjacent to concrete block to the east of the transect at 39 m. (PDS OPT Transect 1 South).




Transect 2 N			
Date: 29 January, 2020	Method: SSB/	4	Tide: Flooding
Distance and direction: 40 m north		Diver: Callum Harvey	
Time start (min): 1110	Time end (min): 1125		Total time (min): 15
Depth: 8.3 – 9.9 m	Water visibility: 0.2 – 1 m		Seabed visibility: Good

The diver set the transect line, running 40 m to the north. The seabed had a gentle slope from 8.3 m down to a depth of 9.9 m at the northern end. The seabed was sandy, lightly covered in silt and shell grit, with scattered stands of kelp, apart from the area between 15 m and 30 m, which became very silty, reducing visibility in this area (Figure 11).

A concrete block was recorded on the eastern side of the transect at the 3 m mark (Figure 12). This block was rectangular, measured 0.3×0.4 mm and 0.1 mm thick and was resting at an approximate 45° angle into the seabed. Immediately adjacent to this block was a 1.2 m long ferrous pipe with a 0.5 m diameter running in a NE to SW direction (Figure 13).

Immediately passed the 5 m mark on the eastern side of the transect were two bottles, one broken at the neck. These appeared to be long neck beer bottles. A brick was partially buried at the base of a bottle (Figure 14). Another object, possible a piece of concrete, was recorded at 13 m and measured 0.6 m long x 0.1 m wide and 0.1 high.

An apparent concrete object was located at the 13 m mark. This was a thin piece of concrete measuring 0.6 long x 0.1 m wide and 0.1 m deep (Figure 15). A piece of what appeared to be concrete rubble was recorded on the western side of the transect at 18 m (Figure 17). At 23 m, a square concrete block was resting on the seabed. Measuring 0.4 m square, it was 0.25 m thick (Figure 15).

The only other material recorded was a bottle and a modern plastic bag (Figure 18).

No refusal was met when probing along the transect line, except for an area to the east of the line at the 5 m mark. The probe hit refusal at 1 m but probing in the immediate area around this mark did not meet any further resistance. In another area at the 20 m mark, there was refusal between 0.3 and 0.5 m beneath the seabed. There did not appear to be any pattern to the depth of refusal.

For a digital representation of the transect see Figure 19.





Figure 11: Example of seabed along Transect 2. (PDS OPT Transect 2 N 0 to 40 m).



Figure 13: Ferrous pipe; 1.2 m long and 0.5 m diameter. (PDS OPT Transect 2 N 0 to 40 m).



Figure 15: Concrete block at 45 degree angle. (PDS OPT Transect 2 N 0 to 40 m).



Figure 12: Concrete block. (PDS OPT *Transect N 0 to 40 m).*



Figure 14: Two long neck beer bottles with brick. (PDS OPT Transect N 0 to 40 m).



Figure 16: Square concrete block (0.4 m). (PDS OPT Transect 2 N 0 to 40 m).



Figure 17: Concrete rubble. (PDS OPT *Transect N 0 to 40 m).*



Figure 18: Plastic shopping bag. (PDS OPT *Transect N 0 to 40 m*).







Transect 3 S			
Date: 29 January, 2020	Method: SSB/	4	Tide: slack to ebbing
Distance and direction: 40 m southDiver: Callum Harvey			Harvey
Time start (min): 1147	Time end (min): 1214		Total time (min): 27
Depth: 8.2 – 13.5 m	Water visibility: 0.5 – 1.5 m		Seabed visibility: Good

The diver set the transect line, running 40 m to the south. The depth at the southern end was 13.5 m. The seabed was sandy, lightly covered in silt and shell grit, with scattered stands of kelp. The seabed had a clay like texture between the 20 m and 30 m marks.

There was a length of flat hose, similar to a dredge or fire hose lying just underneath a light silt layer, on the eastern side of the transect between 5 m and 10 m (Figure 20). A concrete block was recorded running across the transect line at 6 m in an almost east to west alignment. The block was 2 m long and 0.3 m high. Immediately adjacent to the block, was a long ferrous pipe. The pipe was on the same alignment as the block, was 8 m long and had a diameter of 0.1 m. On the western side of the transect, the pipe had a right angled ferrous bracket made of flat bar attached to the southern side (Figure 21). On the eastern side of the transect, there were two ferrous spikes attached to the northern side of the pipe. Approximately, 2 m from the eastern end the pipe was bent as if something had tried to lift it or caught and dragged it. The pipe was bent in a V-shape for an approximately two metre section before disappearing into the seabed.

Twelve metres along the transect line, to the west a coil of lead or tin was buried in the sea bed. The material was coiled like a rope but the material acted more like a soft metal such as lead, as when bent it stayed in the bent position. The coil was heavily covered in sediment Figure 22). Just past the coil, there was a small collection of bottles, many broken and on the western side of the transect at 15 m a modern tyre was recorded. The tyre was embedded in the seabed at a 45° angle (Figure 23).

At 16m there was a thin strip of copper. The strip measured 0.20 long and 0.015 m wide. There were holes at regular intervals along the strip, potentially for fastenings (Figure 24). Continuing along the transect, there was more brick rubble and broken bottles. At 19 m along the transect there was a small piece of chain link (Figure 25). At 21 m along the transect a small piece of copper sheathing was recorded. Measuring 0.1 x 0.3 m, the metal was slightly concave and fastening holes were present. No fastenings were found with the sheathing piece (*Figure 26* and Figure 25). Close to the piece of sheathing, a section of what appeared to be planking was buried in the sediment. The plank was 0.02 m thick and only a 0.05 m section was exposed (*Figure 27*).

A green glass bottle was recorded at 26 m along the transect. The bottle had a curved body and was 0.02 m tall. The body was lightly embedded in the silt (Figure 28).

On the eastern side of the transect, between the 30 m and 35 m mark a 4 m timber ran almost parallel with the transect line, measuring 0.25 m wide and 0.15 m thick. This is potentially a timber wale (Figure 29). A fastening hole 3 mm diameter was recorded at the northern end. No other fastening holes or fastenings were observed along the length of timber. The southern end was squared off. Sitting on top of this timber was another rounded timber running in a perpendicular direction (west to east). The western end was heavily degraded with a blackened appearance and the eastern end was degraded and heavily encrusted with growth. The timber was 0.30 m diameter and 2.5 m long (Figure 30).

At the 40 m mark there was brick rubble, bottles and a concrete block, resting on its edge measuring 0.6 x 0.7 and 0.05 m thick. There was also one bone fragment, large enough to

be an animal bone such as cow or sheep.

The original probe was lost in the visibility and was replaced with a 2 m fibreglass pole marked at 0.1 m increments. No refusal was met when probing along the transect line, except for a ten metre area either side of the transect line of the line at 10 m. The probe hit refusal at 1 m but probing in the immediate area around this mark did not meet any further resistance.

For a digital representation of the transect see Figure 31.



Figure 20: Flat hose, potentially a dredge or fire hose recorded between 5 and 10 m along transect. (PDS OPT Transect 3 South 40 to 0 m).



Figure 21: Section of 8 m length of ferrous pipe with right angled bracket crossing the transect at 6.5 m mark. Concrete block can be seen in the background. (PDS OPT Transect 3 South 40 - 0 m).



Figure 22: Coil of soft metal material possibly lead or tin recorded 11 m along the transect. (PDS OPT Transect 3 South 40 to 0 m).



Figure 23: Tyre located 15 m along the transect. (PDS OPT Transect 3 South).



Figure 24: Short length of copper strip with fastening holes recorded at 17 m along the transect. (PDS OPT Transect 3 South 40 to 0 m).



Figure 25: Piece of chain link lying loose on the seabed at 19 m along the transect. (PDS OPT Transect 3 South 40 to 0 m).



Figure 26: Piece of metal sheathing with fastening holes. The metal was slightly concave. (PDS OTP Transect 3 South 0 to 40 m).



Figure 27: Buried timber, potentially a plank, measuring 0.02 m thick with only 0.05 m exposed. Indicated by red arrow. (PDS OTP Transect 3 South 0 to 40 m).



Figure 28: Green glass bottle with curved body at 26 m along transect. (PDS OPT Transect 3 South 0 to 40 m).



Figure 29: Timber, likely a waler, running almost parallel with the transect line between 30 and 35 m. (PDS OPT Transect 3 South 40 to 0 m).



Figure 30: Timber pile running perpendicular to wale timber (just visible underneath the pile) [PDS OPT Transect 3 South 0 to 40 m).







Transect 4 NE			
Date: 29 January, 2020	Method: SSB/	4	Tide: Ebbing
Distance and direction: 20 m north east		Diver: Callum Harvey	
Time start (min): 1240	Time end (min): 1253		Total time (min): 13
Depth: 8.2 – 11.3 m	Water visibility: 0.5 to 1.5 m		Seabed visibility: Good

The diver set the transect line, running 20 m to the north west. The seabed was sandy, lightly covered in silt and shell grit, with scattered stands of kelp (Figure 32).

A pile stump was recorded along the transect line at the 2 m mark. The centre was heavily degraded making the top of the stump semi-circular. The pile stood 0.5 m proud of the seabed and measured 0.4 m in diameter. The pile was too degraded and heavily encrusted with growth obscuring any evidence of copper sheathing (Figure 33).

A timber branch was recorded loose on top of the seabed adjacent to this pile 1.5 m long x 50 mm diameter (Figure 34). Just past the 5 m mark on the transect a ferrous pipe, 1 m long x 80 mm in diameter. The pipe was hollow and appeared broken at both ends (Figure 35).

There was scattered concrete rubble along the rest of the transect (Figure 36) and the remnants of a shopping trolley were located on the western side of the transect just before the 15 m mark (Figure 37).

No refusal was met when probing along the transect line, except for one area to the west of the line at the 20 m mark. The probe hit refusal at 0.6 m but probing in the immediate area around this mark did not meet any further resistance.

For a digital representation of the transect see Figure 38.





Figure 32: Example of seabed on Transect 4. (Professional Diving Services, OPT Transect 4 NE 0 to 40 m).



Figure 34: Tree branch resting loose on seabed. Outline marked in blue. (PDS Transect OPT 4 NE 0 to 40 m).



Figure 33: Pile stump: 0.45 diameter and standing 0.5 m proud of the seabed. Very heavily eroded. (PDS OPT Transect 4 NE 0 to 40 m).



Figure 35: Ferrous pipe resting loose on seabed. (PDS OPT Transect 4 NE 0 to 40 m).



Figure 36: Concrete rubble (PDS OPT *Transect 4 NE 0 to 40 m).*



Figure 37: Grill from a shopping trolley, indicated with red arrow. (PDS OPT Transect 4 NE 0 to 40 m).





Transect 5 W			
Date: 29 January, 2020	Method: SSB/	4	Tide: Ebbing
Distance and direction: 20 m westDiver: Callum Harvey			Harvey
Time start (min): 1258	Time end (min): 1310		Total time (min): 12
Depth: 8.2 – 11.9 m	Water visibility: 0.5 – 2 m		Seabed visibility: Good

The diver set the transect line, running 20 m to the west, heading into Campbell's Cove. The depth at the western end was 11.9 m. The seabed was sandy, lightly covered in silt and shell grit, with scattered stands of kelp (Figure 39).

A small scattering of concrete rubble was present near the beginning of the transect line. At the 5 m mark, a 2 m length of concrete was recorded. This concrete was a rounded triangular shape and rose 0.1 m above the seabed. It appeared relatively new with only a small amount of growth, possible a piece of kerbing. A square potentially concrete block was located at the 11 m mark. Resting at a 45° angle, the block rose out of the seabed 0.1 m and measured 1 m x 0.3 m (Figure 40).

At the 13 m mark, a rounded object protruded 0.4 m from the seabed. Measuring 0.5 m x 0.3 m, the object appears narrow for a pile but was solidly embedded in the seabed and may have been heavily degraded (Figure 41). There was no obvious evidence of sheathing.

Another potential concrete block $(0.4 \times 0.4 \times 0.3 \text{ m})$ was recorded at the 15 m mark and immediately adjacent to this block, a pile was recorded running in an approximate SE to NW direction (Figure 42). The pile measured 6 m long and was 0.4 m diameter. The SE end was heavily degraded, while the NW end appeared cut. It was heavily covered in growth obscuring any presence of copper sheathing.

No refusal was met when probing along the transect line, except for one area to the north of the line at 10 m. The probe hit refusal at 1 m but probing in the immediate area around this mark did not meet any further resistance.

For a digital representation of the transect see Figure 43.

For an overview of all five transects see Figure 44.





Figure 39: Example of the sandy seabed, lightly silted with a covering of shell grit and scattered strands of kelp. (Professional Diving Services: OTP Transect 5 West 0 to 20 m)



Figure 41: Potential pile stump, heavily degraded, south of the transect line at the 13 m mark. (Professional Diving Services: OTP Transect 5 West 0 to 20 m (Professional Diving Services: OTP Transect 5 West 0 to 20 m)



Figure 40: Potential concrete block at a 45 degree angle at the 11 m south of the transect line. (Professional Diving Services: OTP Transect 5 West 0 to 20 m)



Figure 42: Pile recorded crossing the transect line at the 15 m mark running in a SE to NW direction. (Professional Diving Services: OTP Transect 5 West 0 to 20 m)









Figure 44: Digital overview of all transects. (Base image Google Earth).



3 INTERPRETATION OF RESULTS

This maritime archaeological survey conducted to the east of the OPT mooring dolphin located near Campbell's Cove recorded items very similar in nature and variety to the maritime survey conducted in 2014.³ (See Figure 45 for the areas covered by the 2014 and 2020 surveys). The archaeological remains present on the seabed included *in situ* pile stumps, cut sections of piles lying on the seafloor and other structural timbers, including possible timber walers. The amount of growth on these timbers prohibited the identification of any remnant copper sheathing, however, two loose pieces of sheathing were recorded lying loose on the seabed. The long ferrous pipe in transect 3 South likely carried water or other services along a structure and was attached lengthways with the angled bracket. These items are likely remains of the former Wharf No. 7 (1901-1980) in Campbell's Cove. Wharf No.7 was a longer and wider structure than the previous structure (built in 1876) in the Cove, and the location of the Dolphin is located at the western end of the 1901 wharf, beyond the eastern of the previous constructed 1876 wharf.

No relics were recorded on the seabed in the survey area. Other material such as bricks, a modern tyre, concrete rubble and bottle scatters were recorded. Some of this modern material is likely from the building of the OPT wharf extension.

Diver probing during the survey did not record any evidence of timbers lying underneath the seabed. Where refusal was felt underneath the seabed, it was unpredictable and random indicating rock or concrete scatter rather than lengths of timber or wharf remains.

³ **Cosmos Archaeology Pty Ltd, 2014**, Overseas Passenger Terminal Wharf Extension, Sydney Cove. Maritime Archaeological Survey and Statement of Heritage Impact. Report prepared for Sydney Ports.



Figure 45: 2014 survey area (green) and 2020 survey area (red). (Base image: Google Earth.)



ANNEX A – VIDEO LOG

Video File	Description	File size
OPT Transect 1 S 0 to 40 m.mp4	Transect from southern side of dolphin 40 m to south	354.2 MB
OPT Transect 2 N 0 to 40 m.mp4	Transect from centre point 40 m to north	274.5 MB
OPT Transect 3 S 40 to 0 m.mp4	Transect from southern point to centre point 40 m	331.8 MB
OPT Transect 3 S 0 to 40 m.mp4	Transect from centre point to southern point 40 m	267.5 MB
OPT Transect 4 NE 0 to 20 m.mp4	Transect from centre point 20 m to north east	258.8 MB
OPT Transect 5 W 0 to 20 m.mp4	Transect from centre point 20 m to west	255.4 MB



Appendix B – Skeletal Remains: Stop Work Procedures

This section outlines the procedure that should be followed in the case that potential human remains are discovered during the life of the Proposed Activity. The procedure takes into account the following documents:

- Manual for the Identification of Aboriginal Remains (NSW Department of Environment & Conservation 2006);
- Skeletal Remains Guidelines for the management of human skeletal remains under the Heritage Act 1977 (NSW Heritage Office 1998); and
- The Aboriginal Cultural Heritage Standards and Guidelines Kit (NSW NPWS 1997).

In the event that potential human skeletal remains are identified within the Proposed Activity area at any point during the Proposed Activity, the following standard procedure should be followed.

- 1. All work in the vicinity of the remains should cease immediately;
- 2. The location should be cordoned off construction work can continue outside of this area as long as there is no risk of interference to the remains or the assessment of the remains;
- 3. Where uncertainty over the origin (i.e., human or non-human) of the remains exists, a physical or forensic anthropologist should be commissioned to inspect the exposed remains in situ and make a determination of origin, ancestry (Aboriginal or non-Aboriginal) and antiquity (precontact, historic or modern):
 - a. If the remains are identified as modern and human, the area will become a crime scene under the jurisdiction of the NSW Police;
 - b. If the remains are identified as pre-contact or historic Aboriginal, the site should be secured and the relevant DPC office notified; and
 - c. If the remains are identified as historic (non-Aboriginal), the site should be secured and the Heritage NSW (DPIE) notified.

Appendix G– Sediment Contamination Assessment Report





Port Authority of New South Wales

Overseas Passenger Terminal, Circular Quay Sediment Contamination Assessment Report

August 2020

Executive summary

Port Authority of New South Wales (PANSW) is developing a plan to address sedimentation and rock outcrop issues at the sea bed in the vicinity of the Overseas Passenger Terminal (OPT) at Circular Quay. It is anticipated this plan will include dredging works to deepen the berth pocket resulting in the removal of an estimated 22,185 m³ of sediment.

Dredging will involve the removal and disturbance of likely contaminated sediments within the berth of the OPT. This report provides the results of the contamination assessment of the sediments within the proposed dredging area.

The primary objectives of this investigation were to assess the results of the investigation with reference to relevant guidelines for the purpose of onshore and offshore disposal, including consideration of the potential for acid sulphate soils (ASS), in order to provide recommendations to PANSW for potential disposal options.

This summary should be read in conjunction with the statement of limitations outlined in Section 1.4 of this report.

Background

The site is the berth area off the OPT operated by PANSW is used to dock large commercial cruise liners. The area is also within the route of ferry traffic docking at Circular Quay. The site has been used as a commercial shipping port since the 1880s, with the OTP operating as a cruise terminal since 1960.

Limited historical information pertaining the contamination status of the site was available. GHDs review of previous investigations at the site noted the previous identification of mercury and polycyclic aromatic hydrocarbons (PAHs) above the ANZECC (2000) guideline levels and the presence of potential acid sulphate soils (PASS).

Sampling Approach

Sampling was conducted in October and November 2019 using vibrocoring methods. Fourteen sample locations within the dredging footprint of the OPT were targeted. Sampling locations were selected on a grid basis to obtain a representative assessment of the contamination within the sediments.

Samples were analysed under the NSW EPA (2014 Waste Classification Guidelines and the National Assessment Guidelines for Dredging (2009) – the NAGD (2009).

Key Findings

Two distinct groupings of units of marine/estuarine sediments were identified in the dredging footprint. Upper units (one or two units) consisting of a dark grey to dark brown clay to sand unit were present in the majority of cores (with the exception of VC04, VC09, VC10) with organic odour and shell fragments. Units below this were more variable with yellow-grey, pale grey, yellow-brown and ranged in grain size from sand to clay. No units showed any visual or olfactory evidence of gross contamination. Furthermore, PID readings from all sediments were at or below 1.2 ppm.

Under the waste classification guidelines, identified exceedances of the General Solid Waste CT1 criteria were for lead, mercury and benzo(a)pyrene (B(a)P) across the dredging footprint and at varying depths. A single exceedance of the Restricted Solid Waste CT2 criterion was identified for B(a)P. Analytical results for all other COPCs were below the guideline criteria

Following TCLP, all analytes were below the TCLP1 criteria for general solid waste. These results are considered to be representative of the larger dataset on which TCLP was not undertaken. For those analytes for which TCLP was performed, concentrations were also below the SCC1 (with TCLP) criteria for all samples.

Under the NAGD (2009) the following was identified:

- Exceedances of the screening levels (SQG_{low}) were identified for copper, lead, mercury, silver and zinc and exceedances of the NAGD (2009) SQG-high values for zinc and lead. The 95% UCLs for the exceeding metals also exceeded the SQG_{low} for copper, lead, mercury and silver and the SQG_{high} for zinc.
- The concentration of TPH in the fraction C₁₀-C₃₆ (normalised to 1% TOC) were below the SQG_{low} of 550 mg/kg with the exception of VC12_0.0-0.5, and all samples were below concentrations of volatile TRH in the fraction C₆-C₁₀ and BTEXN were reported below the laboratory limit of reporting (LOR) in all samples selected for analysis.
- PAHs were detected in samples VC02_0.0-0.5, VC07_0.0-0.5 and VC12_0.0-0.5 with exceedances of the SQG_{Iow} for a number of individual PAH d in these samples. The 95 % UCL is exceeded for Acenaphthylene, Benz(a)anthracene, Dibenz(a,h)anthracene, Fluorene and Phenanthrene.
- Concentrations of TBT (normalised to TOC) were above the LOR in three of eight samples submitted for analysis. The detected concentrations normalised to TOC were 19.4 μg Sn/kg, 20.3 μg Sn/kg and 1 μg Sn/kg, two of which (VC07_0.0-.5 and VC12_0.0-0.5) were above the NAGD (2009) SQG low of 9 μg Sn/kg.
- Total organic carbon ranged from 0.05 to 2.82 %.
- Total PCBs were detected, and exceeded the SQG_{low} in VC07_0.0-0.5 and VC12_0.0-0.5. The total PCBs is entirely comprised of Arochlor 1254 in both samples. The 95% UCL also exceeds the SQG_{low} with a value of 0.0566 mg/kg.
- Cyanide, herbicides, chlorinated hydrocarbons, explosives, nitroaromatics, nitrosoamines and phthalates were below the limit of reporting in all samples.

Due to 95% UCL exceedances of SQG_{low} the NAGD (2009) requires a Phase III analysis including elutriate analysis, which measures the release of contaminants from sediments into seas water. A sea water blank and three samples with exceedances of the SQG_{low} were analysed for PAH, PCB, copper, mercury and silver. No detects for any analytes were identified in the elutriate samples or the seawater blank.

Copper and silver were also assessed by the 1M HCl extractable metals method, this gives a closer estimate of the bioavailable fraction of the metals than the whole sediment analysis. Silver was not detected by the method in any of the three samples tested. Copper was below the SQG_{low} in all three samples.

Scattered occurrences of TBT were in the sediments, thought it appears the majority of the sediments only contain low levels of TBT, which is demonstrated by the fact that six of the eight tested samples reported TBT concentration at or below the laboratory PQL of 1 μ g Sn/kg. While elutriate or bioavailability testing for TBT could not be completed for the two samples containing higher TBT concentrations due to limited amount of sediment samples available, elutriate testing of these two samples for other chemicals (including metals) showed no detections of COPC in the elutriate analysis or sea water blanks.

In regard to potential acid sulphate soils the results indicate the presence of PASS and potential acid generating capacity of the sediments.

Some dioxin compounds were present in all eight samples reporting WHO TEQ_(0.5 LOR) and I-TEQ (0.5 LOR) averages of 19 and 34 respectively. Whilst Australian guidelines for dioxins are not currently available, these levels are within the range of background concentrations reported for Australian sediments (Muller et al., 2004)

Under the NSW EPA (2014) dioxin contaminated waste is subject to the Chemical Control Order in Relation to Dioxin-Contaminated Waste Materials (1986) (The Dioxin Waste CCO). This document defines dioxin contaminated waste as waste materials containing more than one part in 100 million (by weight; equivalent to 0.01 ppm, or 10 μ g/kg) of dioxin. 2,3,7,8-TCDD was detected in two of the five samples analysed at a highest concentration of 6.5 ng/kg, therefore below the concentration regulated by The Dioxin Waste CCO and are not considered classified as dioxin contaminated waste.

Conclusions and recommendations

Overall, the findings of the investigation indicate the presence of contaminated sediments within the proposed dredging area. With reference to the objectives of this investigation, the following conclusions are made:

- Suitability for on-shore disposal: The chemical analysis of the material under NSW EPA (2014) and the Dioxin Waste CCO (1986) indicates the sediments would be suitable for disposal as GSW and should be disposed of to a facility with the appropriate license to receive material based on this classification.
- Suitability for off-shore disposal: Based on the finding of this investigation, the dredge sediment may be suitable for offshore disposal. It is recommended that PANSW seek information regarding the background contaminant levels at the preferred disposal site, particularly with reference to TBT and dioxin, to establish if offshore disposal would be appropriate, and to inform on the most suitable disposal location.
- Consideration of potential for Acid Sulphate Soils: Based on the results of the analysis for PASS it is indicated that PASS conditions are present within the dredge footprint. The ASSMP will be prepared to identify, manage and treat the PASS encountered during dredging to minimise the production of acid leachate. The dredging strategy should be designed to limit the timeframe for potential for oxidisation of the sediments. If offshore disposal were chosen the potential for ASS generation would reduce greatly due to sediments being transferred to the disposal area immediately after dredging, limiting time for oxidation. If onshore disposal was chosen, an ongoing monitoring of the excavated sediments is recommended to assess the liming requirements. To assist in outlining the procedures for PASS monitoring during excavation, GHD recommended by National Acid Sulphate Soil Management Plan (ASSMP) is prepared, as recommended by National Acid Sulfate Soil Guidance Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management (Water Quality Australia, 2018).

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.4 and the assumptions and qualifications contained throughout the Report.

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List of Acronyms

Abbreviation	Description
AASS	Actual Acid Sulphate Soils
ANC	Acid Neutralising Capacity
ANZECC/ARMCANZ	Australian and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand
ASS	Acid Sulphate Soils
ASSMAC	Acid Sulfate Soils Management Advisory Committee
AVS-SEM	Acid Volatile Sulfide/Simultaneously Extracted Metals
BTEXN	Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene
CD	Chart Datum
COC	Chain of Custody
COPC	Contaminant of Potential Concern
CRS	Chromium Reducible Sulphur
CSP	Continuous Seismic Profiling
DECC	Department of Environment Climate Change
DEMP	Dredging Environmental Management Plan
GSW	General Solid Waste
ISQG	Interim Sediment Quality Guidelines
JSEA	Job Safety and Environmental Analysis
LOR	Limit of Reporting
NAGD	National Assessment Guidelines for Dredging (2009)
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NODGDM	National Ocean Disposal Guidelines for Dredged Material (EA 2002)
NSW EPA	New South Wales Environmental Protection Authority
OCDD	octachlorodibenzo-p-dioxin
OCP	Organochlorine Pesticides
OPT	Overseas Passenger Terminal
PAH	Polycyclic Aromatic Hydrocarbons
PANSW	Port Authority of NSW
PASS	Potential Acid Sulphate Soils
PCB	Polychlorinated Biphenol
PID	Photo-ionization Detector
PQL	Practical Quantification Limits
PSD	Particle Size Distribution
RAP	Remedial Action Plan
RSW	Restricted Solid Waste
SOP	Standard Operating Procedure
ТВТ	Tributyltin

Abbreviation	Description
TCLP	Toxic Characteristic Leaching Procedure
TEQ	Toxic Equivalent Quantity
TOC	Total Organic Carbon
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit

1. Introduction

1.1 Background

Port Authority of New South Wales (PANSW) is developing a plan to address sedimentation and rock outcrop issues at the sea bed in the vicinity of the Overseas Passenger Terminal (OPT) at Circular Quay.

It is anticipated this plan will include dredging works to deepen the berth pocket resulting in the removal of an estimated 22,185 m³ of sediment. PANSW is considering onshore and offshore disposal options which will be assessed based on the outcomes of geotechnical and geochemistry investigations.

PANSW has engaged GHD to assess the contamination status of the sediments in the overseas passenger berth, within the dredging footprint. It is understood that PANSW currently considers onshore disposal as the preferred option due to the limited design timeframe, however, offshore disposal is also being considered should the project timeframe allow.

1.2 **Objectives**

The objective of this report is to document the following regarding the contamination status of the sediments in the berth off the OPT at Circular Quay:

- The analysis results of the sediment samples collected by GHD in October and November 2019.
- The results of the analysis in relation to the NSW EPA (2014) *Waste Classification Guidelines* ("the waste classification guidelines").
- The results of the analysis in relation the National Assessment Guidelines for Dredging (2009) ("the NAGD").
- The potential presence of Acid Sulphate Soils (ASS)
- Recommendations for PANSW regarding further action required in regards to the contamination for both onshore and offshore disposal options.

1.3 Scope

To achieve the stated objectives GHD undertook the following scope of works:

- Prepared a Job Safety and Environmental Analysis (JSEA) for site works
- Undertook sub-sampling of sediments from vibrocore cores
- Submitted sediment samples to the National Association of Testing Authorities (NATA) accredited laboratory for analysis of the contaminants of potential concern as outlined in Section 5.2.
- Prepared this report in accordance with the NSW EPA (2014) and the NAGD (2009).

1.4 Limitations

This report: has been prepared by GHD for Port Authority of New South Wales and may only be used and relied on by Port Authority of New South Wales for the purpose agreed between GHD and the Port Authority of New South Wales as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Port Authority of New South Wales arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Port Authority of New South Wales and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

Table 1 Site identification details

Feature	Details
Address	10 – 48 Circular Quay West, Sydney, NSW, 2000
Lot/DP	1/DP876516 (OPT building)
Site coordinates	33.8580°S 151.2101°E
Site operator	Ports Authority of New South Wales (PANSW)

The site is the berth area off the OPT operated by PANSW is used to dock large commercial cruise liners. The area is also within the route of ferry traffic docking at Circular Quay.

The site has been used as a commercial shipping port since the 1880s, with the OTP operating as a cruise terminal since 1960.

The area is tidally influenced and the seabed is at approximately -10.7 m chart datum (CD) with some variation from -16 m CD to 0 m CD across the site, as shown in the bathymetric survey provided to GHD by PANSW. Chart datum is -0.95 m AHD. The elevated sea bed is at northwest and south-west of the site.

2.1 Geology and acid sulphate soils

The Sydney 1:100,000 Geological Sheet (Herbert, 1983) shows the bedrock as Hawkesbury Sandstone overlain by alluvial and estuarine sediments and anthropogenically derived fill.

The units which comprise the geology are described as follows:

- Hawkesbury Sandstone medium to course grained sandstone with minor shale and laminite.
- Alluvial and estuarine sediments Quaternary age sediments ranging from clay to sand with shell layers.
- Anthropogenically derived fill dredged sediments, demolition waste, and industrial and household waste.

Top of rock was interpreted by Coffey (2019) at -39 m CD to -5 m CD with the shallowest rock outcropping in the north-east of the site and the change in elevation approximately corresponding to the changes in sediment thickness.

Continuous seismic profiling (CSP) by Coffey (2019) shows that sediment ranges from 0 to 30 m. With the thinnest sediment at the north-west of the site and along the western wall of the berth, closest to the OTP.

The sediments in the area are mapped as a high probability occurrence for ASS (Land & Water Conservation, 1997). Sediments containing ASS will require classification and / or treatment in accordance with NSW Environment Protection Authority (EPA)'s Waste Classification Guidelines -Part 4: Acid Sulfate Soils (2014), should they be proposed for onshore disposal.

3. Existing information

The following reports on previous works at the site were provided to GHD by PANSW:

- Douglas Partners (2014) Report on Sediment Quality Assessment Overseas Passenger Terminal – Wharf Extension, Mooring Dolphin and Caisson Protection (Circular Quay)
- Arup (2019) OPT Berth Infrastructure Desktop Study Existing Geotechnical Data (Arup Memorandum)
- Coffey (2019) OPT Berth Deepening Investigations Geotechnical and Geophysical Investigations Report (draft)

Of these reports, two (summarised below) are relevant to the site contamination. Arup (2019) and Coffey (2019) provide information on geotechnical conditions only and were reviewed for background information.

3.1 **Previous sediment investigations**

3.1.1 Douglas Partners (2014) Sediment Quality Assessment

- *Location* Overseas Passenger Terminal Circular Quay
- Scope /To determine the likely contaminants, potential acid sulphate soils (PASS) andobjectivespreliminary in situ waste classification of material for land-based disposal. To
provide advice on the options of either re-using the dredged spoil as filling on
other parts of the site or disposal of the spoil off-site.
- Sampling Sampling consisted vibro coring or Petite Ponar bottom sampling dredge of 6 sediment samples to a maximum of 0.2m depth. Samples were taken from locations approximately evenly spaced around the wharf extension, Mooring Dolphin and Caisson Protection.

Visual assessment and chemical testing was conducted on 5 sediment samples. Visual assessment consisted of inspection of samples for signs of concern (e.g. staining, odours, hydrocarbon sheen and asbestos cement etc.). Chemical testing included analysis for metals, Polycyclic Aromatic Hydrocarbons (PAH), Total Recoverable Hydrocarbons (TRH), Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), Organochlorine Pesticides (OCP), Organophosphorus Pesticides (OPP), total phenols, Polychlorinated Biphenyls (PCB), asbestos, Tributyltin (TBT) and potential acid sulphate soil (PASS).

Relevant findings

The following findings were made regarding sediment contamination:

- Sediments contained PASS but there was a significant quantity of shells which could partially neutralise acids formed from the exposure of soils to air and oxidation.
- The disposal of the dredged spoil off site to a landfill could have a soil classification of General Solid Waste (TCLP1) (according to the DECCW Waste Classification Guidelines 2009) provided a confirmation that no liming is required as a result of ex-situ PASS testing.

- Levels of mercury and PAH in some samples exceeded the high trigger values of the ANZECC (2000) Interim Sediment Quality Guidelines (ISQG). Indicated potential risk to the marine environment and the need for further investigations to determine bioavailability.
- No asbestos was present in samples.

Conclusions and recommendations

Based on the findings of the works completed by Douglas Partners (2014), the following conclusions were made:

- The two main options for disposal of the dredged spoil were re-use as reclamation fill on site, behind retaining walls or disposal to landfill.
- If used as reclamation fill then the high levels of contaminants, such as mercury and PAH, would not have a significant impact on the marine environment. Although if the PASS spoil is placed above the water table and can oxidise it should be tested ex-situ for actual acid sulphate soils (Quantification Limits)
- If the spoil is disposed off-site to a landfill the solid and liquid phases need to be separated. The solid phase should be tested for ASS and the need for liming prior to landfilling as General Solid Waste (non-putrescible). The liquid phase should be tested for pH and suspended solids prior to disposal into the harbour.

3.1.2 GHD Geotechnics (2006) Preliminary Geotechnical and Geochemical investigation as summarised in Arup Memorandum (2019)

Location Campbells Cove - Circular Quay Scope / To determine the geochemistry of the proposed dredged sediment and likely objectives foundation materials for vessel anchorages. Sampling Sampling consisted of 10 vibrocoring from the seabed to 3.5m depth until refusal within the Campbells Cove area. Physical properties testing and chemical testing was conducted on 6 soil samples. Physical properties testing consisted of soil classification tests by particle size distribution, Atterberg limits and moisture content. Chemical testing included acid sulphate soil assessment and geochemical analysis. Acid sulphate soil assessment involved PASS indicator tests and Peroxide Oxidised Combined Acidity and Sulphate (POCAS) testing. Geochemical analysis determined levels of metals, TPH/BTEX, PAH, OCP, and toxicity characteristic leaching procedure (TCLP).

Relevant findings

The following findings were made regarding sediment contamination:

 Total Potential Acidity (TPA) of 660 Mol H+/tonne of the sediment exceeding the trigger level of 62 Mol H+/tonne set by the Acid Sulphate Soils Advisory Committee (ASSMAC, 1998).

Conclusions and recommendations

Confirmation of PASS nature of the sediment by the ASSMAC guidelines.

Classification of the material as inert waste due to Practical Quantification Limits (PQL) being consistent with the Waste Guidelines PQL requirements.
4. Basis for assessment

Relevant assessment criteria for onshore and offshore disposal are presented in the following sections, with the specific criteria presented in the tables in Appendix C.

4.1 Offshore disposal

The assessment criteria for dredged sediment for potential offshore disposal were sourced from:

- National Assessment Guidelines for Dredging (NAGD 2009).
- ANZECC/ ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (as recommended in the NAGD ((Commonwealth of Australia, 2009)).
- ANZAST (2018) Australia and New Zealand Guidelines for Fresh and Mine Water Quality -Toxicant default guideline values for sediment quality (ANZAST, 2018)

4.2 Onshore disposal

For waste classification purposes to support potential onshore disposal, the results were reviewed with reference to:

- NSW EPA (2014) Waste Classification Guidelines
- Chemical Control Order in Relation to Dioxin-Contaminated Waste Materials (1986) (The Dioxin Waste CCO).
- Chemical Control Order in Relation to TBT-Contaminated Waste Materials (1988) (The TBT Waste CCO)

4.3 Acid sulphate soils

The assessment for acid sulphate soils was based on the following:

- QLD (2014) Acid Sulfate Soils Technical Manual Soil management Guidelines V4.0 based on greater than 1,000 tonnes of fine texture soils to be disturbed. Which is based on the guidelines of the Acid Sulphate Soils Management Advisory Committee (ASSMAC 1998).
- Dear, S-E., Ahern, C. R., O'Brien, L. E., Dobos, S. K., McElnea, A. E., Moore, N. G. & Watling, K. M., 2014. Queensland Acid Sulfate Soil Technical Manual (QASSTM): Soil Management Guidelines. Brisbane: Department of Science, Information Technology, Innovation and the Arts, Queensland Government (Dear et al 2014).
- National Acid Sulfate Soil Guidance Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management (Water Quality Australia, 2018).

It is generally accepted that the 1998 ASSMAC Guidelines, whilst still useful as a reference document, have been superseded in terms of up to date scientific research and management practices and therefore the QASSTM takes precedence. The National Acid Sulfate Soil Guidance is adopted as a reference for potential management measures during the dredging process.

5. Methodology

5.1 Sediment sampling event

Sample locations consisted of 14 vibrocore locations VC01-VC14, these locations are shown on Figure 1, Appendix A and summarised in Table 2.

Table 2 Summary of cores

Borehole	Date	Penetration Achieved	Sample recovery	% recovery
VC01	30/10/2019	1.58	1.10	70
VC02	31/10/2019	2.45	1.60	65
VC03	30/10/2019	1.32	1.10	83
VC04	31/10/2019	1.10	1.00	91
VC05	30/10/2019	0.90	0.90	100
VC06	31/10/2019	1.00	1.00	100
VC07	30/10/2019	1.55	1.20	77
VC08	31/10/2019	2.45	1.60	65
VC09	30/10/2019	0.95	1.00	105 ¹
VC10	31/10/2019	1.30	0.80	62
VC11	30/10/2019	3.00	1.20	40
VC12	31/10/2019	1.36	1.20	88
VC13	31/10/2019	1.60	1.10	69
VC14	31/10/2019	2.43	1.40	49

Notes:

¹ Recovery of more than 100 % is due to swelling of sediment upon retrieval.

Drilling was conducted from a 13 m dedicated workboat, fitted with a Hiab crane and winch.

The vibrocore comprises a tripod frame with the vibrocore tube attached in the centre. Drilling was advanced using 3 m long, 80 mm diameter aluminium vibrocore tubes with a plastic liner and a detachable core catcher on the base. The crane was used to lower the vibrocore frame to the seabed, at which point it was advanced into the sediment with a motor. Once refusal or target depth was achieved, the vibrocore was raised back to the boat and the liner with contained sediment removed to allow subsampling.

Core recovery was continuous with variable recoveries as described in Table 2. Reduced sample recovery can often be attributed to the stiffness of sediment preventing the core catcher from closing immediately, leading to loss of sediment from the base of the core.

Additional opportunistic sampling was conducted by GHD during Coffey's geotechnical assessment (Coffey, 2019) at locations BH05, BH06 and BH07 as marked on Figure 1, Appendix A on 7 November 2019.

All samples were collected with a new pair of nitrile gloves directly from the vibrocore liner. Sub sampling comprised:

- One subsample over a 0.1 m interval at 0.5 m increments along the entirety of the core e.g. 0.0 m to 0.1 m; 0.5 to 0.6 m for acid sulphate soil.
- One subsample over a 0.1 m or 0.2 m interval at as many increments along the entirety of the core as were possible with the available sediment volume e.g. 0.0-0.1, 0.0-0.2, 0.3-0.4.
- A bulk homogenised samples representing a 0.5 m interval at 0.5 m increments along the entirety of the core, e.g. 0 m to 0.5 m; 0.5 m to 1.0 m, as per the NAGD (2009).

Samples were collected in 250 ml glass sample jars and filled to the brim and sealed with Teflon lined caps to lower the potential for loss of volatile contaminants. Samples for acid sulphate soil analysis and sealed in designated zip lock bags, providing approximately 100 g of sediment. Samples for particle size distribution analysis sediment was collected and sealed in designated zip lock bags providing approximately 500 g of sediment. Samples were stored on ice immediately after being sampled.

Samples collected in bags for acid sulphate soil analysis were measured in the field with photionization detector (PID), fitted with a 10.6eV lamp and calibrated with isobutylene gas at a concentration of 100 ppm, as per GHD's standard operating procedure (SOP). The instruments calibration certificate is provided in Appendix F. PID readings are presented on the borehole logs in Appendix B.

Quality control samples were taken to represent 10% of the samples collected. These were labelled FD01 – FD10.

Rinsate samples were taken from the trowel used for sediment sampling, for confirmation of correct decontamination protocol. One rinsate sample was taken for each day of sediment sampling (three in total).

For each day of sampling a trip spike and trip blank was also analysed (three in total).

The test reports, chains of custody (COC), and sample receipts are provided in Appendix E.

The samples number of samples selected for analysis and the analytes are summarised in Section 5.2.

5.2 Sample analysis

Sampling frequency was derived based on 22,185 m³ of material to be dredged on the assumption that the total amount dredged will not exceed this, should this volume be increased, further sampling may be required.

The NSW EPA (2014) *Waste Classification Guidelines* do not describe a minimum number of samples required for the classification of waste. As such, GHD referred to Table A of the NSW EPA (1995) *Sampling Design Guidelines* and the recommended sample density for stockpiled material as described in the VIC EPA (2009) *Industrial Waste Resource Guidelines*. These guidelines advise that when utilising the 95% UCL for contaminants a sampling frequency of 1:250 should be used, i.e. one sample for every 250 m³ of waste material.

Table 6 of the NAGD (2009) outlines a sampling frequency based on the volume of material to be dredged, based on the volume estimate provided by PANSW, eight sampling locations were required in order to accurately assess the contamination at the site.

The following analytes were selected and are based on the limited prior contamination information at the site, information in the NAGD (2009), common contaminants in urban marine environments in Australia and Table 1 and Table 2 of the NSW EPA (2014).

- Particle size distribution (PSD)
- Metals
- Benzene, toluene, ethylbenzene, xylenes, naphthalene (BTEXN)
- Total recoverable hydrocarbons (TRH)
- Polycyclic aromatic hydrocarbons (PAHs)
- Organochlorine pesticides and organophosphate pesticides (OCP and OPP)
- Polychlorinated biphenyls (PCBs)
- Dioxins
- Tributyltin (TBT)
- Total organic carbon (TOC)
- Fluoride
- Cyanide
- Semi volatile organic compounds (SVOC) including halogenated hydrocarbons, chlorinated hydrocarbons, explosives, Promanide, nitroaromatics, nitrosoamines, MAHs, phalates.

Disposal option	Guideline	Initial Screen (# samples)	Secondary round (# samples)	Tier 2 analyses (# samples)
Onshore	NSW EPA (2014)	 Total Cyanide (17) Weak Acid Dissolved Cyanide (8) Fluoride (12) TOC (14) Metals arsenic (17) aluminium (9) beryllium (8) cadmium (17) chromium (17) cobalt (9) copper (17) iron (9) lead (17) molybdenum (8) manganese (9) 	Lead (65) Mercury (15) PAH (65) PCB (5)	 TCLP Lead (18) Mercury (16) Benzo(a)pyrene (19)

Table 3 Summary of analysed samples

Disposal option	Guideline	Initial Screen (# samples)	Secondary round (# samples)	Tier 2 analyses (# samples)
		 mercury (17) nickel (17) selenium (17) silver (17) vanadium (9) zinc (9) PCBs (17) PAH (17) OC/OP (17) Halogenated hydrocarbons (4) MAHs (4, 12 Styrene) 		
Offshore	NAGD (2009)	 PSD (8) TRH/BTEXN (8) Metals (8) aluminium (8), antimony(8) arsenic (8), cadmium (8) chromium (8) chromium (8) cobalt (8) cobalt (8) iron (8) lead (8) manganese (8), nickel (8), selenium (8), silver (8) vanadium (8) zinc (8) PAH (8) Phenols (8) VOC (5) tributyltin (8) dioxins (8) 		Elutriate copper (4) • silver (4) • PAHs (4) • PCBs (3) Simultaneously extractable metals • copper (3) • silver (3)

Disposal option	Guideline	Initial Screen (# samples)	Secondary round (# samples)	Tier 2 analyses (# samples)
		 TOC (8) Cyanide (8) PCB (8) OCP/OPP (8) Chlorinated hydrocarbons (5) Explosives (5) Promanide (5) Nitroaromatics (5) Nitrosoamines (5) Phalates (5) 		
Onshore offshore	Acid sulphate soils	Acid sulphate soil field screen (43)	22 samples Chromium reducible sulphur suite	

Tiered analyses were undertaken including an initial screening round of analysis of selected samples, followed by a second round of analyses for waste classification purposes., This approach allowed the analyses to be targeted for the contaminants of most concern, disregarding those analytes which were not detected as part of the initial screen.

Two duplicate samples were submitted to the primary laboratory for analyses and one to the secondary laboratory. One duplicate analyses was performed on a homogenised sample under the NAGD (2009) methodology, which meets the 10 % requirement. Duplicate sampling frequency is not specified under the NSW EPA (2014) guidelines, however one inter-laboratory and one intra-laboratory duplicate were analysed to verify the precision of the analyses.

5.3 Data evaluation

5.3.1 Data normalisation

Most natural and anthropogenic substances, including metals and organic contaminants, show a higher affinity to fine grained particulate matter than coarse fraction sediments, with organic matter and clay minerals generally exhibiting the strongest adsorption capacity for contaminants (OSPAR, 2001)¹.

The objective of using normalisation techniques is to reduce the variability between samples arising from differences in sediment properties, such as grain size distribution. However, it is noted that the correlation between contaminant and co-factor concentrations may be weak or absent in some areas (OSPAR, 2009).

¹ OSPAR (2009) Update of JAMP guidelines for monitoring contaminants in sediment: Technical annex on normalisation of contaminant concentrations in sediment.

For organic contaminants, values are normalised to 1% organic carbon, as recommended in (ANZAST (2018). If the sediment organic carbon content is higher than 0.2%, ANZAST (2018) recommends that the guideline values should be adjusted owing to the presence of additional carbon binding sites which act to reduce the contaminants bioavailability. For the purpose of this data, the following points are made:

- Where TOC was less than 0.2%, normalisation was not required and the actual reported concentration of organic contaminants has been used.
- Where TOC was greater than 0.2%, normalisation of the total PAH concentration was undertaken and the normalised concentration was used in statistical calculations. Calculations used in normalising the data were as follows:
 - Where TOC is greater than 0.2% but less than 10%, the concentration was divided by the TOC.
 - Where the TOC is greater than 10%, the concentration was divided by 10.

5.3.2 Calculation of 95% upper confidence limit

In accordance with the requirements of the NAGD (2009) and the NSW EPA (2014) *Waste Classification Guidelines*, the upper 95 per cent confidence limit (95% UCL) is used to determine compliance with the screening levels. Outputs from ProUCL for calculation of the 95% UCL are presented in Appendix D.

6.1 Subsurface conditions

Logs of all cores taken are presented in Appendix B and PSD for selected samples is presented Table C1, Appendix C.

Composition of the cores vary from one to four units of marine and estuarine sediments ranging from clay to sand. Upper units were predominantly dark grey to dark brown in colour with organic odour and shell fragments. No olfactory or visual indicators of gross contamination were observed. These units were present in all cores (with the exception of VC04, VC09, VC10) and range from 0.1 m to 1.2 m in thickness, with one or two units present.

Units below this were more variable with yellow-grey, pale grey, yellow-brown and ranged in grain size from sand to clay. The lower units showed no visual or olfactory evidence of gross contamination.

Borehole	Date	Sample recovery	Number of units	PSD conducted
VC01	30/10/2019	1.10	2	0.5-1.0 m
VC02	31/10/2019	1.60	3	0.0-0.5 m
VC03	30/10/2019	1.10	3	0.0-0.5 m
VC04	31/10/2019	1.00	2	0.5-1.0 m
VC05	30/10/2019	0.90	2	-
VC06	31/10/2019	1.00	2	-
VC07	30/10/2019	1.20	2	0.0-0.5 m
VC08	31/10/2019	1.60	3	1.0-1.5 m
VC09	30/10/2019	1.00	1	-
VC10	31/10/2019	0.80	2	0-0.5 m
VC11	30/10/2019	1.20	1	-
VC12	31/10/2019	1.20	4	0.0-0.5 m
VC13	31/10/2019	1.10	2	-
VC14	31/10/2019	1.40	3	-

Table 4 Summary of viborocores and samples analysed for PSD

6.2 Waste classification results

The information in Table 5 is required by the NSW EPA when conducting a waste classification.

Table 5 Summary of information required by the NSW EPA for WasteClassification

Details	Information
The full name, address, Australian Company	GHD Pty Ltd
Number (ACN) or Australian Business Number (ABN) of the organisation and person(s) providing the waste classification	Level 15, 133 Castlereagh Street, Sydney, NSW 2000
	ACN: 008 488 373 / ABN: 39 008 488 373
Location of the site where the waste was	Berth off Overseas passenger terminal.
generated including the site address	Circular Quay, Sydney NSW 2000
History of the material and the processes and activities that have taken place to produce the waste	The site is the berth area off the OPT operated by PANSW is used to dock large commercial cruise liners. The area is also within the route of ferry traffic docking at Circular Quay.
	The site has been used as a commercial shipping port since the 1880s, with the OTP operating as a cruise terminal since 1960.
	Due to the nature of the material as marine sediment it is possible the sediment has been transported to the location from anywhere within the Sydney harbour area.
Potential contaminating activities that may have occurred at the site where the waste was generated	The likely contaminating activity at the site are relating to shipping such as fuel spillages and shedding of anti-fouling paints from the hulls of vessels.
Description of the waste, including photographs, visible signs of contamination, such as discolouration, staining, odours, etc.	Refer to section 6.1 and Appendix B of this report.
Quantity of the waste (estimated)	22, 185 m ³
Sampling method including pattern, depth, locations, sampling devices, procedures, and photos of the sample locations and samples	Refer to section 5 of this report
Contaminants tested	Refer to section 5.2 of this report
Laboratory documentation – chain-of- custody, sample receipt, laboratory report	Laboratory analytical certificates and chain- of-custody documentation from GHD's sampling event in October and November 2019 is provided in Appendix E

Details	Information
All results regardless of whether they are not used in the classification process	All laboratory analytical certificates generated from GHD's sampling event in October and November 2019 is provided in Appendix E. GHD is not aware of any other results which are relevant to this classification.
	are relevant to this classification.

6.2.1 Primary analyses

Twenty-two samples were initially analysed under the waste classification suite outlined in section 5.2, with the sample numbers and analytes in Table 3.

In the initial screening, sample exceedances of the General Solid Waste CT1 criteria were identified for lead, mercury and benzo(a)pyrene (B(a)P). A single exceedance of the Restricted Solid Waste CT2 criterion was identified for B(a)P.

Analytical results for all other COPCs were below the guideline criteria

Based on these exceedances the remaining waste classification samples were analysed for lead and B(a)P, to meet the required frequency. A selection of samples were also submitted for mercury analysis.

Exceedances of the CT1 and CT2 criteria are summarised in Table 6 and the results present in full in Table C3, Appendix C. All laboratory certificates are presented in Appendix E.

Analyte	Criterion	Number of samples exceeding criterion	Criterion value	Maximum concentration (mg/kg)	95% UCL
Lead	CT1	11 of 90	100	318	63.53
Mercury	CT1	1 of 40	4	4.25	1.057
Benzo(a)pyrene	CT1	10 of 90	0.8	4.0	0.546
	CT2	1 of 90	3.2		

Table 6 Summary of exceedances of the CT1 and CT2 criteria

For analytes with exceedances, the 95 % UCL was calculated using all samples that had been analysed for the COPCs (including those also analysed under the NAGD (2009) guidelines). For those analytes with exceedances of the NSW EPA (2014) CT1 and CT2 criteria, the 95% UCL did not exceeded the guideline. Outputs from ProUCL for calculation of the 95 % UCL are presented in Appendix D.

It should be noted that the NSW EPA (2014) guidelines do not include criteria for dioxins or tributyltin. The NSW EPA has advised that the current policy with respect to the disposal of organotin waste is that for waste to be compared to the ANZAST (2018) Default Guideline for Sediment Quality – High Value for classification. All measured tributyltin concentrations (TBT as Sn) were below the guideline value of 70 μ g/kg. Further discussion of dioxin and tributyltin are included in section 6.5 and section 7.1 of this report.

6.2.2 Toxicity characteristics leaching procedure

Due to exceedances of the CT1 Criteria for lead, B(a)P and mercury additional analyses were undertaken using the toxicity characteristics leaching procedure (TCLP, the results of which are presented in Table C4, Appendix C.

Following TCLP extraction and analyses, all analytes were reported below the TCLP1 criteria for general solid waste. These results are considered to be representative of the larger dataset on which TCLP was not undertaken and are consistent with historical waste classification data reported as part of previous investigations within the area. For those analytes for which TCLP was performed, concentrations were also below the SCC1 (with TCLP) criteria for all samples.

6.3 NAGD results

6.3.1 Whole sediment

Eight homogenised samples were analysed for the COPCs. A number of exceedances of the NAGD (2009) and ANZECC (2000) ISQG were identified, and are summarised in Table 7 and shown on Figure 2, Appendix A.

Hereafter the following definitions apply:

- The term SQG_{low} is used to refer to both the NAGD (2009) screening value, ANZECC (2000) ISQG low and the ANZAST (2018) DGV.
- The term SQG_{high} refers to the NAGD (2009) SQG-high values, the ANZECC (2000) ISQG

 high and the ANZAST (2018) DGV High as the relevant assessment criteria set out in the NAGD (2009).

The results of the inorganics analysis are presented in Table C5, Appendix C and the organics analysis in Table C6, Appendix C.

Analyte	SQG Low	SQG _{HIGH}	Detects	Min. (mg/kg)	Max. (mg/kg)	95% UCL	Guideline exceedanc es (a)
Metals							
Copper	65	270	3 of 8	<1.0	189	95.95	SQG _{low} 2 of 8
Lead	50	220	8 of 8	<5	318	318 ¹	SQG low 4 of 8 SQG high 1 of 8
Mercury	0.15	1	5 of 8	0.01	4.25	1.823	SQG low 2 of 8
Silver	1	3.7	5 of 8	<0.1	3.0	1.421	SQG low 2 of 8
Zinc	200	410	7 of 8	<1.0	445	445 ¹	SQG _{high} 1 of 8

Table 7 Summary of analytes exceeding nominated criteria

Analyte	SQG Low	SQG HIGH	Detects	Min. (mg/kg)	Max. (mg/kg)	95% UCL	Guideline exceedanc es (a)
PAHs							
Acenaphthene 2	0.016	0.5	1 of 8	<0.004	0.024	Unable to calculat e	SQG _{low} 2 of 8
Acenaphthylen e ²	0.04	0.64	3 of 8	<0.004	0.192	0.126	SQG low 3 of 8
Anthracene ²	0.085	1.1	3 of 8	<0.004	0.11	0.0835	SQG low 3 of 8
Benz(a)anthra cene²	0.261	1.6	4 of 8	<0.004	0.8	0.414	SQG _{low} 4 of 8
Benzo(a) pyrene²	0.43	1.6	5 of 8	<0.004	0.830	0.541	SQG low 3 of 8
Chrysene ²	0.384	0.28	4 of 8	<0.004	0.666	0.359	SQG low 1 of 8
Dibenz(a,h)ant hracene²	0.063	0.26	4 of 8	<0.004	0.121	0.0835	SQG low 3 of 8
Fluoranthene ²	0.6	5.1	5 of 8	<0.004	1.4	0.718	SQG low 2 of 8
Fluorene ²	0.019	0.54	3 of 8	<0.004	0.039	0.0261	SQG _{low} 3 of 8
Phenanthrene ²	0.24	1.5	4 of 8	<0.004	0.667	0.338	SQG low 3 of 8
Pyrene ²	0.665	2.6	4 of 8	<0.004	1.429	0.719	SQG low 1 of 8
PAHs (Sum of total) ²	10	50	4 of 8	<0.004	7.14	4.731	SQG _{low} 0 of 8
Other							
Tributyltin	0.009	0.07	3 of 8	<0.0005	0.0194	0.0123 ³	SQG low 2 of 8
PCBs	0.034	-	2 of 8	<0.0018	0.0645	0.0566 ³	SQG low 2 of 8
TRH C ₁₀ -C ₃₆	550	-	5 of 8	<3	221	280.1	SQG low 1 of 8

Notes:

¹ Maximum value is used as 95% UCL is greater than highest value

²Concentrations normalised to TOC content as discussed in Section 5.3.1.

³ Dataset not considered statistically valid for 95% UCL calculation

BOLD 95% UCL exceeds SQG_{low}

Italic 95% UCL exceeds SQG_{high}

Heavy metals in sediments

Exceedances of the NAGD (2009) screening levels were identified for copper, lead, mercury, silver and zinc and exceedances of the NAGD (2009) SQG-high values for zinc, lead and mercury.

The highest metal concentrations were reported in samples VC02_0.0-0.5, and VC07_0.0-0.5 with exceedances of the SQG_{low} for copper, lead, mercury and silver. Zinc exceeded the SQG_{high} in VC02_0.0-0.5 with a value of 445 mg/kg compared to the guideline of 410 mg/kg.

The 95% UCLs for the exceeding metals also exceeded the SQG_{low} for copper, lead, mercury and silver and the SQG_{high} for lead and zinc. The Zinc 95% UCL however is unlikely to be an accurate representation as it is skewed by a single elevated value, rather than being representative of the dataset as a whole.

Concentrations of TRH and BTEX

NAGD (2009) presents a screening level of 550 mg/kg for total petroleum hydrocarbons (TPH). The concentration of TPH in the fraction C_{10} - C_{36} (normalised to 1% TOC) ranged from below the limit of reporting to 650 mg/kg with a 95% UCL average of 280.1 mg/kg (standard deviation 264.9), below the SQG_{Iow} of 550 mg/kg.

Concentrations of volatile TRH in the fraction C_6 - C_{10} and BTEXN were reported below the laboratory limit of reporting (LOR) in all samples selected for analysis.

Concentrations of PAH

PAHs were detected in samples VC02_0.0-0.5, VC07_0.0-0.5 and VC12_0.0-0.5.

In these samples there were a number of exceedances of the SQG_{low} for individual PAH compounds as listed in Table 7 and in Table C6 in Appendix C. Total PAHs did not exceeded the SQG_{low} in any samples. The 95 % UCL is exceeded for Acenaphthylene, Benz(a)anthracene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Fluoranthene, Fluorene and Phenanthrene.

Concentrations of other parameters

- Cyanide was below the LOR in all samples
- Concentrations of TBT (normalised to TOC) were above the LOR in three of eight samples submitted for analysis. The detected concentrations normalised to TOC were 19.4 µg Sn/kg, 20.3 µg Sn/kg and 1 µg Sn/kg, two of which (VC07_0.0-0.5 and VC12_0.0-0.5) were above the NAGD (2009) SQG low of 9 µg Sn/kg.
- Total organic carbon ranged from 0.05 to 2.82 %.
- Total PCBs were detected, and exceeded the SQG_{low} value of 0.034 mg/kg in VC07_0.0-0.5 and VC12_0.0-0.5 with values of 0.064 mg/kg and 0.102 mg/kg respectively. The total PCBs is entirely comprised of Arochlor 1254 in both samples. The 95% UCL also exceeds the SQG_{low} with a value of 0.0566 mg/kg.

• Herbicides, chlorinated hydrocarbons, explosives, nitroaromatics, nitrosoamines and phthalates were below the limit of reporting in all samples.

6.3.2 Toxicity

The NAGD requires that those analytes where the 95% UCL exceeds the screening criteria are subjected to a Phase III analysis, to assess their potential toxicity to marine organisms.

The results of the Phase III analyses are presented in Table C7, in Appendix C.

This Phase III analysis included elutriate analysis, which measures the release of contaminants from sediments into seas water. A sea water blank and three samples with exceedances of the SQG_{low} were analysed for PAH, PCB, copper, mercury and silver.

No detects for any analytes were identified in the elutriate samples or the seawater blank.

Copper and silver were also assessed by the 1M HCl extractable metals method, this gives a closer estimate of the bioavailable fraction of the metals than the whole sediment analysis. Silver was not detected by the method in any of the three samples tested. Copper was below the SQG_{low} in all three samples.

6.4 Acid sulphate soils

6.4.1 Field screen

Samples for potential acid sulphate soil (PASS) were initially submitted to the lab for a pH field screen, the results of the field screen are presented in Table C2 in Appendix C.

The results for initial pH of the sample (pH_F) range from 7.3 to 8.9. pH after digestion with hydrogen peroxide (pH_{Fox}) ranged from 5.2 to 6.5. Samples showed a reaction rate of 3 with one sample showing a reaction rate of 4 and one of 2. The decrease in pH for all samples ranged from 1.3 to 3.5. While a final pH of less than 3.5 is considered an indicator of potential acid sulphate soils (PASS), and the lowest final PH in these samples was 5.2 the presence of PASS cannot be excluded as pH is often higher when samples are from a marine source.

6.4.2 Acid sulphate soils – Chromium Reducible Sulphur method

In order to supplement the acid sulphate soil (ASS) field screen, 22 samples were selected for laboratory analyses at the primary laboratory using the chromium reducible sulphur suite (CRS), with one or two samples per core selected.

The results were compared to the action criteria provided in the QLD (2014) Acid Sulfate Soils Technical Manual – Soil management Guidelines V4.0 based on more than 1000 tonnes of fine texture soils to be disturbed.

The laboratory report is included in Appendix E. The results are summarised in Appendix C, Table C2.

Of 22 samples analysed, 13 exceeded the action criteria of 0.03 % sulphur and 18 M H⁺/t at all depths. These samples all had pHKCl greater than 8.6 pH units and acid neutralising capacity that ranged from 254 to 9,590 M H⁺/t. The liming rates were less than 1 kg CaCO₃/t.

The acid neutralising capacity of the sediments (ANC) indicates that there is the potential for the sediments to self-neutralise. However, it is common for not all neutralising capacity to be available to the reaction, thus the actual ANC may be reduced compared to that measured by the laboratory.

It should be noted that measurement of ANC does not measure the effectiveness of the material in neutralising acidity, large fragments of carbonate material (i.e. shell) are be ineffectual at

neutralising acidity, however are still measured by the laboratory. Therefore, the presence of shell fragments in the sediments sampled, as recorded on the borehole logs in Appendix B, suggests the possibility that not all ANC in the analysed sediments would be available to the neutralising reaction.

The National Acid Sulfate Soil Guidance – National acid sulfate soils identification and laboratory methods manual (Water Quality Australia, 2018) recommends that where the ANC is not corroborated with other data, as is the case in this instance, the net acidity calculation should not incorporate the ANC.

6.5 Dioxins

'Dioxins' refers to a group of persistent chlorinated chemical compounds known as polychlorinated dibenzodioxins (PCDD), which share certain similar chemical structures, properties and biological characteristics, including toxicity (Mueller, et al, 2004). Dioxins are not deliberately produced, but are released into the environment as a result of combustion activities including power generation, waste incineration, metal smelting and manufacture of some chemicals (EPHC, 2005).

Dioxins occur as a complex mixture in most environmental media and as such, toxic equivalents (TEQs) are used to assist with interpretation of data, allowing the toxicity to be expressed as a single number. TEQs are calculated by normalising individual compounds to 2,3,7,8-tetrachlorodibenzo-p-dioxin, the most toxic PCDD. The total toxicity of any mixture is then expressed as the sum of the individual TEQs (Mueller, et al, 2004)

Samples were analysed for dioxins across the dredge footprint. A total of eight samples were analysed as per the sampling frequency requirement of the NAGD (2009). The results are reported in full in the laboratory report provided in Appendix E and presented in Table C8, Appendix C and summarised in Table 8. Both the World Health Organisation (WHO) TEQ and International TEQ (I-TEQ) are reported by the laboratory and summarised in Table 8. For the purpose of this report, the following TEQ values were applied

- WHO TEQ (0.5 LOR) where value of half LOR was used to calculate the TEQ where results were reported by the laboratory as non detect
- I-TEQ (0.5 LOR) where value of half LOR was used to calculate the TEQ where results were reported by the laboratory as non detect.

Sample ID	WHO TEQ (0.5 LOR)	I-TEQ (0.5 LOR)
VC01_0.5-1.0	10.50	26.46
VC02_0.5-1.0	134.61	156.94
VC03_0.0-0.5	24.96	69.14
VC04_0.5-1.0	14.73	38.61
VC07_0.0-0.5	40.45	51.46
VC08_1.0-1.5	13.79	25.92
VC10_0.0-0.5	28.16	79.27
VC12_0.0-0.5	17.79	27.16

Table 8 Summary of Dioxin results

Sample ID	WHO TEQ (0.5 LOR)	I-TEQ (0.5 LOR)
Mean Average Total TEQ	36	59

Results from all samples were strongly dominated by 1234678-HpCDD, Octa-dioxin, Hexadioxin and OCDD (octachlorodibenzo-p-dioxin) which all had concentrations a number of orders of magnitude above the LOR and other dioxin compounds in the same samples. The results were relatively consistent across all samples with the variation in dioxin TEQs not appearing to possess an identifiable spatial pattern, laterally or with depth. It is noted that the highest TEQ is in a sample at 0.5 - 1.0 m depth.

6.6 Quality assurance and quality control

Sediment samples were transported in ice-cooled chests (eskys) to the following NATA accredited laboratories under chain of custody:

- ALS Environmental Services Pty Ltd, Sydney, NSW primary samples and intra-laboratory duplicates.
- Eurofins|MGT laboratory, Lane Cove, NSW inter-laboratory duplicates.

A copy of the chain of custody for all batches is attached. The laboratories selected to carry out analysis are NATA accredited for the analysis performed. Test methods are listed on the attached laboratory reports, in Appendix E.

Samples were selected for analysis to include a sample set which was representative of all sediment types encountered and to be spatially distributed across the entire dredging area and therefore are considered to be representative of material to be excavated, as far as practicable.

6.6.1 Field and laboratory quality control assessment

All fieldwork was conducted in general accordance with GHD standard operating procedures. Laboratory and field quality control and quality assurance procedures are summarised in Table 9.

Parameter	Assessment
Laboratory	
Laboratory Duplicates	All laboratory duplicates were within acceptable RPDs.
Laboratory control spikes (LCS)	No LCS non-conformances were identified.
Matrix Spikes (MS)	The following MS non-conformances in the form of recovery outside of the assigned limits were identified:
	• ES1936029 – 1,1-Dichloroethene, organotins
	ES1936922 – hexavalent chromium
	 ES1936183 – hexavalent chromium, tributyltin
	ES1937111 - hexavalent chromium
Method blanks	No method blank non-conformances were identified.

Table 9 Summary of quality control parameters

Parameter	Assessment
Limits of reporting	Limits of reporting were equal to or below the assessment criterion for all analytes.
Field	
Rinsate Blanks	Results of the rinsate blanks are presented in table C10, Appendix C. No detections of any analytes were found in the rinsate blank samples, indicating that the equipment decontamination protocol was effective.
Duplicates	Results of the relative percentage difference (RPD) calculations are presented in Table C9, Appendix C. All duplicates were within the acceptable limits of 30 % RPD for inorganics and 50% RPD for organics, where the measured concentration was more than 10 times the LOR, with the exception of the intra-lab duplicate sample FD05, where the iron concentrations had an RPD of 41%. This is likely due to the natural heterogeneity of contamination in sediments.
Trip spikes and trip blanks	All trip spikes and trip blanks were within acceptable limits.
Holding Times	 Holding time exceedances were identified in the following reports: ES1937111 ES1937483 ES1936029 These holding time exceedances were for analytes that are generally considered to be stable, and given the samples were correctly stored by the laboratory, are unlikely to have a detrimental effect on the results to the analysis.

Overall the instances of non-conformance of the QA/QC parameters are not considered to affect the conclusions drawn from the results provided.

7. Discussion and conclusions

Referring to the objectives of this report outlined in Section 1.2, and the limitations of this investigation as outlined in Section 1.4, the following sections provide a summary of conclusions made on the basis of the analytical results obtained during the course of these works

7.1 Waste classification

Based on observations made during sampling, and GHD's understanding of the site, the samples collected are considered to be generally representative of site conditions. Historical samples have not been taken into account as the available information is not representative of the entire samples depth, and also were sampled more than five years prior to this sampling event.

Under NSW EPA (2014) step one of classifying waste is to determine if the waste is 'special waste'. Due to the presence of dioxin and tributyltin the waste may be considered special waste this is discussed further below.

Special waste considerations - Dioxins

Dioxin contaminated waste is subject to the Chemical Control Order in Relation to Dioxin-Contaminated Waste Materials (1986) (The Dioxin Waste CCO). The Dioxin Waste CCO is currently under review by NSW EPA. This document defines dioxin contaminated waste as waste materials containing more than one part in 100 million (by weight; equivalent to 0.01 ppm, or 10 μ g/kg) of dioxin. Dioxin is in turn defined as 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The Dioxin Waste CCO prohibits the disposal of 2,3,7,8-TCDD wastes and the NSW EPA states that "You must get a licence from the EPA for processing, storing, selling, distributing or conveying these wastes".

2,3,7,8-TCDD was detected in four of the eight samples analysed at a highest concentration of 18.4 ng/kg and an average concentration of 3.6 ng/kg. Concentrations of dioxin, reported as 2,3,7,8-TCDD are therefore below the concentration regulated by The Dioxin Waste CCO and are not considered classified as dioxin contaminated waste.

Special waste considerations - TBT

Tributyltin waste is subject to the Chemical Control Order in Relation to Organotin Wastes (1989) (The Organotin Waste CCO). However, the NSW EPA's organotin waste management framework is currently under review.

In correspondence during this project, the NSW EPA has advised that the current policy with respect to the disposal of organotin waste is that for waste to be classified as General Solid Waste (GSW), the ANZAST (2018) Default Guideline for Sediment Quality – High Value should be used as guidance as follows:

- Concentrations of tributyltin below the guideline being classified as GSW,
- Concentrations of tributyltin above the guideline being classified as Restricted Solid Waste (RSW).

Based on the results of this sampling, the concentration of tributyltin in the sediments meet the criteria to be classified as GSW.

Waste classification – general considerations

The following summarises the chemical analysis of the waste:

- Analytical results indicated exceedances of the General Solid Waste CT1 criteria for lead, mercury and B(a)P and a single exceedance of the Restricted Solid Waste CT2 criterion for B(a)P.
- The 95% UCL for the COPCs which exceeded the Waste Classification criteria were all below the CT1 criteria
- Based on the exceedances, selected samples were submitted for TCLP extraction and analysis for lead, mercury and B(a)P all samples were below the General Solid Waste SCC1 criteria and TCLP 1 criteria.

Based on the above analysis results the materials can be classified as General Solid Waste (GSW) and should be disposed of to a facility with appropriate license to accept material based on this.

7.2 Analysis under NAGD (2009)

For the purpose of potential off-shore disposal, data was reviewed with reference to NAGD (2009). In summary, the following points are noted:

- Homogenised bulk sediment analysis identified exceedances of the SQG_{low} for total PCBs, TBT, a number of individual PAHs, copper, lead, mercury and silver, and one exceedance of the SQG_{high} for zinc and lead.
- Elutriate testing was conducted for copper, silver, mercury, PAHs and PCBs, and 1M HCI extractable metals for copper and silver.
- No detections of any COPCs were identified during elutriate analyses or on the seawater blank and the results of the 1M HCl extractable metals analysis showed results below the relevant guidelines. It is considered unlikely that the COPCs are bioavailable in the current marine environment.
- While elutriate testing was not conducted for lead, it should be noted that TCLP testing conducted as part of the waste classification, showed no exceedances of the ANZAST (2018) 95% Marine Water Guideline of 0.004 mg/L for lead.
- It should also be noted that the result for zinc, appears anomalous.
- The investigation identified scattered occurrences of TBT in the sediments, thought it appears the majority of the sediments only contain low levels of TBT, which is demonstrated by the fact that six of the eight tested samples reported TBT concentration at or below the laboratory PQL of 1 µg Sn/kg. While elutriate or bioavailability testing for TBT could not be completed for the two samples (VC07_0.0-0.5 and VC12_0.0-0.5) containing higher TBT concentrations due to limited amount of sediment samples available from this sampling event, it is noted elutriate testing of these two samples for other chemicals (including metals) showed no detections of COPC in the elutriate analysis or sea water blanks.
- Samples VC02_0.0-0.5 and VC07_0.0-0.5 have the most exceedances of the COPCs, however there does not appear to be a spatially relationship regarding contamination at the site.
- Some dioxin compounds were detected in all of the eight samples analysed. These levels fall within the range that has been identified for background in Australia.

Given these results, the dredge sediment may be suitable for offshore disposal, with reference to the recommendations in Section 8 of this report.

7.3 Acid sulphate soils

The analytical results for chromium reducible sulphur indicate the presence of PASS and the potential acid generating capacity of the sediments throughout the lateral and vertical extent of the sediments.

8. Recommendations

Based on the findings of these works, and subject to the limitations outlined in Section 1.4 the following recommendations are made with respect to waste disposal options for dredged sediment:

- For the option of offshore disposal, it is recommended that PANSW seek information regarding the contaminant levels at the preferred disposal site, particularly with reference to tributyltin and dioxin. This site characterisation is recommended in the NAGD (2009) in order to inform selection of the most appropriate disposal location and to establish how a disposal site may be impacted.
- PASS conditions are present within the dredge footprint. The dredging strategy should be designed to limit the timeframe for potential for oxidisation of the sediments. If offshore disposal were chosen the potential for ASS generation would reduce greatly due to sediments being transferred to the disposal area immediately after dredging, limiting time for oxidation. Should onshore disposal be selected, it is recommended that the liming requirements are assessed during dredging by ongoing monitoring of the excavated sediments. To assist in outlining the procedure for PASS monitoring during excavation GHD recommends that an Acid Sulphate Soil Management Plan (ASSMAP) is prepared, as recommended by National Acid Sulfate Soil Guidance Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management (Water Quality Australia, 2018).

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Appendices

GHD | Report for Port Authority of New South Wales - Sediment Contamination Assessment Report, 12517046

Appendix A - Figures



G:\21\12517046\GIS\Maps\Deliverables\21_12517046_Z001_SiteLocation.mxd Print date: 16 Dec 2019 - 20:15 Data source: General Topo - NSW LPI DTDB 2019. Cadastre - NSW LPI DCDB 2019. Aerial Imagery - Sixmaps 2019 . Created by: kqvelasco



Investigation Locations (Coffey, Nov 2019)

Lot Boundary

Borehole Locations

 \mathbf{O} Borehole / CPT Locations

Meters Map Projection: Transverse Mercator Horizontal Datum: GDA 1994 Grid: GDA 1994 MGA Zone 56

Date 16 Dec 2019

Exceedances of Nominated Guidelines for Offshore Disposal

FIGURE 2

Data source: General Topo - NSW LPI DTDB 2019. Cadastre - NSW LPI DCDB 2019. Aerial Imagery - Sixmaps 2019. Created by: kgw

Appendix B - Borehole Logs



ENVIRONMENTAL-SOIL BORE

Page 1 of 1

Client PANSW Drill Co. Easting 344418 Project Circular Quay Investigation Driller Darren Skene Northing 6251919 Grid MGA94 Project No. 12517046 Rig Type Site Overseas Passenger Terminal Drill Method Vibrocore Elevation -10.77 m AHD Location VC01 Total Depth (m) 1.1 Logged By SE Date Drilled 30/10/2019 Checked By CY Diameter (mm) 100 COMMENTS/ **Drilling Method** CONTAMINANT LITHOLOGICAL DESCRIPTION Elevation (m) Graphic Log Consistency INDICATORS Soil Type (Classification Group Symbol); Particle PID (ppm) Sample ID Depth (m) Odours, staining, waste materials,separate phase liquids, imported fill, ash. Moisture Size; Colour; Secondary / Minor Components. VC VC01_0-0.2 0.9 Clayey SAND, dark grey, with shell and wood W L organic odour, no staining. fragments. - 0.2 -0.2 VC01_0-0.5 Clayey SAND, medium grained, pale yellow-grey, W L no odour, no staining. weathered sandstone. - 0.4 -0.4 VC01_0.4-0.6 0.8 VC01_0.5-0.6 0.6 -0.6 VC01_0.5-1.0 - 0.8 -0.8 1 -1 0.7 VC01_1-1.1 Core recovery: 1.10 m Total penetration: 1.58 m - 1.2 - -1.2 Refusal in residual - 1.4 -1.4 1.6 -1.6 - 1.8 -1.8 - 2 -2 2.2 -2.2 24 -2.4 - 2.6 -2.6 2.8 -2.8 Notes

This log is not intended for geotechnical purposes. **Drilling Abbreviations** Moisture Abbreviations Consistency Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, D-Dry, SM-Slightly Moist, Granular Soils VL-Very Cohesive Soils VS-Very DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation M-Moist, VM-Very Moist, Loose, L-Loose, MD-Medium Soft, S-Soft, F-Firm, (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, W-Wet, S-Saturated Dense, D-Dense, VD - Very ST-Stiff, VST-Very Stiff, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore, Dense H-Hard WB-Wash Bore, WS-Window Sampler



ENVIRONMENTAL-SOIL BORE

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Client PANSW Project Circular Quay Investigation Project No. 12517046 Site Overseas Passenger Terminal Location VC02 Date Drilled 31/10/2019				Drill Co. Driller Darren Skene Rig Type Drill Method Vibrocore Total Depth (m) 1.6 Diameter (mm) 100			Easting 334466 Northing 6251945 Grid MGA94 Elevation -11.57 m AHD Logged By SE Checked By CY				
Depth (m) Drilling Method	PID (ppm)	Sample ID	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)			
- VC - 0.2 	1.2	VC02_0-0.2 VC02_0.0-0.5		Clayey SILT with sand, low to medium plasticity, dark grey, shell fragments.	W	S	organic odour, no staining	- - - - - - - - - - - - - - - - - - -			
- 0.6 	1.0	VC02_0.5-0.6 VC02_0.5-1.0		Clayey SAND, fine and medium grained, dark grey-brown, shell fragments.	W	L	organic odour, no staining	- - - - - - - - - - - - - - - - - - -			
- - - - - - - - 1.2 - - - - - - - - - - - - - - - - - - -	1.1	VC02_0.9-1 VC02_1-1.2 VC02_1-1.5		CLAY with sand, medium to high plasticity, grey.	M	ST	no odour, no staining.				
- 1.6 				Core recovery: 1.60 m Total penetration: 2.45 m Refusal on bedrock				1.6 			
- - 2.4 - - 2.6 - - 2.6 - - 2.8 - 								2.4 2.6 			

This log is not intended for geotechnical purposes.			
Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



ENVIRONMENTAL-SOIL BORE

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Client PANSW Drill Co. Easting 334437 Project Circular Quay Investigation Driller Darren Skene Northing 6251990 Grid MGA94 Project No. 12517046 Rig Type Site Overseas Passenger Terminal Drill Method Vibrocore Elevation -12.61 m AHD Location VC03 Total Depth (m) 1.1 Logged By SE Date Drilled 30/10/2019 Checked By CY Diameter (mm) 100 COMMENTS/ **Drilling Method** CONTAMINANT LITHOLOGICAL DESCRIPTION Elevation (m) Graphic Log Consistency INDICATORS Soil Type (Classification Group Symbol); Particle PID (ppm) Sample ID Depth (m) Odours, staining, waste Moisture Size; Colour; Secondary / Minor Components. materials, separate phase liquids, imported fill, ash. VC VC03_0-0.2 0.9 S VS Sandy CLAY, low to medium plasticity, dark grey, weak organic odour, no trace shells staining. Clayey SAND with silt, medium to fine grained, pale W D no odour, no staining. grey. - -0.2 0.2 VC03_0-0.5 VC03_0.3-0.4 - 0.4 -0.4 VC03__0.4-0.6 1.0 VC03 0.5-0.6 0.6 -0.6 VC03_0.6-0.7 W D SAND, pale grey. no odour, no staining. VC03_0.5-1 -0.8 - 0.8 -1 1.1 VC03_1-1.1 Core recovery: 1.10 m Total penetration: 1.32 m - 1.2 - -1.2 Refusal in residual -1.4 - 1.4 1.6 -1.6 - 1.8 -1.8 - 2 -2 2.2 -2.2 24 -2.4 -2.6 - 2.6 2.8 -2.8 Notes

10103

This log is not intended for geotechnical purposes.

Drilling Abbreviations Moisture Abbreviations Consistency Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, D-Dry, SM-Slightly Moist, Granular Soils VL-Very Cohesive Soils VS-Very DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation M-Moist, VM-Very Moist, Loose, L-Loose, MD-Medium Soft, S-Soft, F-Firm, (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, W-Wet, S-Saturated Dense, D-Dense, VD - Very ST-Stiff, VST-Very Stiff, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore, Dense H-Hard WB-Wash Bore, WS-Window Sampler



ENVIRONMENTAL-SOIL BORE

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Client		NA/			Drill Co	Feeti		464	
Projec	t Circ	ovv ular Qua	v Investigation		Driller Darren Skene	Eastin	ng 334 1 ina 62	464 251999	
Project No. 12517046			16		Rig Type	.94			
Site (Oversea	as Passe	enger Terminal		Drill Method Vibrocore	Eleva	tion -1	2.76 m AHD	
Locat	ion VC	04	5		Total Depth (m) 1.0	Loga	ed Bv	SE	
Date I	Drilled	31/10/2	019		Diameter (mm) 100	Chec	ked By	CY	
Depth (m)	Drilling Method	(mqq) Olc	Sample ID	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
_	VC	0.7	VC04_0-0.1		CLAY with sand, medium plasticity, pale grey, with	w	F	no odour, no staining	_
-			VC04 0.05		shell fragments.				F
			0-0.5						
_ 0.2								A.	L -0.2
-									-
- 0.4			VC04_0.4-0.5	V/////////////////////////////////////					-0.4
-			VC04 0506						F
			VC040.5-0.6						
- 0.6			VC040.5-1.0	///	Clayey SAND with silt, fine to medium grained, pale vellow-brown.	VM	D	no odour, no staining.	-0.8
		1	VC04_0.7-0.8] / / ,					F
- 0.8				/ / /					-0.8
E I									t
-		0.9	VC04_0.9-1						F
-1				/:/.	Core recovery: 1.00 m				-1
					Total penetration: 1.10 m				E
-					Refusal in residual				╞
- 1.2									E -1.2
_									-
									F
- 1.4									-1.4
-									╞
- 16									
- 1.0									
-									╞
- 18									
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_ 2									F-2
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t I									È
- 2.2									-2.2
F									F
F I									F
- 2.4									-2.4
Εl									t
FI									Ļ
- 2.6									-2.6
t I									Ľ
- I									F
- 2.8									-2.8
E I									F
- I									F
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This log is not intended for geotechnical purposes.
Drilling Abbreviations

Drilling AbbreviationsMoisture AbbreviationsConsistency AbbreviationsAH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring,
DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation
(shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube,
SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore,
WB-Wash Bore, WS-Window SamplerD-Dry, SM-Slightly Moist,
M-Moist, VM-Very Moist,
W-Wet, S-SaturatedGranular Soils VL-Very
Loose, L-Loose, MD-Medium
Dense, D-Dense, VD - Very
DenseCohesive Soils VS-Very
Soft, S-Soft, F-Firm,
ST-Stiff, VST-Very Stiff,
H-Hard

ESlog



BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE VC05

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Client Projec Projec Site C Locati Date D	PANS t Circ t No. oversea on VC orilled	SW ular Qua 1251704 as Passe C05 30/10/2	y Investigation 16 enger Terminal 019		Drill Co. Driller Darren Skene Rig Type Drill Method Vibrocore Total Depth (m) 0.9 Diameter (mm) 100	Eastii North Grid Eleva Loggo Chec	ng 334 hing 62 MGA94 htion -1 ed By ked By	450 252060 4 11.86 m AHD SE 5 CY	
Depth (m)	Drilling Method	PID (ppm)	Sample ID	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	VC	0.7	VC05_0-0.1		Sandy CLAY, low to medium plasticity, dark grey,	s	s	weak organic odour, no	-
- 0.2			VC05_0-0.5		Clayey SAND, fine to medium grained, poorly graded, pale yellow-brown and pale grey.	W	L	no odour, no staining.	0.2 0.2 0.4
		0.6	VC050.5-0.7	+//					È.
0.6			-						-0.6
			VC050.5-0.9	+//					Ł
0.8		0.8	VC050.8-0.9	+//					-0.8
1.2 1.4 1.6 1.8 2 2 2.2					Refusal in residual				1.2 1.4 1.6 1.6 1.8 1.8 1.8 1.8 1.8 1.8 1.8
2.4									
2.8									- 2.8 - -

Notes

This log is not intended for geotechnical purposes.

 Drilling Abbreviations
 Moisture Abbreviations
 Consistency Abbreviations

 AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore, WB-Wash Bore, WS-Window Sampler
 D-Dry, SM-Slightly Moist, W-Wet, S-Saturated
 Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense
 Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



ENVIRONMENTAL-SOIL BORE

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Client	PANS	w			Drill Co.	Easti	na 334	482					
Project Circular Quay Investigation		Driller Darren Skene Northing 6252048											
Proje	ct No.	1251704	6		Rig Type			Grid MGA94					
Site	Oversea	as Passe	enger Terminal		Drill Method Vibrocore	Eleva	tion -1	2.86 m AHD					
Locat	ion VC	:06			Total Depth (m) 1.0	Logg	ed By	SE					
Date I	Drilled	31/10/2	019		Diameter (mm) 100	Chec	ked By	CY					
epth (m)	rilling Method	D (ppm)	Sample ID	raphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	oisture	onsistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	levation (m)				
Ľ	ā	L 0.5	VC06 0.0.1	Ū		ž	Ŭ						
	VC	0.5	VC06_0-0.1		CLAY, medium plasticity, dark grey, trace shells.	W	F	weak organic odour, organic staining, metal	Ł				
_			VC06_0-0.5	V////////				bolt at 0.3 m.	F				
- 0.2									-0.2				
									E				
-			VC060.3-0.4		CLAY with sand, medium plasticity, pale grey mottled	W	S	no odour, no staining.	F				
- 0.4				V/////////////////////////////////////	yellow-brown.				-0.4				
E I									È				
-		0.6	VC060.5-0.6						+				
— 0.6 -			VC060.5-1.0						0.6				
-			VC06_0.7-0.8						F				
- 0.8		1	VC060.8-0.9 & FD06						-0.8				
-									F				
-									-				
- '					Core recovery: 1.0 m				-				
-					Refusal in residual				F				
- 1.2									L -1.2				
-									\vdash				
									Ľ				
- 1.4									-1.4				
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- 1.6									-1.6				
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Notes

This log is not intended for geotechnical purposes.

Drilling AbbreviationsMoisture AbbreviationsConsistency AbbreviationsAH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring,
DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation
(shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube,
SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore,
WB-Wash Bore, WS-Window SamplerD-Dry, SM-Slightly Moist,
M-Moist, VM-Very Moist,
W-Wet, S-SaturatedGranular Soils VL-Very
Loose, L-Loose, MD-Medium
Soft, S-Soft, F-Firm,
ST-Stiff, VST-Very Stiff,
H-Hard



ENVIRONMENTAL-SOIL BORE

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Client PANSW Project Circular Quay Investigation Project No. 12517046 Site Overseas Passenger Terminal Location VC07 Date Drilled 30/10/2019					Drill Co.Easting 334458Driller Darren SkeneNorthing 6252136Rig TypeGrid MGA94Drill Method VibrocoreElevation -11.56 m AHDTotal Depth (m) 1.2Logged By SEDiameter (mm) 100Checked By CY					
Depth (m)	Drilling Method	PID (ppm)	Sample ID	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)	
- - - - - - - - - - - - - - - - - - -	VC	0.5	VC07_0-0.1 VC07_0-0.2 & FD03 VC07_0-0.5		Clayey SAND with silt, fine to medium grained, dark grey, trace shells.	W	L	weak organic odour, no staining.	- - - - - - - - - - - - - - - - - - -	
- - - - - - 0.8		0.8	VC070.5-0.6 VC070.5-1 VC070.7-0.8		Sandy CLAY, low plasticity, pale grey mottled red.	W	ST	no odour, no staining.		
- 1 - - - <u>1.2</u>		0.8	VC07_1-1.1 VC07_1-1.2		Coro receventi 1.20 m				1 - - - 1.2	
- 1.4 - 1.6 - 1.6 - 1.8 - 2 - 2.2 - 2.2 - 2.4 2.6 2.8 2.8					Total penetration: 1.55 m Refusal in residual				1.4 	

This log is not intended for geotechnical purposes.			
Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



ENVIRONMENTAL-SOIL BORE

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Client PANSW Drill Co. Easting 334499 Project Circular Quay Investigation Driller Darren Skene Northing 6252126 Project No. 12517046 Grid MGA94 **Rig Type** Site Overseas Passenger Terminal Drill Method Vibrocore Elevation -12.07 m AHD Location VC08 Total Depth (m) 1.6 Logged By SE Date Drilled 31/10/2019 Checked By CY Diameter (mm) 100 COMMENTS/ **Drilling Method** CONTAMINANT LITHOLOGICAL DESCRIPTION Elevation (m) Graphic Log Consistency INDICATORS Soil Type (Classification Group Symbol); Particle PID (ppm) Sample ID Depth (m) Odours, staining, waste materials,separate phase liquids, imported fill, ash. Moisture Size; Colour; Secondary / Minor Components. VC VC08_0-0.1 & FD07 Sandy CLAY, low to medium plasticity, dark W 0.7 S weak organic odour, no brown-grey, trace shells. staining VC08_0-0.5 - 0.2 - -0.2 VC08_0.3-0.4 - 0.4 -0.4 0.8 VC08_0.5-0.6 0.6 -0.6 VC08_0.5-1 W MD Clayey SAND, fine to medium grained, grey. no odour, no staining. VC08_0.7-0.8 - 0.8 -0.8 L 0.9 VC08_1-1.1 & FD08 Sandy CLAY, high plasticity, pale grey. W S no odour, minor organic staining VC08 1-1.5 - 1.2 --1.2 VC08__1.3-1.4 -1.4 1.4 0.8 VC08__1.5-1.6 Core recovery: 1.60 m Total penetration: 2.45 m Refusal on bedrock · 1.8 -1.8 - 2 -2 2.2 -2.2 24 -2.4 -2.6 - 2.6 2.8 -2.8 Notes This log is not intended for geotechnical purposes. **Drilling Abbreviations** Moisture Abbreviations Consistency Abbreviations

D-Dry, SM-Slightly Moist,

M-Moist, VM-Very Moist,

W-Wet, S-Saturated

Granular Soils VL-Very

Loose, L-Loose, MD-Medium

Dense, D-Dense, VD - Very

Dense

Cohesive Soils VS-Very

ST-Stiff, VST-Very Stiff,

Soft, S-Soft, F-Firm,

H-Hard

AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring,

DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation

SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore,

WB-Wash Bore, WS-Window Sampler

(shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube,



ENVIRONMENTAL-SOIL BORE

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United Product Damy Investigation Damit Co. Estand 3-341, 1 Project Ciscular Damy Investigation Damits Dames Sterme Northing 052211 Orif MGAM Project Ciscular Damy Investigation Damits Dames Sterme Northing 052211 Orif MGAM Data Drive Dames Sterme Northing 052211 Orif MGAM Data Drive Ciscular Data Investigation Data Drive Ciscular Data Investigation Data Drive D	Client		214/			D-W C-	Fasti		474	
Projector Rig Type Ord MGA4 Location VC000 Diff Method Vibocore Elevation -15.82 m AHD Location VC000 Diff Method Vibocore Elevation -15.82 m AHD Location VC000 Diff Method Vibocore Elevation -15.82 m AHD Location VC000 Sample ID Rig Type Community Location VC000 Sample ID Rig Type Community Rig	Projec	t Circ	svv :ular Qua	v Investigation		Drill Co. Driller Darren Skene	Easti	ng 334 1 ina 62	474 252211	
Site Oversea Pasanger Terminal Location V/OD Date Drilled 30(10/2019 Dill Method Viscore Total Depth (m) 1 Logged By SE Checked By CY Image: State Drilled 30(10/2019) Sample ID Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 30(10/2019) Sample ID Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 30(10/2016) Sample ID Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 30(10/2016) Sample ID Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 30(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 30(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 10(10/2016) Image: State Drilled 30(10/2016) Image: State Drilled 30(10/2016) Image: State Drilled 30(10/2016) Image: State Drilled 30(10/2016) Image: State Drilled 30(10/2016) Image: State Drilled 30(10/2016) Image: State Drille	Projec	ct No.	1251704	46		Rig Type	Grid	MGA94	1	
Location VC00 Date Drilled 30/10/2019 Total Depth (m) 1 Diameter (mm) 100 Logged by SE Checked by CV Image: Strate Control (Control (Contro) (Control (Control (Control (Control (Control (Co	Site C	Oversea	as Passe	enger Terminal		Drill Method Vibrocore	Eleva	tion -1	3.62 m AHD	
Date Drilled 30/10/2019 Diameter (mm) 100 Checked By CY	Locati	ion VC	209			Total Depth (m) 1	Logg	ed By	SE	
Image: state in the s	Date D	Drilled	30/10/2	019		Diameter (mm) 100	Chec	ked By	CY	
Bit Mark									COMMENTS/	
VC 1.8 VC08_0.0.1 Claysy SAND, madium grained, orange-brown and gray, with shells in top 100 mm. W MD weak organic odour, organic staining. 0.4 VC08_0.0.0.2 & FD02 VC08_0.0.0.8 VC08_0.0.0.0 VC08_0.0.0.0.0 VC08_0.0.0.0 VC08_0.0.0.0.0 VC08_0.0.0.0 VC0	Depth (m)	Drilling Method	PID (mqq) OIA	Sample ID	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
02 vc0e_023 # F02 04 vc0e_03.6 0.9 vc0e_03.6 0.8 vc0e_03.6 vc0e_03.6 vc0e_03.6 0.8 vc0e_03.6 vc0e_03.6 vc0e_03.6 0.5 vc0e_03.6 1.2 vc0e_03.6 1.4 vc0e_03.6 1.5 vc0e_03.6 1.6 vc0e_03.6 1.7 vc0e_03.6 1.8 vc0e_03.6 1.4 vc0e_03.6 1.5 vc0e_03.6 1.6 vc0e_03.6 1.7 vc0e_03.6 <t< td=""><td>_</td><td>VC</td><td>1.8</td><td>VC09_0-0.1</td><td></td><td>Clayey SAND, medium grained, orange-brown and grey, with shells in top 100 mm.</td><td>W</td><td>MD</td><td>weak organic odour, organic staining.</td><td>E</td></t<>	_	VC	1.8	VC09_0-0.1		Clayey SAND, medium grained, orange-brown and grey, with shells in top 100 mm.	W	MD	weak organic odour, organic staining.	E
0.4 V00=_0.05 0.6 V00=_0.61 0.8 V00=_0.61 0.8 V00=_0.61 0.5 V00=_0.61 12 0.5 14 0.5 12 0.5 13 0.5 24 0.5 24 0.5	- 0.2			VC09_0-0.2 & FD02						E
0.4 VC09_0406 0.8 VC09_051 0.8 VC09_081 0.5 VC09_081 0.5 VC09_081 0.6 VC09_081 0.7 VC09_081 0.8 VC09_081 0.9 VC09_081 0.9 VC09_081 0.6 VC09_081 0.7 VC09_081 0.8 VC09_081 0.9 VC09_081 1.2 VC09_081 1.2 VC09_081 1.2 VC09_081 1.4 VC09_081 1.4 VC09_081 1.4 VC09_081 1.4 VC09_081 1.4 VC09_081 1.4 VC09_081 1.5 VC09_081 1.6 VC09_081 1.8 VC09_081 2.2 VC09_081 2.2 VC09_081 2.3 VC08_081	- 0.2 - -			VC09_0-0.5						-
0.6 0.9 VC09_0.5-0.6 0.8 VC09_0.7-0.8 VC09_0.9-1 0.5 0.5 VC09_0.9-1 1.2 0.5 1.4 1.4 1.6 1.4 1.8 1.8 2.2 1.8 2.2 1.8	- 0.4 -			VC09_0.4-0.6						0.4 -
0.0 VC00_0.0.4 0.8 VC00_0.0.4 0.5 VC00_0.0.4 0.5 VC00_0.0.4 1.2 Core recovery: 1.00 m 1.4 Refusal in residual	F		0.9	VC090.5-0.6	$\left \right $					F
VC09_0.7.0.8 VC09_0.8-1 0.5 VC09_0.9-1 1.2 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.4 0.5 1.8 0.5 1.8 0.5 2.2 0.5 2.4 0.5	- 0.6			VC090.5-1						
VC09_08-1 Core recovery: 100 m 12 Core recovery: 100 m 14 Core recovery: 100 m 14 Refusal in residual 14 Core recovery: 100 m 112 Core recovery: 100 m 114 Core recovery: 100 m 118 Core recovery: 100 m 118 Core recovery: 100 m 118 Core recovery: 100 m 119 Core recovery: 100 m 120 Core recovery: 100 m 121 Core recovery: 100 m 122 Core recovery: 100 m 123 Core recovery: 100 m <				VC09_0.7-0.8						E-08
0.5 VC09_0.0.1 1.2 Core recovery: 1.00 m 1.4 Trial Penetration: 0.95 m 1.4 Refusal in residual 1.4 Image: Core recovery: 1.00 m 1.5 Image: Core recovery: 1.00 m	_			VC090.8-1		-				
Core recovery: 1.00 m Total Penetration: 0.95 m Refusal in residual	-		0.5	VC09_0.9-1						1
12 14 1.4 1.6 1.8 2.2 2.4 2.4						Core recovery: 1.00 m Total Penetration: 0.95 m				È
	- - 1.2					Refusal in residual				1.2
										Ę
	- - 1.4									-1.4
										F
	- - 1.6									-1.6
	F									F
	- - 1.8									1.8
	-									F
	-2									2
	-									F
	- 2.2									-2.2
	-									F
	- 2.4									-2.4
	F									F
	- 2.6									-2.6
	F									F
	- 2.8									-2.8
	E									E
	Notes									Γ

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC_Vibracore, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard


ENVIRONMENTAL-SOIL BORE

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Client PANSW Drill Co. Easting 334452 Project Circular Quay Investigation Driller Darren Skene Northing 6251976 Grid MGA94 Project No. 12517046 Rig Type Site Overseas Passenger Terminal Drill Method Vibrocore Elevation -11.99 m AHD Location VC10 Total Depth (m) 0.8 Logged By SE Date Drilled 31/10/2019 Checked By CY Diameter (mm) 100 COMMENTS/ **Drilling Method** CONTAMINANT LITHOLOGICAL DESCRIPTION Elevation (m) Graphic Log Consistency INDICATORS Soil Type (Classification Group Symbol); Particle PID (ppm) Sample ID Depth (m) Odours, staining, waste materials,separate phase liquids, imported fill, ash. Moisture Size; Colour; Secondary / Minor Components. VC VC10_0-0.1 0.9 Clayey SAND with silt, pale grey, shell fragments. W D weak organic odour, organic staining. VC10_0-0.2 - 0.2 - -0.2 VC10_0-0.5 & FD05 - 0.4 -0.4 0.8 VC10 0.5-0.6 0.6 -0.6 VC10_0.5-1 W MD Clayey SAND, fine to medium grained, pale grey. no odour, no staining. VC10_0.7-0.8 0 0 9 Core recovery: 0.80 m Total penetration: 1.3 m Refusal in sediment ⊢ .1 - 1.2 -1.2 - 1.4 -1.4 1.6 -1.6 - 1.8 -1.8 - 2 -2 2.2 -2.2 24 -2.4 - 2.6 -2.6 2.8 -2.8

Notes

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Drilling Abbreviations Moisture Abbreviations Consistency Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, D-Dry, SM-Slightly Moist, Granular Soils VL-Very Cohesive Soils VS-Very DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation M-Moist, VM-Very Moist, Loose, L-Loose, MD-Medium Soft, S-Soft, F-Firm, (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, W-Wet, S-Saturated Dense, D-Dense, VD - Very ST-Stiff, VST-Very Stiff, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore, Dense H-Hard WB-Wash Bore, WS-Window Sampler



ENVIRONMENTAL-SOIL BORE

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Client PANSW Drill Co. Easting 334478 Project Circular Quay Investigation Driller Darren Skene Northing 6252271 Grid MGA94 Project No. 12517046 Rig Type Site Overseas Passenger Terminal Drill Method Vibrocore Elevation -12.87 m AHD Location VC11 Total Depth (m) 1.2 Logged By SE Date Drilled 30/10/2019 Checked By CY Diameter (mm) 100 COMMENTS/ **Drilling Method** CONTAMINANT LITHOLOGICAL DESCRIPTION Elevation (m) Graphic Log Consistency INDICATORS Soil Type (Classification Group Symbol); Particle PID (ppm) Sample ID Depth (m) Odours, staining, waste materials,separate phase liquids, imported fill, ash. Moisture Size; Colour; Secondary / Minor Components. VC VC11_0-0.1 0.6 Clayey SAND, fine to medium grained, grey, increase W MD no odour, no staining. in sand content with depth, trace shells. VC11_0-0.2 - 0.2 - -0.2 VC11_0-0.5 - 0.4 -0.4 0.8 VC11_0.5-0.6 0.6 -0.6 VC11_0.5-0.7 & FD01 VC11_0.5-1 - 0.8 -0.8 -1 1.2 VC11_1.0-1.1 VC11_1-1.2 Core recovery: 1.20 m Total penetration: 3.0 m Target depth acheieved - 1.4 -1.4 1.6 -1.6 - 1.8 -1.8 - 2 -2 2.2 -2.2 24 -2.4 - 2.6 -2.6 2.8 -2.8 Notes

This log is not intended for geotechnical purposes. **Drilling Abbreviations** Moisture Abbreviations Consistency Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, D-Dry, SM-Slightly Moist, Granular Soils VL-Very Cohesive Soils VS-Very DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation M-Moist, VM-Very Moist, Loose, L-Loose, MD-Medium Soft, S-Soft, F-Firm, (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, W-Wet, S-Saturated Dense, D-Dense, VD - Very ST-Stiff, VST-Very Stiff, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore, Dense H-Hard WB-Wash Bore, WS-Window Sampler



ENVIRONMENTAL-SOIL BORE

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Client PANSW Project Circular Quay Investigation Project No. 12517046 Site Overseas Passenger Terminal Location VC12 Date Drilled 31/10/2019 Drill Co. Driller Darren Skene Rig Type Drill Method Vibrocore Total Depth (m) 1.1 Diameter (mm) 100 Easting 334472 Northing 6252092 Grid MGA94 Elevation -12.07 m AHD Logged By SE Checked By CY

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
-	VC	0.8	VC12_0-0.1		Clayey SAND with silt, dark grey, trace shells.	w	MD	weak organic odour, no staining.	-
- - 0.2	0		VC12_0-0.5						-0.2
-					SAND with clay, fine-medium grained, poorly graded, orange-brown mottled red.	W	MD	no odour, minor iron oxide staining.	È
- - 0.4			VC120.3-0.4						-0.4
-									È
- 		0.9	VC120.5-0.6						-0.6
_			VC120.5-1						È
- 0.8					Clayey SAND, fine-medium grained, poorly graded, pale grey.	W	D	no odour, no staining.	-0.8
_			VC120.8-0.9						F
- 1					CLAY, high plasticity, pale grey.	М	ST	no odour, no staining.	L_1
		0.8	VC12_1-1.1						F.
-									- 12
_					Core recovery: 1.20 m Total penetration: 1.36 m				
-					Refusal in residual				
-									E
- 16									E_16
-									-
-									E1.
- 1.0									E -1.8
-									F
- 2									F
-									E
- 2.2 -									F -2.2
-									F
- 2.4									2.4
-									F
- 2.6 -									F -2.6
-									F
- 2.8 -									2.8
-									F

Notes

This log is not intended for geotechnical purposes.

 Drilling Abbreviations
 Moisture Abbreviations
 Consistency Abbreviations

 AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore, WS-Window Sampler
 D-Dry, SM-Slightly Moist, W-Wet, S-Saturated
 Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense
 Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



ENVIRONMENTAL-SOIL BORE

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Client Projec Projec Site C Locat Date I	t PANS ct Circ ct No. Dversea ion VC Drilled	SW ular Qua 1251704 as Passe C13 31/10/2	y Investigation 16 enger Terminal 019	1	Drill Co. Driller Darren Skene Rig Type Drill Method Vibrocore Total Depth (m) 1.1 Diameter (mm) 100	Eastin North Grid Eleva Logg Chec	ng 334 MGA94 Ition -1 ed By ked By	505 52316 4 2.73 m AHD SE CY	
Depth (m)	Drilling Method	PID (ppm)	Sample ID	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
- 0.2	VC	1.0	VC13_0-0.1 VC13_0-0.5 VC13_0.3-0.4		Sandy CLAY, low to medium plasticity, dark grey, trace shells.	W	S	weak organic odour, no staining.	- -
- 0.4 		1.2	VC13_0.5-0.6 & FD09 VC13_0.5-1 VC13_0.7-0.8		Clayey SAND, fine-medium grained, poorly graded, pale grey mottled orange-red, trace rootlets.	м	D	no odour, minor organic staining.	0.4
- - - 1 -		1.1	VC13_1-1.1		Core recovery: 1.10 m				- -
- - - - - - 1.4 -					Total penetration: 1.60 m Refusal in residual				- - - - - - - - - - - - - 1.4
- - 1.6 - - - 1.8 -									- 1.6 - - - 1.8 -
- - 2 - - - 2.2 -									- - - - 2.2
- - 2.4 - - - 2.6 -									- 2.4 - - - 2.6 -
- - 2.8 -									- - 2.8 - -

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



ENVIRONMENTAL-SOIL BORE

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Client PANSW Drill Co. Easting 334528 Project Circular Quay Investigation Driller Darren Skene Northing 6252314 Project No. 12517046 Grid MGA94 **Rig Type** Site Overseas Passenger Terminal Drill Method Vibrocore Elevation -13.18 m AHD Location VC14 Total Depth (m) 1.4 Logged By SE Date Drilled 31/10/2019 Checked By CY Diameter (mm) 100 COMMENTS/ **Drilling Method** CONTAMINANT LITHOLOGICAL DESCRIPTION Elevation (m) Graphic Log Consistency INDICATORS Soil Type (Classification Group Symbol); Particle PID (ppm) Sample ID Depth (m) Odours, staining, waste Moisture Size; Colour; Secondary / Minor Components. materials, separate phase liquids, imported fill, ash. VC VC14_0-0.1 0.9 W Sandy CLAY, low to medium plasticity, dark brown, S weak organic odour, no trace shells staining VC14_0-0.5 0.2 - -0.2 VC14_0.3-0.4 0.4 -0.4 VC14_0.5-0.6 & FD10 1.1 0.6 -0.6 VC14_0.5-1 W MD SAND with clay, medium grained, poorly graded, dark no odour, no staining, grey, trace shells (increase in shell fragments content at 1.1 m). VC14_0.7-0.8 - 0.8 -0.8 .1 0.4 VC14_1-1.1 - 1.2 -1.2 Sandy CLAY, medium to high plasticity, orange-brown М F no odour, minor iron oxide mottled red staining 0.6 VC14_1.3-1.4 14 1.4 Core recovery: 1.40 m Total penetration: 2.43 m Refusal in residual 1.6 -1.6 · 1.8 -1.8 - 2 -2 2.2 -2.2 24 -2.4 -2.6 2.6 2.8 -2.8 Notes

This log is not intended for geotechnical purposes. **Drilling Abbreviations** Moisture Abbreviations Consistency Abbreviations D-Dry, SM-Slightly Moist, Granular Soils VL-Very Cohesive Soils VS-Very AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation M-Moist, VM-Very Moist, Loose, L-Loose, MD-Medium Soft, S-Soft, F-Firm, (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, W-Wet, S-Saturated Dense, D-Dense, VD - Very ST-Stiff, VST-Very Stiff, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, VC-Vibracore, Dense H-Hard WB-Wash Bore, WS-Window Sampler

Appendix C - Analytical results



Appendix C Table C1 Particle size distribution

											Par	ticle Size Anal	ysis							
				% (Cobbles (>6cm)	% Gravel (>2mm)	% Sand (0.06-2.00 mm)	% Silt (2-60 µm)	% Clay (<2 µm)	m125+%	% +150µm	+300µm %	% +425µm	шноод+ %	% +1180µm	% +2.36mm	% +4.75mm	% +9.5mm	% +19.0mm	% +37.5mm	% +75.0mm
EQL				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Location Code	Date	Field ID	Depth																	
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1	<1	<1	72	8	20	70	64	43	26	9	<1	<1	<1	<1	<1	<1	<1
VC02	31/10/2019	VC02_0.0-0.5	0 - 0.5	<1	<1	22	52	26	10	4	2	<1	<1	<1	<1	<1	<1	<1	<1	<1
VC03	30/10/2019	VC03_0.0-0.5	0-0.5	<1	<1	51	12	3/	48	42	27	14	4	<1	<1	<1	<1	<1	<1	<1
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1	<1	<1	80	4	10	80	12	30	10	3	<1	<1	<1	<1	<1	<1	<1
VC08	31/10/2019	VC08_1.0-1.5	1 - 1.5	<1	5	48	9	33	00	35	47	10	3	0 <1	4	 	<1	<1	<1	<1
VC10	31/10/2019	VC10_0.0-0.5	0-05	<1	<1	56	13	32	51	40	10	10	3	<1	<1	<1	<1	<1	<1	<1
VC12	31/10/2019	VC12 0.0-0.5	0 - 0.5	<1	<1	81	4	15	81	75	52	29	10	1	<1	<1	<1	<1	<1	<1
Statistics				-		-		-	-	-	-	-	-							
Number of Results				8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects				0	1	8	8	8	8	8	8	7	7	2	1	1	0	0	0	0
Minimum Concentration	n			<1	<1	22	4	15	10	4	2	<1	<1	<1	<1	<1	<1	<1	<1	<1

Appendix C Table C2

Acid sulphate soils analytical results

					ASS	- Field		ASS - pH	ASS - Acio	dity Trail	ASS -	Potential	ASS	ANC			ASS	- Acid Base	Accountin	Iq		SPOCAS
				PHE	рн-FOX	pHF minus pH-fox	Reaction Rate	PHKC	Titratable Actual Acidity	Titratable Actual Acidity (sulfur units)	Chromium Reducible Sulfur	Chromium Reducible Sulphur (acidity units)	Acid Neutralising Capacity	Acid Neutralising Capacity (acidity units)	s-Net Acidity without ANCE	s-Net Acidity without - ANCE	ANC Fineness Factor	Net Acidity (acidity units)	Net Acidity (sulfur units)	Liming Rate	Liming Rate excluding ANC	Acid Neutralising Capacity (sulfur units)
				pH Units	pH Units	pH Units	-	pH Units	mole H+/t	%S	%S	mole H+/t	% CaCO3	mole H+/t	%S	mole H+/t	-	mole H+/t	%S	kg CaCO3/	t kg CaCO3/1	t %S
EQL	Kata Osila Tashuisal Manual		- \/4.0	0.1	0.1		1	0.1	2	0.02	0.005	10	0.01	10	0.02	10	0.5	10	0.02	1	1	0.01
QLD (2014) Acid Sui	Itate Solis Technical Manual -		s v4.0								0.03	18										
Location Code	Date		Deptn	0.1	60	1 1 0	1 4	0.0	L -0	L <0.02	1 20	746	16.5	2 200	1 20	746	1 4 5	<10	<0.00	1	50	5.00
BH05	20/10/2019	BH05 4.6-4.7	4.6 - 4.7	8.5	6.2	2.3	4	0.0	< <u><</u> <2	<0.02	0.161	101	0.53	1 000	0.16	101	1.5	<10	<0.02		8	3.05
VC01	30/10/2019	VC01_0.0-0.1	0.5-0.6	7.7	5.7	2.3	3	9.0	~2	~0.0Z	0.101	101	9.55	1,900	0.10	101	1.5	×10	<u> ~0.02</u>			- 3.05
	20/10/2019	VC01_0.5-0.0	0.3 - 0.0	7.2	5.2	21	3	0.2	-2	<0.02	0.023	14	0.47	03	0.02	14	1.5	<10	<0.02		1	0.15
1/002	20/10/2019	VC02_0.0_01	0.01	8.8	6.0	2.1	3	9.2	<2	<0.02	0.023	171	1/ 8	2 95	0.02	171	1.5	<10	<0.02	<1	13	4.75
10002	30/10/2019	VC02 0.0-0.1	05.06	8.8	6.3	2.0	3	0.3	~2	~0.0Z	0.214	17.1	14.0	2,300	0.21	1/1	1.5	\$10	~0.02		- 15	4.75
	30/10/2019	VC02_0.5-0.6	0.0 1	7.9	6.3	1.5	3														+	+
	20/10/2019	VC02_0.9-1.0	15 16	7.0	5.0	1.5	3	81	<2	<0.02	0.022	1/	0.76	151	0.02	14	15	<10	<0.02	<1	1	0.24
VC03	30/10/2019	VC03_0.0-0.1	0-01	7.4	6.2	1.0	2	0.1	~2	~0.0Z	0.022	14	0.70	151	0.02	14	1.5	\$10	~0.02		<u>+ '</u>	0.24
10003	30/10/2019	VC03_0.5_0.6	05.06	7.5	5.7	1.7	2														+	
	30/10/2019	VC03 1 0 1 1	1 1 1	7.0	5.1	1.0	3	7.0	-2	<0.02	0.021	13	0.25	50	0.02	13	15	<10	<0.02			0.08
VC04	31/10/2019	VC04_0.0-0.1	0.01	7.4	5.8	17	3	7.0	<2	<0.02	0.021	<10	0.23	86	<0.02	<10	1.5	<10	<0.02	<1		0.00
10004	21/10/2010	VC04_0.010	0.0.1	7.0	5.6	1.7	3	1.2	~2	~0.0Z	0.011	\$10	0.45	00	~0.02	\$10	1.5	\$10	~0.02		+	- 0.14
VC05	20/10/2019	VC05_0.0_0_1	0.9-1	9.3	6.2	2.1	3	0.1	-2	<0.02	0.020	12	0.08	106	0.02	12	1.5	<10	<0.02	-1		0.31
VC05	30/10/2019	VC05_0.5_0.6	0.5 0.6	8.0	6.0	2.1	3	9.1	~2	~0.0Z	0.020	12	0.90	190	0.02	12	1.5	<10	NU.UZ		<u> </u>	0.51
	30/10/2019	VC05_0.9-0.0	0.5 - 0.0	7.4	5.3	21	3	74		<0.02	0.010	<10	0.22	45	<0.02	<10	1.5	<10	<0.02			0.07
VCOC	30/10/2019		0.0-1	0.7	5.0	2.1	2	0.0	<2	<0.02	0.010	201	12.5	2 500	0.02	201	1.5	<10	<0.02	<1	20	0.07
10000	31/10/2019	VC06_0.0-0.1	0-0.1	0.7	5.7	2.0	2	0.9	<u>~</u>	~ 0.02	0.010	301	12.5	2,300	0.01	301	1.5	\$10	~0.02		20	+ *
VC07	20/10/2019	VC07_0.0_01	0.01	8.6	63	2.4	3	0.2	<2	<0.02	0 107	67	28.0	5 590	0.11	67	15	<10	<0.02	<1	5	8.96
10007	30/10/2019	VC07_0.5_0.6	0.5 0.6	8.3	6.2	2.0	3	5.2	~2	~0.02	0.107	07	20.0	3,330	0.11		1.5	\$10	~0.02			0.30
	30/10/2019	VC07_1.0.1.1	1 1 1	7.0	5.0	2.1	3	80	62	<0.02	0.023	1/	1 3/	260	0.02	14	15	<10	<0.02	<1	1	0.43
VC08	31/10/2019	VC08 0.0.01	0.01	8.2	6.3	10	3	0.3	~2	N.02	0.025	14	1.04	203	0.02	14	1.5	\$10	~0.0Z		+ '	0.40
10000	31/10/2019	VC08_0.5_0.6	05.06	8.5	6.4	21	3	92	<2	<0.02	0 295	184	21.2	4 230	0.29	184	15	<10	<0.02	<1	14	6.78
	31/10/2019	VC08 1 0 1 1	1 1 1	7.0	5.0	2.1	3	0.2		10.02	0.200	104	21.2	4,200	0.20	104	1.0	10	40.02			0.70
	31/10/2019	VC08 1 5 1 6	15 16	8.1	6.3	1.8	3	0.0	62	<0.02	0.056	35	1 27	254	0.06	35	15	<10	<0.02	< 1	3	0.11
VC00	30/10/2019	VC09_0.0_0 1	0_01	8.8	6.0	2.4	3	3.0	~2	N.02	0.000		1.27	204	0.00		1.5	\$10	~0.02			0.41
10009	30/10/2019	VC09_0.5-0.6	0.5-0.6	8.0	6.0	2.4	3														+	-
	30/10/2019	VC09_0.0_1.0	0.0 1	8.1	5.6	25	3	80	< <u>-</u> 2	<0.02	0.015	<10	0.77	153	<0.02	<10	15	<10	<0.02	<1		0.24
VC10	31/10/2019	VC10_0_0_0_1	0.9-1	77	6.4	13	3	6.7	<2	<0.02	0.010	12	0.77	60	<0.02	12	1.5	<10	<0.02	<1	1 21	0.24
VCIU	31/10/2019	VC10_0.5.0.6	05.06	7.5	5.8	1.0	3	0.7	~2	~0.0Z	0.013	12	0.00	03	×0.02	12	1.5	\$10	~0.02		<u> </u>	0.11
VC11	30/10/2019	VC11_0_0_0_1	0.01	8.8	6.2	2.6	3	92	<2	<0.02	0 195	121	35.1	7 010	0.19	121	15	<10	<0.02	<1	- a	11.2
	30/10/2019	VC11_0.5-0.6	05-06	8.8	6.4	2.0	3	0.2	- 12	10.02	0.100	121	00.1	7,010	0.10	121	1.0	10	10.02			11.2
	30/10/2019	VC11_1.0-1.1	1 - 1 1	8.9	63	2.4	3	9.2	<2	<0.02	0.286	178	22.1	4 4 1 0	0.29	178	15	<10	<0.02	<1	13	7.07
VC12	31/10/2019	VC12 0 0-0 1	0-01	8.7	6.0	2.0	3	9.1	<2	<0.02	0.087	54	16.4	3 280	0.09	54	1.5	<10	<0.02	<1	4	5.26
1012	31/10/2019	VC12_0.5-0.6	05-06	82	5.9	2.3	3	-		0.02	0.001	0.		0,200	0.00	<u> </u>			0.02	· · ·	+ <u>·</u>	
	31/10/2019	VC12_1.0-1.1	1 - 1 1	7.3	5.6	17	3	1	1												+	1
VC13	31/10/2019	VC13_0.0-0.1	0-01	8.3	6.4	1.9	3		1												+	1
	30/10/2019	VC13 0.5-0.6	05-06	8.2	6.2	2	3	9.0	<2	< 0.02	0.040	25	1.11	222	0.04	25	1.5	<10	<0.02	<1	2	0.36
	30/10/2019	VC13 1.0-1.1	1 - 1.1	7.8	6.3	1.5	3					-										
VC14	31/10/2019	VC14_0.0-0.1	0-01	8.4	6.4	2	3	9.1	<2	< 0.02	0.358	224	48.0	9.590	0.36	224	1.5	<10	<0.02	<1	17	15.4
	31/10/2019	VC14 0.5-0.6	0.5 - 0.6	8.6	6.5	2.1	3							- /							-	
	31/10/2019	VC14 1.0-1.1	1 - 1.1	8.6	6.5	2.1	3														-	
	31/10/2019	VC14 1.3-1.4	1.3 - 1.4	8.1	6.3	1.8	3	8.9	<2	< 0.02	0.030	18	1.65	330	0.03	18	1.5	<10	< 0.02	<1	1	0.53
Statistics		· -		•			•			•							•	•		•		
Number of Posulte				13	13	13	13	22	22	22	22	22	22	22	22	22	22	22	22	22	22	1 22
Number of Detects				43	43	43	43	22	0	0	22	10	22	22	18	10	22	0	0	0	16	- 22
Minimum Concentrat	tion			73	52	35	-+5	67	- 0 - 22	<0.02	0.01	<10	0.22	45	0.02	<10	15	<10	<0.02	- U - 1	1	
Maximum Concentra	ation			80	6.5	1 3	<u> </u>	0.7	12	<0.02	12	7/6	18	9.500	1.02	7/6	1.5	<10	<0.02	21	56	15.07
Linaxiniani Concellua				0.3	0.0	1 1.0	1 7	1 3.2	1 12	1-0.02	1 1.4	1-10	1 70	0,000	1.4	1 140	1 1.0	10	1 10.02			10.4

Circular Quay Investigation Port Authority of NSW

22	22	22	22
0	0	16	22
<0.02	<1	1	0.07
<0.02	<1	56	15.4
0 <0.02 <0.02	0 <1 <1	16 1 56	0.07 15.4

Appendix C Table C3 Wastle Classification - solid waste guidelines analytical results

					1																							Organa	1			
				Cyanides Inorganics Major Ions TOC Metals												Metals				BTEXN												
				- C Juindo		annoo																						inotaio				1
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				anic	istr	anic	o <u>ri</u> c	a	Ē	Ĕ	eni	<u></u>	두	μo	Xa/	alt	l ğ		g	ğ	2	₫ <u></u>	kel	eni	er.	Jad	υ	l fi	ZC	ner	dł	ene
				Š	l ≥	Š	Ē	[] []	Alu	And I	Ars	<u>B</u> er	aŭ (- F	Le e	Ö	l S	2	e e	Mai	Ā	Mol	Nic	Sel	Sil	٧ar	Ξ	L i i	l a	2	댪	1 Ž
				mg/kg	%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				1	0.1	1	40	0.02	50	0.5	1	1	0.1	1	0.5	0.5	1	50	1	10	0.01	2	1	0.1	0.1	2	1	0.0005	0.1	0.1	0.1	0.1
NSW EPA (2014) Ge	eneral Solid Waste CT1 (No	Leaching)				320	3,000				100	20	20	100	100				100		4	100	40	20	100				10	288	600	
NSW EPA (2014) Re	estricted Solid Waste CT2 (N	lo Leaching)				1,280	12,000				400	80	80	400	400				400		16	400	160	80	400				40	1,152	2,400	
Location Code	Date	Field ID	Depth																													
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7	<1	47	<1	160				10	<1	<1		< 0.5				127		1.1	<2	5	<5	<2				<0.2	< 0.5	< 0.5	<0.5
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45	<1	23.7	<1	170	<u> </u>		<u> </u>	6	<1	<1		<0.5			<u> </u>	68		0.2	<2	2	<5	<2				<0.2	<0.5	< 0.5	<0.5
	20/10/2010	BH07_2.5-2.95	2.5 - 2.95		10.2	<1	40	<u> </u>		<u> </u>	< 5				<0.5		<u> </u>	<u> </u>	156		<0.1 1.0	<2	5	<0	<2				<0.2	<0.5	<0.5	
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2		13.8														<5		1.9										<u> </u>	
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0		13.5	<1		0.06	3870	<0.50	<1 00	<u> </u>	<0.1	3		<0.5	<10	1470	14	<10	<0.01		<10	<0.1	<0.1	3.8	<10	<0 0005	<0.2	<0.2	<0.2	<0.2
VC01	30/10/2019	VC01 1.0-1.1	1.0 - 1.1		14.5	<1		0.04	2820	< 0.50	<1.00		<0.1	2.5		< 0.5	<1.0	1020	1.1	<10	< 0.01		<1.0	<0.1	<0.1	2.5	<1.0	0.0000	<0.2	<0.2	<0.2	<0.2
VC02	30/10/2019	VC02 0.0-0.2	0.0 - 0.2		43.8							<u> </u>							223													
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5		49.1	<1		2.82	12200	<0.50	16.1	1	0.5	42		4.2	120	34900	318	88	4.25		10.4	0.6	3	32.6	445	0.0028	<0.2	<0.2	<0.2	<0.2
VC02	31/10/2019	VC02_0.5-0.6	0.5 - 0.6		22.4														66		0.9											
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0		21.4														6													
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2		20.7														13		<0.1											
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5		17.6														8													
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6		13	<1		0.07	8610	<0.50	1.22	L	<0.1	8.9		<0.5	<1.0	5400	3.1	<10	<0.01		1	0.2	<0.1	14.8	1.9		<0.2	<0.2	<0.2	<0.2
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2		20.4			0.45	44000	.0.50	1.1.00		.0.4	40.7		0.5		4000	14		0.05			0.4	.0.4		40.7	.0.0005				
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	_	13.1	<1	40	0.15	11300	< 0.50	<1.00		<0.1	10.7		0.5	<1.0	1290	33.6	<10	0.05		2	0.1	<0.1	5.5	16.7	<0.0005	<0.2	<0.2	< 0.2	<0.2
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4		12.1	<1	40	0.10	11600	<0.50	<1.00	<u> </u>	<0.1	12.5		<0.5	<1.0	1240	13.5	< 10	0.04		1.9	<0.1	0.1	5.1	0.2		<0.2	<0.2	<0.2	<u> <0.2</u>
VC03	30/10/2019	VC03_0.4-0.0	0.4 - 0.0		18.5			<u> </u>									<u> </u>		29												<u> </u>	
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7		19.3														5												<u> </u>	
VC03	30/10/2019	VC03 1.0-1.2	1.0 - 1.2		17.3														<5												<u> </u>	-
VC04	30/10/2019	VC04 0.0-0.1	0.0 - 0.1		24														16		<0.1											
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4		17.1	<1		0.1	14800	<0.50	<1.00		<0.1	13.2		< 0.5	<1.0	2510	28	<10	<0.01		2	0.2	0.1	10.4	3.4		<0.2	<0.2	<0.2	<0.2
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6		15.9														7													
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0		64.3	<1		0.05	14600	<0.50	<1.00		<0.1	12		<0.5	<1.0	3080	4.9	<10	<0.01		1.6	0.1	0.3	8.9	2.3	<0.0005	<0.2	<0.2	<0.2	<0.2
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8		19.2														<5												\square	
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0		20.1							ļ							<5												 '	
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1		23.5			<u> </u>				<u> </u>							56		0.6										 	<u> </u>
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7		17.8			<u> </u>										<u> </u>	<5												──	<u> </u>
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9		14.7	<1	<10	0 11	1150	<0.50	3.22		<01	13		<0.5	<10	3840	5 16	<10	<0.01		<10	<0.1	0.1	15.6	15		<0.2	<0.2	<0.2	-02
VC05	31/10/2019	VC06_0.0-0.1	0.0 - 0.1	<1	4.3	<1	90	2 05	4130	~0.50	18	<1	<1	4.5	<0.5	~ 0.5	1.0	3040	224	<10	34	<2	10	<5	<2	13.0	1.5		<0.2	<0.2	<0.2	<0.2
VC06	31/10/2019	VC06 0.0-0.5	0.0 - 0.5		20			2.00			1.0				-0.0				11		0.1	-2	10	.0					-0.2	-0.0	-0.0	
VC06	31/10/2019	VC06 0.3-0.4	0.3 - 0.4		18.1														8		<0.1											<u> </u>
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6		18.9														11													
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0		21.4														30													
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8		22.1														36													
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9		21.6														18													
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2		1.5	<1	80	1.28	3930	< 0.50	6.28		<0.1	12.5		1.4	38.2	11800	67.7	34	0.84		3	0.2	0.3	11.9	96.6	0.0004	<0.2	<0.2	<0.2	<0.2
VC07	30/10/2019		0.0 - 0.5		31.3	<1		1.05	5550	<0.50	9.04		<0.1	10.0		2.4	189	15600	110	31	1.61		4.4	0.3	1.5	10.2	158	0.0204	<0.2	<0.2	<0.2	<0.2
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4		32.7			<u> </u>											09		<01										├───	<u> </u>
VC07	30/10/2019	VC07_0.5-0.0	0.5 - 1.0	_	22.3			<u> </u>				<u> </u>					<u> </u>	<u> </u>	7		NO.1										<u> </u>	
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.8		20.6														6												<u> </u>	<u> </u>
VC07	30/10/2019	VC07 1.0-1.2	1.0 - 1.2		17.4														198		<0.1											<u> </u>
VC08	31/10/2019	VC08 0.0-0.1	0.0 - 0.1	<1	31.1	<1	120	1.2			14	<1	<1		<0.5				117		1.8	<2	6	<5	<2				<0.2	<0.5	<0.5	< 0.5
VC08	31/10/2019	VC08_0.0-0.5	0.0 - 0.5		36.7														111													
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4		46														216		2.5											
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6		31.3														19												\square	
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0		27.3												<u> </u>	<u> </u>											<u> </u>	<u> </u>	 	<u> </u>
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8		27.1			<u> </u>				 							6										<u> </u>		 	
	31/10/2019		1.0 - 1.1	_	18.6	~1		0.45	7000	20.50	244		101	10.0		<0 F	Z10	2460	14.6	-10	0.05		10	0.2	0.0	21.2	20	<0.0005	-0.0	-0.2	-0.0	1 -0 0
VC08	31/10/2019	VC08_1.0-1.5	13-14	_	18.7	<u>×1</u>		10.15	1220	<u>\.50</u>	3.11		×0.1	10.8		< <u>0.5</u>	<u> </u>	3400	14.0 0	10	0.05		1.2	0.3	0.2	∠1.3	J.2	~0.0005	<u> </u>	<u> ∼∪.∠</u>	<u>~U.2</u>	+~0.2
VC08	31/10/2019	VC08 1 5-1 6	15-16	_	15.4			<u> </u>		<u> </u>							<u> </u>	<u> </u>	11	<u> </u>									<u> </u>	-	t	<u> </u>
VC09	30/10/2019	VC09 0 0-0 2	0.0 - 0.2		34.5	<1		0.08	8120	<0.50	1 74	1	<0.1	10.3		0.8	<10	4720	10.7	20	0.02		1.8	0.2	0.1	15.4	2.9		<0.2	<0.2	<0.2	<0.2
VC09	30/10/2019	VC09 0.0-0.5	0.0 - 0.5		14.5	· ·		1	2.20	0.00	1	1				0.0			<5	<u> </u>					2.1				1		<u> </u>	1
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6		16.3						1	1				1			17										1			1
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0		17.8														22													
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8		17.2														10													

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Appendix C Table C3 Wastle Classification - solid waste guidelines analytical results

				Cyanide	s Inor	ganics	Major lons	тос										Metals										Organo Metals				BTEXN
				Cyanide (WAD)	Moisture (%)	Cyanide (Total)	Fluoride	Total Organic Carbon	Aluminium	Antimony	Arsenic	Beryllium	Cadmium	Chromium (III+VI)	Chromium (hexavalent)	Cobalt	Copper	lron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Vanadium	Zinc	Tributyltin (as Sn)	Benzene	Toluene	Ethylbenzene	Xylene (o)
				mg/kg	%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	g mg/kg	g mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0		15.6														5													
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2		19.4														29		0.1											
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5		15.4	<1		0.06	9760	< 0.50	<1.00		<0.1	6.9		<0.5	<1.0	1360	4.6	<10	<0.01		1.3	0.1	<0.1	6.3	2.1	<0.0005	<0.2	<0.2	<0.2	<0.2
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6		20.4														9													
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8		18.8	<1		0.12	14600	<0.50	<1.00		<0.1	11.9		<0.5	<1.0	1230	24.5	<10	0.01		2	<0.1	<0.1	4.7	4.2		<0.2	<0.2	<0.2	<0.2
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2		28.6														55		0.8											
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5		28.4														5													
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7		28.4	<1	150	0.53	6760	<0.50	8.73		<0.1	12.2		1.4	3.2	17800	7	28	0.03		4.3	0.4	0.4	13.6	14		<0.2	<0.2	<0.2	<0.2
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0		29														9													
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2		27.7														6													
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5		24.2	<1		0.34	4790	<0.50	2.2		<0.1	6		< 0.5	4.5	4290	10.6	<10	0.12		<1.0	<0.1	0.2	13.5	14.4	0.0069	<0.2	<0.2	<0.2	<0.2
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4		19.3														<5													
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6		19.6														<5													
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9		16.6														<5												\square	
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1	<1	19.9	<1	80	0.13			<5	<1	<1		< 0.5				42		<0.1	<2	4	<5	<2				<0.2	<0.5	< 0.5	<0.5
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1	<1	32.2	<1	180	1.45			13	<1	<1		< 0.5				154		2.2	<2	7	<5	<2				<0.2	<0.5	<0.5	<0.5
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5		30														84												\square	
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4		30.5														18		0.3										\square	
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6		15.4														6												\square	
VC13	31/10/2019	VC13 0.5-1.0	0.5 - 1.0		15														9												\square	
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8		14.8														16													
VC13	31/10/2019	VC13 1.0-1.1	1.0 - 1.1		13.6														7												\square	
VC14	31/10/2019	VC14 0.0-0.1	0.0 - 0.1		35.7												1	1	57		0.7											
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5		38					1	1	1					1	1	14													
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4		34														20												\square	
VC14	31/10/2019	VC14 0.5-1.0	0.5 - 1.0		31.7														6													
VC14	31/10/2019	VC14 0.7-0.8	0.7 - 0.8		26.1					1	1	1	1		1		1	1	<5		<0.1											
VC14	31/10/2019	VC14 1.0-1.1	1.0 - 1.1	<1	24.9	<1	70	0.29			9	<1	<1		< 0.5				<5		<0.1	<2	3	<5	<2				<0.2	<0.5	< 0.5	< 0.5
VC14	31/10/2019	VC14 1.3-1.4	1.3 - 1.4		17.9														8												\square	
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6		30.8														6												\square	
Statistics			·				•			•	•	•				•	•	•	•									•				
Number of Results					8 90	25	12	2 22	17	7 17	25	5 8	2	5 17	7	8 17	17	/ 17	90	17	40	8	25	25	25	17	17	8	25	25	25	25
Number of Detects					0 90	0	1	1 22	17	/ () 15	5 0		1 17	7	0 6	5 5	5 17	77	5	24	0	21	11	11	17	15	3	0	0	0	0
Minimum Concentration				<	1 1.5	<1	<4(0.04	2820) <0.5	5 <1.0) <1	<0.1	1 2.5	5 <0.	5 < 0.5	5 <1.0	1020	1.1	<10	<0.01	<2	<1.0	<0.1	<0.1	2.5	<1.0	< 0.0005	< 0.2	<0.2	<0.2	<0.2
Maximum Concentration				<	1 64.3	<1	180	2.82	14800) <0.5	5 18	3 <1	<	1 42	2 <0.	5 4.2	189	34900	318	88	4.25	<2	10.4	0.6	3	32.6	445	0.0204	<0.2	<0.5	<0.5	<0.5

Appendix C

Table C3

Wastle Classification - solid waste guidelines analytical results

														TRH	H - NEPN	M 2013	- SG						TRH	I - NEPN	N 1999 -	SG						
									TRH	- NEPM	2013				Clea	anup			TRH	- NEPM	1999			Clea	anup							
				ylene (m & p)	ylene Total	TEX (Sum of Total) - ab Calc	1 (C6-C10 minus TEX)	6-C10 Fraction	2 (>C10-C16 minus aphthalene)	C10-C16 Fraction	3 (>C16-C34 raction)	4 (>C34-C40 raction)	C10-C40 (Sum of otal)	C10-C16 SG Cleanup	C16-C34 SG Cleanup	C34-C40 SG Cleanup	C10-C40 (sum) SG leanup	6-C9 Fraction	10-C14 Fraction	15-C28 Fraction	29-C36 Fraction	10-C36 (Sum of otal)	10-C14 SG Cleanup	15-C28 SG Cleanup	29-C36 SG Cleanup	10-C36 (sum) SG leanup	um of polycyclic romatic hydrocarbons	enzo(e)pyrene	cenaphthene	cenaphthylene	nthracene	enz(a)anthracene
				× mg/kg				O ma/ka		Λ ma/ka					Λ ma/ka	Λ ma/ka		U ma/ka	O ma/ka	O ma/ka			O ma/ka	U ma/ka	U ma/ka		<u>ທີສ</u>	<u>n</u> ma/ka	<u>ح</u> ma/ka	₹ ma/ka	 ma/ka	ma/ka
EQL				0.2	0.3	0.2	3	3	3	3	3	5	3	50	100	100	50	3	3	3	5	3	50	100	100	50	0.5	0.004	0.004	0.004	0.004	0.004
NSW EPA (2014) Gen	eral Solid Waste CT1 (No L	_eaching)			1,000													650				10,000				10,000						
NSW EPA (2014) Rest	tricted Solid Waste CT2 (No	o Leaching)			4,000													2,600				40,000				40,000						
Location Code	Date	Field ID	Depth	<0 F				<10						<50	220	<100	200	<10					<50	220	140	260	20.0		<0 F	0.5	0.6	
BH05 BH06	7/11/2019	BH05_4.6-4.7 BH06_1.2-1.45	4.0 - 4.7	<0.5	+	-		<10						<50	320	170	1020	<10					<50	220	400	360	30.9 9.1		< 0.5	0.5 <0.5	0.0 <0.5	2.4
BH07	7/11/2019	BH07 2.5-2.95	2.5 - 2.95	<0.5	+			<10						<50	<100	<100	<50	<10					<50	<100	<100	<50	< 0.5		< 0.5	< 0.5	< 0.5	<0.5
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																								13		<0.5	<0.5	<0.5	1.2
VC01	30/10/2019	VC01_0.4-0.6	0.4 - 0.6																								<0.5		<0.5	<0.5	<0.5	<0.5
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	< 0.2	<0.5	< 0.2	<3.0	<3	<3	<3	<3	<5	<3					<3	<3	<3	<5	<3						< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1	<0.2	<0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3				<u> </u>	<3	<3	<3	<5	<3					177	<0.004	<0.004	< 0.004	<0.004	< 0.004
VC02	31/10/2019	VC02_0.0-0.5	0.0-0.5	<0.2	<0.5	<0.2	<3.0	<3	4	4	78	28	110					<3	<3	48	46	94					17.7	0.631	0.044	0.297	0.286	1.5
VC02	31/10/2019	VC02 0.5-0.6	0.5 - 0.6		10.0	10.2	10.0				10	20						-~		10	10	01					1	0.001	< 0.5	< 0.5	< 0.5	1.5
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																								<0.5		<0.5	<0.5	<0.5	<0.5
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																								<0.5		<0.5	<0.5	<0.5	<0.5
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5		10.5	10.0	12.0	2	-12	2	2							2				-0					<0.5	10.004	< 0.5	< 0.5	< 0.5	< 0.5
	30/10/2019	VC02_1.5-1.6	1.5 - 1.0	<0.2	<0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3				<u> </u>	<3	<3	<3	<5	<3					<0.5	<0.004	<0.004	<0.004	<0.004	0.005
VC03	30/10/2019	VC03_0.0-0.5	0.0-0.5	<0.2	<0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3					<3	<3	<3	<5	<3					NU.3	<0.004	<0.04	<0.04	<0.04	<0.04
VC03	30/10/2019	VC03 0.3-0.4	0.3 - 0.4	<0.2	<0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3					<3	<3	<3	<5	<3						< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6																								<0.5		<0.5	<0.5	<0.5	<0.5
VC03	30/10/2019	VC03_0.5-1.0	0.4 - 1.0																								<0.5		<0.5	<0.5	<0.5	<0.5
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7	_	<u> </u>																						< 0.5		< 0.5	< 0.5	< 0.5	< 0.5
	30/10/2019	VC04_0.0-0.1	1.0 - 1.2																								<0.5		<0.5	<0.5	<0.5	<0.5
VC04	30/10/2019	VC04_0.0-0.1	0.0-0.1	<0.2	<0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3					<3	<3	<3	<5	<3					NU.3	<0.004	<0.04	<0.04	<0.04	<0.04
VC04	31/10/2019	VC04 0.5-0.6	0.5 - 0.6			0.2	0.0	Ŭ	Ŭ	- Ŭ	<u> </u>	Ť	Ť					Ť		Ŭ	Ŭ						<0.5	0.001	< 0.5	< 0.5	< 0.5	<0.5
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.2	<0.5	<0.2	<3.0	<3	<3	<3	4	<5	4					<3	<3	5	<5	5						<0.005	< 0.005	<0.005	<0.005	<0.005
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																								<0.5		<0.5	<0.5	<0.5	<0.5
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0																								< 0.5		< 0.5	< 0.5	< 0.5	<0.5
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1		+						<u> </u>						<u> </u>										<0.5		< 0.5	< 0.5	< 0.5	< 0.5
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9		+																						< 0.5		< 0.5	< 0.5	< 0.5	<0.5
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	<0.2	< 0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3					<3	<3	<3	<5	<3						< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1	<0.5				<10						<50	610	190	800	<10					<50	350	370	720	14		<0.5	<0.5	<0.5	1
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5		<u> </u>																						< 0.5		< 0.5	< 0.5	< 0.5	< 0.5
	31/10/2019	VC06_0.3-0.4	0.3 - 0.4	_													<u> </u>										< 0.5		< 0.5	< 0.5	<0.5	<0.5
VC00	31/10/2019	VC06_0.5-1.0	0.5 - 1.0	_	+								<u> </u>														< 0.5		< 0.5	< 0.5	< 0.5	<0.5
VC06	31/10/2019	VC06 0.7-0.8	0.7 - 0.8		+																						< 0.5		< 0.5	< 0.5	< 0.5	< 0.5
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9																								<0.5		<0.5	<0.5	<0.5	<0.5
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2	<0.2	< 0.5	<0.2	<3.0	<3	4	4	122	49	175					<3	<3	68	79	147]]		0.307	< 0.025	0.132	0.103	0.417
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.2	<0.5	<0.2	<3.0	<3	1	7	176	69	252				<u> </u>	<3	<3	101	111	212					3.6	0.373	< 0.025	0.202	0.116	0.542
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4		+																						<0.5		<0.5	<0.5	<0.5 <0.5	<0.5
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0																								< 0.5		< 0.5	< 0.5	< 0.5	<0.5
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.8																								<0.5		<0.5	<0.5	<0.5	<0.5
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2																								<0.5		<0.5	<0.5	<0.5	<0.5
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1	< 0.5				<10						<50	190	<100	190	<10					<50	110	110	220	5.9		< 0.5	< 0.5	< 0.5	0.6
	31/10/2019	VC08_0.0-0.5	0.0 - 0.5								<u> </u>		<u> </u>														2.8		< 0.5	< 0.5	<0.5	<0.5
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6		-																						<0.5		<0.5	<0.5	<0.5	<0.5
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0		1	1																					<0.5		< 0.5	< 0.5	< 0.5	<0.5
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																								<0.5		<0.5	<0.5	<0.5	<0.5
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1																								<0.5		<0.5	<0.5	<0.5	<0.5
	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.2	<0.5	<0.2	<3.0	<3	<3	<3	66	48	114					<3	<3	18	70	88					<0 F	<0.004	< 0.004	< 0.004	< 0.004	0.006
VC08	31/10/2019	VC00_1.3-1.4	1.5 - 1.4		+												<u> </u>	+									<0.5		<0.5 <0.5	<0.5	<0.5 <0.5	>0.0 <0.5
VC09	30/10/2019	VC09 0.0-0.2	0.0 - 0.2	< 0.2	<0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3					<3	<3	<3	<5	<3					-0.0	<0.004	< 0.004	< 0.004	< 0.004	<0.004
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5																								<0.5		< 0.5	< 0.5	< 0.5	< 0.5
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6																								<0.5		<0.5	<0.5	<0.5	<0.5
	30/10/2019	VC09_0.5-1.0	0.5 - 1.0	_																							< 0.5		< 0.5	< 0.5	< 0.5	< 0.5
VC09	30/10/2019	10009_0.7-0.8	JU.7 - U.8		1																						<0.5		<0.5	<0.5	<0.5	<0.5

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Circular Quay Investigation

Port Authority of NSW

Appendix C Table C3

Wastle Classification - solid waste guidelines analytical results

														TR	RH - NEF	PM 2013	3 - SG						TR	H - NEP	M 1999	- SG						
									TRH	- NEPM	M 2013				Cle	eanup			TR	H - NEPN	/ 1999			Cle	anup							
						- (1			s					dnu	dnu	dnu	0						dn	dn	dn		suo					
				Xylene (m & p)	Xylene Total	BTEX (Sum of Tota Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minu Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	>C10-C16 SG Clea	>C16-C34 SG Clea	>C34-C40 SG Clea	>C10-C40 (sum) S0 Cleanup	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	C10-C14 SG Clean	C15-C28 SG Clean	C29-C36 SG Clean	C10-C36 (sum) SG Cleanup	Sum of polycyclic aromatic hydrocarb	Benzo(e)pyrene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene
				mg/kę	g mg/kg	g mg/kg	mg/kg	mg/kg	g mg/kg	mg/kg	g mg/kg	mg/kg	g mg/kg	mg/kg	g mg/k	g mg/k	g mg/k	g mg/kg	g mg/k	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0																								<0.5		<0.5	<0.5	< 0.5	< 0.5
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2																								<0.5		<0.5	< 0.5	< 0.5	< 0.5
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	< 0.2	< 0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3					<3	<3	<3	<5	<3						<0.004	< 0.004	<0.004	< 0.004	< 0.004
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6																								<0.5		<0.5	<0.5	< 0.5	<0.5
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8	< 0.2	< 0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3					<3	<3	<3	<5	<3						0.006	< 0.004	<0.004	< 0.004	0.012
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2																								< 0.5		<0.5	<0.5	< 0.5	< 0.5
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5																								<0.5		<0.5	<0.5	< 0.5	< 0.5
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7	< 0.2	< 0.5	<0.2	<3.0	<3	<3	<3	6	<5	6					<3	<3	4	<5	4						<0.004	< 0.004	<0.004	< 0.004	< 0.004
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0																								< 0.5		<0.5	< 0.5	< 0.5	< 0.5
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2																								<0.5		<0.5	<0.5	< 0.5	< 0.5
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	< 0.2	< 0.5	<0.2	<3.0	<3	<12	<12	185	72	257					<3	<6	109	112	221						0.117	<0.004	0.06	0.037	0.147
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4																								< 0.5		<0.5	<0.5	< 0.5	< 0.5
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6																								<0.5		<0.5	<0.5	<0.5	<0.5
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																								<0.5		<0.5	<0.5	< 0.5	<0.5
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1	< 0.5				<10						<50	<100) <100) <50	<10					<50	<100	<100	<50	<0.5		<0.5	<0.5	<0.5	<0.5
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1	< 0.5				<10						<50	160	<100	160	<10					<50	<100	100	100	6.9		<0.5	<0.5	<0.5	0.7
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5																								10.2		<0.5	<0.5	<0.5	1
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4																								4.4		<0.5	<0.5	<0.5	0.5
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6																								<0.5		<0.5	<0.5	<0.5	<0.5
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0																								<0.5		<0.5	<0.5	<0.5	<0.5
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8																								< 0.5		<0.5	<0.5	<0.5	<0.5
VC13	31/10/2019	VC13 1.0-1.1	1.0 - 1.1																								< 0.5		<0.5	< 0.5	< 0.5	< 0.5
VC14	31/10/2019	VC14 0.0-0.1	0.0 - 0.1																								< 0.5		<0.5	< 0.5	< 0.5	< 0.5
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5							1	1			1					1		1			1		1	< 0.5		<0.5	<0.5	<0.5	< 0.5
VC14	31/10/2019	VC14 0.3-0.4	0.3 - 0.4																								< 0.5		<0.5	< 0.5	< 0.5	< 0.5
VC14	31/10/2019	VC14 0.5-1.0	0.5 - 1.0																								< 0.5		<0.5	< 0.5	< 0.5	< 0.5
VC14	31/10/2019	VC14 0.7-0.8	0.7 - 0.8							1	1			1					1					1		1	< 0.5		<0.5	< 0.5	< 0.5	< 0.5
VC14	31/10/2019	VC14 1.0-1.1	1.0 - 1.1	< 0.5				<10						<50	<100) <100) <50	<10					<50	<100	<100	<50	< 0.5		<0.5	< 0.5	< 0.5	< 0.5
VC14	31/10/2019	VC14 1.3-1.4	1.3 - 1.4																								< 0.5		<0.5	< 0.5	< 0.5	< 0.5
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																								<0.5		<0.5	<0.5	<0.5	<0.5
Statistics																																
Number of Results				2	5 17	7 17	17	25	5 17	/ 17	7 17	/ 17	7 17	7 8	8	8	8	8 25	5 1	17 17	17	17	8	8	8	8	73	17	90	90	90	90
Number of Detects						0 0	Ó		0 3	3	3 7	7 5	5 7	/ (0	5	2	5 0		0 7	5	7	0	4	5	5	14	5	1	5	F	18
Minimum Concentration				<0.	2 <0.5	5 < 0.2	<3.0	<	3 <3	3 <	3 <3	3 <	5 <3	3 <50	0 <10	0 <10	0 <5	0 <3	3 <	<3 <3	<	<3	<50	<100	<100	<50	< 0.5	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Maximum Concentration	ı			<0.	5 < 0.5	5 < 0.2	<3.0	<10	0 <12	2 <12	2 185	5 72	2 257	/ <50	0 85	0 19	0 102	0 <10	> <	6 109	112	221	<50	560	400	960	30.9	0.631	0.044	0.5	3.0	2.4
L													-															• • •				<u> </u>

Circular Quay Investigation

Port Authority of NSW

Appendix C

Table C3

Wastle Classification - solid waste guidelines analytical results

									PAH	s																		Phenols	3	
				zo(b+j+k)fluoranth	zo(a) pyrene	zo[b+j]fluoranthene	zo(k)fluoranthene	zo(g,h,i)perylene	sene	nz(a,h)anthracene	ranthene	nthalene	rene	no(1,2,3- yrrene	anthrene	це	s (Sum of total) - calc	I 8 PAHs (as BaP)(zero LOR) - Lab	I 8 PAHs (as BaP)(half LOR) - Lab	I 8 PAHs (as BaP)(full LOR) - Lab	Methylphenol (m,p- ol)	b-trichlorophenol	3-trichlorophenol	dichlorophenol	dimethylphenol	dichlorophenol	lorophenol	sthylnaphthalene	sthylphenol	rophenol
				Benz	Benz	Benz	Benz	Benz	Chry	Dibe	Fluo	Napl	Fluo	lnde c,d)p	Pher	Pyre	PAH Lab	Tota TEQ Calc	Tota TEQ Calc	Tota TEQ Calc	3,4-h cres	2,4,5	2,4,6	2,4-0	2,4-0	2,6-0	2-ch	2-me	2-me	2-nit
EQL				mg/kg	mg/kg 0.004	mg/kg 0.004	mg/kg 0.004	mg/kg 0.004	mg/kg 0.004	mg/kg 0.004	mg/kg 0.004	mg/kg 0.005	mg/kg 0.004	mg/kg 0.004	mg/kg 0.004	mg/kg 0.004	mg/kg 0.004	mg/kg 0.5	mg/kg 0.5	mg/kg 0.5	mg/kg 0.4	mg/kg 0.5	mg/kg 0.5	mg/kg 0.5	mg/kg 0.5	mg/kg 0.5	mg/kg 0.5	mg/kg 0.005	mg/kg 0.2	mg/kg 0.5
NSW EPA (2014) Gene	eral Solid Waste CT1 (No I	Leaching)			0.8												200					8,000	40						4,000	
113W EFA (2014) Nest	licted Solid Waste CT2 (N	io Leaching)			5.2												000					32,000	100						10,000	
Location Code	Date	Field ID	Depth		1	12	17	1.0	22	<0.5	10	<0.5	<0.5	15	11	57	1	5	53	55	<u>_1</u>	<0.5	<0.5						<0.5	
BH06	7/11/2019	BH05_4.0-4.7 BH06_1.2-1.45	1.2 - 1.45		1.1	4.2	0.7	0.8	0.7	<0.5	1.4	<0.5	< 0.5	0.6	<0.5	1.6		1.5	1.7	2	<1	<0.5	< 0.5						<0.5	
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95		< 0.5	<0.5	< 0.5	<0.5	<0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5		<0.5	0.6	1.2	<1	<0.5	<0.5						<0.5	
VC01	30/10/2019	VC01_0.4-0.6	0.4 - 0.6		< 0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.7	<0.5		<0.5	0.6	1.2										+
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<1	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.5	0.6	1.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.005	< 0.5	< 0.5
VC01 VC02	30/10/2019	VC01_1.0-1.1	0.0 - 0.2		1.9	2.7	0.9	1.6	1.5	< 0.004	2.6	<0.005	< 0.004	1.2	0.9	2.9	<0.004	2.6	2.8	3.1	~1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.5	<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5		1.57	1.49	0.661	1	0.997	0.219	1.89	< 0.2	0.095	0.963	0.885	1.78	14.8	-0.5		4.0	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.044	<0.5	<0.5
VC02 VC02	31/10/2019	VC02_0.5-0.6	0.5 - 0.6		1.9	0.8 <0.5	1.1	1.1	<05	1.9	<0.5	<0.5	<0.5 <0.5	< 0.5	<0.5	<0.5		<0.5	0.6	1.2									'	
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	< 0.5		< 0.5	0.6	1.2										
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5	_	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.039	< 0.5	0.6	1.2	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.5	<0.5
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2		< 0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	<0.5	0.000	<0.5	0.6	1.2		-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.000	-0.0	
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5		< 0.004	<0.004	< 0.004	<0.004	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004				<1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.005	< 0.5	< 0.5
VC03	30/10/2019	VC03_0.4-0.6	0.3 - 0.4		< 0.004	<0.004	< 0.004	<0.004	<0.004	<0.004	< 0.004	<0.005	< 0.004	< 0.004	<0.004	< 0.004	~0.004	<0.5	0.6	1.2		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.5	<0.5
VC03	30/10/2019	VC03_0.5-1.0	0.4 - 1.0		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	0.6	1.2										
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7	_	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5		<0.5	0.6	1.2									'	
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1		< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5		< 0.5	0.6	1.2										
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	-0.5		10	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	< 0.5	<0.5
VC04 VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6	<1	<0.5	<0.5	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.5	<0.005	<0.5	<0.5	< 0.005	<0.5	0.6	1.2	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	< 0.005	<0.6	<0.6
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8		< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	<0.5	< 0.5		< 0.5	0.6	1.2										
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0	_	< 0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	<0.5		< 0.5	0.6	1.2									 '	
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.7	<0.5	<0.5	< 0.5	<0.5	<0.5		<0.5	0.6	1.2									'	
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		<0.5	0.6	1.2					<u> </u>					
VC05 VC06	30/10/2019	VC05_0.8-0.9	0.8 - 0.9		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	2.3	<0.005	<0.004	<0.004	<0.004	2 6	<0.004	23	2.5	28	<1 <1	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.5	<0.5
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5		< 0.5	<0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5		< 0.5	0.6	1.2		0.0	0.0						0.0	
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	<u> </u>	< 0.5	0.6	1.2									'	
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<u> </u>	<0.5	0.6	1.2									·'	
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	<0.5	< 0.5		<0.5	0.6	1.2										
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9	_	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5.72	< 0.5	0.6	1.2	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.025	<0.5	<0.5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	1	0.872	0.799	0.375	0.663	0.7	0.127	1.5	0.06	0.041	0.517	0.7	1.5	7.5	1	1.3	1.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.025	< 0.5	< 0.5
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4		0.7	0.7	< 0.5	< 0.5	< 0.5	< 0.5	1	< 0.5	< 0.5	< 0.5	<0.5	1.2	<u> </u>	0.8	1.1	1.4									'	
VC07 VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6	_	< 0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	<0.5	<u> </u>	<0.5	0.6	1.2									·'	
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.8		< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	0.6	1.2										
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2	_	< 0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	<0.5		<0.5	0.6	1.2	<1	<0.5	<0.5						<0.5	
VC08	31/10/2019	VC08_0.0-0.5	0.0 - 0.5		0.6	0.7	< 0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	0.8		0.7	1.4	1.3		×0.0	-0.0						-0.0	
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4		3	3	1.3	1.1	2	< 0.5	4.6	< 0.5	< 0.5	0.9	2.7	5		3.8	4	4.2										
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	<0.5	-	<0.5	0.6	1.2									·'	+
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	0.6	1.2										
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1	-1	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	0.070	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5	<0 F	<0.005	<0.5	<0.5
VC08	31/10/2019	VC08_1.3-1.4	1.3 - 1.4		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.004	<0.5	<0.005	< 0.5	< 0.5	<0.5	<0.5	0.019	< 0.5	0.6	1.2	-0.0	-0.0	~0.0	~0.0	-0.0	-0.0	~0.0	-0.005	-0.0	-0.0
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		<0.5	0.6	1.2		-0.5	-0.5	-0	-0.5		-0.5	10.007		
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.005	<0.004	<0.004	<0.004	<0.004	<0.004	<0.5	0.6	1.2	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.5	<0.5
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6		< 0.5	<0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5		< 0.5	0.6	1.2										
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0	_	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5		<0.5	0.6	1.2				└──┤					<u> </u> '	┨──┤
	00/10/2010	1,000_0.1-0.0	10.1 0.0		1 .0.0	1 .0.0	10.0	1 .0.0	1 .0.0	1 .0.0	1 .0.0	1 .0.0	.0.0	.0.0	1 .0.0	1 .0.0	1	-0.0	1 0.0	1 1.4		1						1		

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Appendix C

Table C3

Wastle Classification - solid waste guidelines analytical results

									PAH	s																		Phenols	3	
				Benzo(b+j+k)fluoranth ene	Benzo(a) pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Vaphthalene	Fluorene	ndeno(1,2,3- c,d)pyrene	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(half LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc	3,4-Methylphenol (m,p- cresol)	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,6-dichlorophenol	2-chlorophenol	2-methylnaphthalene	2-methylphenol	2-nitrophenol
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0		<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.6	1.2										
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2		<0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	< 0.5	<0.5	< 0.5		<0.5	0.6	1.2										
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	<0.005	< 0.004	< 0.004	< 0.004	< 0.004	<0.004				<1	< 0.5	<0.5	<0.5	< 0.5	<0.5	< 0.5	<0.005	< 0.5	<0.5
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6		< 0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.5	< 0.5	<0.5	< 0.5		<0.5	0.6	1.2				<u> </u>				<u> </u>		<u> </u>
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8		0.013	0.01	0.007	0.008	0.008	< 0.004	0.016	< 0.005	< 0.004	0.008	0.008	0.017	0.113				<1	< 0.5	<0.5	<0.5	< 0.5	<0.5	< 0.5	<0.005	< 0.5	<0.5
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	0.6	1.2				<u> </u>			L	 '		
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5	_	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5		< 0.5	0.6	1.2	<u> </u>			'						L
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	<0.004				<1	< 0.5	< 0.5	<0.5	< 0.5	<0.5	< 0.5	<0.005	<0.5	< 0.5
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0	_	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5		< 0.5	0.6	1.2	L	L		<u> </u>				 '		
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	<0.5	< 0.5		< 0.5	0.6	1.2	L			<u> </u>			<u> </u>	L		<u> </u>
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<1	0.255	0.226	0.116	0.197	0.122	0.04	0.201	0.01	0.008	0.155	0.096	0.217	2.18	< 0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.005	<0.5	<0.5
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4		< 0.5	< 0.5	< 0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	< 0.5	<0.5	<0.5		< 0.5	0.6	1.2	 	ļ		<u> </u>			<u> </u>	 '	+	──
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6		< 0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	0.6	1.2	ļ	ļ		<u> </u>			 '	 '	+	└───
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9		< 0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	0.6	1.2	<u> </u>			<u> </u>			<u> </u>	 '		──
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1		< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	0.6	1.2	<1	<0.5	<0.5	<u> </u>			<u> </u>	<u> </u>	<0.5	
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1		1	1.1	<0.5	0.6	0.6	<0.5	1.4	<0.5	<0.5	<0.5	<0.5	1.5		1.2	1.5	1.8	<1	<0.5	< 0.5	<u> </u>				 '	<0.5	
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5	_	1	1.2	0.5	0.7	0.9	<0.5	2	<0.5	<0.5	<0.5	0.8	2.1		1.3	1.6	1.8	L			'				 '	+	
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4	_	0.7	0.8	<0.5	0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	1		0.8	1.1	1.4	L			<u> </u>			<u> </u>	 '	\rightarrow	
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6	_	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.6	1.2	L			<u> </u>			<u> </u>	 '	+	──
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0		< 0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.6	1.2	 			<u> </u> '			<u> </u>	 '	+	──
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.0	1.2	 			<u> </u>			<u> </u>	 '	+	──
VC13	31/10/2019		1.0 - 1.1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.0	1.2				<u> </u> '			<u> </u>	 '	+	──
VC14	31/10/2019	VC14_0.0-0.1	0.0 - 0.1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.0	1.2				 '			<u> </u>	 '	──┤	──
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.0	1.2				 '	<u> </u>		<u> </u>	 '	+	──
VC14	31/10/2019	VC14_0.3-0.4	0.5 - 0.4	_	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.0	1.2	<u> </u>			<u> </u>			<u> </u>	 '	+	
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0	_	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.0	1.2	<u> </u>			<u> </u> '			<u> </u>	 	+	──
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.0		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.0	1.2	- 1	<0.5	<0.5	<u> </u>			<u> </u>	 '	<0.5	
VC14	21/10/2019	VC14_1.0-1.1	1.0 - 1.1	_	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.0	1.2		NU.5	NU.5	<u> </u>		-	<u> </u>	 '	NO.5	
VC14	21/10/2019	VC14_1.3-1.4	0.5 0.6		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	0.0	1.2				<u> </u>	<u> </u>		<u> </u>	<u> </u>	──┤	<u> </u>
10014	31/10/2019	VC 14-0.5-0.0	0.5 - 0.6		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5		<0.5	0.0	1.2		1					<u> </u>	<u> </u>	<u> </u>	I
Statistics				5		00			00	00	00	00	00			00	17	70	79	79	25	25	25	17	17	17	7 17	17	25	17
Number of Detects				1	20	10	12	3 16	16	5	20	30	30	2 10	12	21	7	10	70	70		0 23	23						20	
Minimum Concentration	1			<1	<0.004	<0.004		1 <0 004		<0.004	<0.004		<0.004	$\frac{12}{1} < 0.004$	<	< 0.004	<0.004	<0.5		12		<0.5	<0.5		<0.5		1 <0 5	<0.005	<0.5	<0.5
Maximum Concentration	n			1	10.004	4 2 2	1 7	7 1 9	22	1 0	10.004	0.004	0.004	1 4	27	5 7	14 8	-0.0	5 3	55	0.0	<0.5	<0.0		<0.0	<0.0	1 <0.5	0.000	<0.5	<0.0
				'	4	4.2	. I. <i>I</i>	1.0	<u> </u>	1.9	4.9	1 0.00	0.090	<u></u>	<u>'</u> <u>2.</u> /	JJ.1	1 14.0	1 3	1 0.0	1 0.0	<u>'</u>	<u> </u>	~0.0	0.0	<u>~0.0</u>	, \0.0	1 -0.0	0.044	-0.3	-0.0

Appendix C

Table C3

Wastle Classification - solid waste guidelines analytical results

																							VO	6									
				0	Τ		1			Ð	e		1		1	e	ue L			5				03								<u> </u>	
				Lene					e	Jzen	ban	e	ene	Q	⊊	lou	etha			etha			ż					e	e	۵		0	ē
				anth	_	e	hen		thar	oper	opro	thai	enz	ĺΞ	B	enta	L mo		fide	L DC		ene	-oro	Jane		e e	ene	sthai	luer	zene	ene	zene	then
				loho	eno	- Du	bro		oroe	Jor	Jor	moe	prob	ue (e e	-2- 5-	l la	ε	isul	Lon	ane	rope	ichle	neth	ane	nze	enz	Droe	ylto	pen	ethe	jen;	roet
				thyle	- dd	phe	gchle	-	chlo	friol	trici	pro	ch c	ano	ano	l Ţ Ź	odic	ofor	p u d	odik	oeth	3- orop	e-D	L L	neth	ylbe	d yd	gchle	prop	utyl	oro	lty	chlo
				- Per	eth.	cetc	ente	hen	-1- 1-d	5,3	5,3	2-d	b G	-prt	l ê	JIBI	Lom	Lom	arbo	Plo	hlor L	s-1, ichld	s-1, uter	ibro	dor	prt	- bro	ents	-isol		rich	rt-b	etra
				ෆ් ma/ka	1 ma/ka	₹ 1 ma/ka	ma/ka	 ma/ka	, ´ ma/ka	 ma/ka	 ma/ka	 	l ∈ [°] 1 ma/ka	na/ka	ma/ka	 4 ⊆ 1 ma/ka	ma/ka	ma/ka	U ma/ka	Ο φ ma/ka	U ma/ka	<u>.</u> ⊆.≙ wa∖ka	<u>'ਹ ਠ</u> ma/ka	 ma/ka	<u>o</u> ma/ka	<u> </u>	<u> </u>	<u>n</u> ma/ka	<u>d</u> ma/ka	წ ma/ka	⊢ ma/ka	<u>₽</u> ma/kc	i ma/ka
EQL				0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	5	5	5	0.5	0.5	0.5	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW EPA (2014) Gene	eral Solid Waste CT1 (No L	Leaching)												4,000																	10		14
113W EFA (2014) Nesu		o Leaching)												10,000																	40		50
Location Code	Date	Field ID	Depth																														
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7		<0.5		<2	<0.5						<5																	< 0.5	─	< 0.5
BH07	7/11/2019	BH00_1.2-1.45 BH07_2.5-2.95	2.5 - 2.95		<0.5		<2	<0.5					+	<5				<u> </u>													< 0.5	<u> </u>	< 0.5
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																														
VC01	30/10/2019	VC01_0.4-0.6	0.4 - 0.6	<0.5	<0.5	<0.5	1	<0.5					<0.5																			─	+
VC01	30/10/2019	VC01_0.3-1.0	1.0 - 1.1	0.5	<0.5	0.5	<2	<0.5							+																	<u> </u>	+
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2																														
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5		<0.5		<2	<0.5																								 	
VC02	30/10/2019	VC02_0.5-0.0	0.5 - 1.0		+								+							<u> </u>												<u> </u>	+
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																														
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5		<0.5		-2	<0.5																								 	+
VC02 VC03	30/10/2019	VC02_1.5-1.0	0.0 - 0.2		- ~0.5		<u>~</u>	0.5					+							<u> </u>												<u> </u>	+
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5		< 0.5		<2	<0.5																									
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4	_	<0.5		<2	<0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	<5	<5	<5	< 0.5	< 0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 1.0	+											+																	<u> </u>	+
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																														
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2												<u> </u>		<u> </u>			<u> </u>												—	┥──┤
VC04 VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4	+	<0.5		<2	< 0.5							+																	<u> </u>	+
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6																														
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.6	<0.6	<0.6	<1	<0.6					<0.6		<u> </u>		<u> </u>			<u> </u>												—	┥──┤
VC04 VC04	31/10/2019	VC04_0.7-0.8	0.9 - 1.0	+		+									+																	<u> </u>	+
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1																														
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																													<u> </u>	+
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9		< 0.5		<2	<0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	<5	<5	<5	< 0.5	< 0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1		<0.5		<2	<0.5						<5																	<0.5		<0.5
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5																														+
VC06	31/10/2019	VC06 0.5-0.6	0.5 - 0.6		1								1							1												<u> </u>	+ +
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																														
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8																													<u> </u>	+
VC07	30/10/2019	VC07 0.0-0.2	0.0 - 0.2		< 0.5		<2	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<5	<5	<5	< 0.5	< 0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.5	<0.5	<0.5	<1	<0.5					<0.5																				
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4		-										<u> </u>																	—	+
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0		+																											<u> </u>	+
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.8																														
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2		<0.5		<2	<0.5						<5	<u> </u>																<0.5	—	<0.5
VC08	31/10/2019	VC08_0.0-0.5	0.0 - 0.5		1 10.0		<u>~</u>	10.0																							~0.0	<u> </u>	0.0
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4																														
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6	-																												<u> </u>	+
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																														
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1																													<u> </u>	\square
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.5	<0.5	<0.5	<1	<0.5					<0.5													<u> </u>						──	╂───┦
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6																														
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2		<0.5		<2	<0.5																								<u> </u>	
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5																						<u> </u>	<u> </u>		<u> </u>				<u> </u>	╂───┦
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0																														
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8																														

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Circular Quay Investigation Port Authority of NSW

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Appendix C

Table C3

Wastle Classification - solid waste guidelines analytical results

																							VC	Cs
				3-methylcholanthrene	4-chloro-3- methylphenol	Acetophenone	Pentachlorophenol	Phenol	1,1-dichloroethane	1,2,3-trichlorobenzene	1,2,3-trichloropropane	1,2-dibromoethane	1,3-dichlorobenzene	2-butanone (MEK)	2-hexanone (MBK)	4-methyl-2-pentanone (MIBK)	Bromodichloromethane	Bromoform	Carbon disulfide	Chlorodibromomethan e	Chloroethane	cis-1,3- dichloropropene	cis-1,4-Dichloro-2- butene	
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	/ m
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0																					
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2																					
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5		<0.5		<2	<0.5																
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6																					
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8		<0.5		<2	< 0.5																
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2																					
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5																					
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7		<0.5		<2	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<5	<5	<5	< 0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0																					
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2																					
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	< 0.5	<0.5	<0.5	<1	<0.5					<0.5											
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4																					
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6																					
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																					
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1		<0.5		<2	< 0.5						<5										
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1		<0.5		<2	< 0.5						<5										
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5																					
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4																					
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6																					
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0																					
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8																					
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1																					
VC14	31/10/2019	VC14_0.0-0.1	0.0 - 0.1																					
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5																					
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4																					
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0																					
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8																					
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1		<0.5		<2	<0.5						<5										
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4																					
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																					
Statistics Number of Results				5	25	5	25	25	4	4	4	4	9	12	4	4	4	4	4	4	4	4	4	1
Number of Detects				0	0	0	0 0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	١T
Minimum Concentra	ation			<0.5	< 0.5	< 0.5	<1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<5	<5	<5	< 0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	، از
Maximum Concentra	ation			<0.6	<0.6	<0.6	<2	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	<0.6	<5	<5	<5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	، از
					-	-	-	-	-	-	-	-			-		-	-						-

Dibromomethane	lodomethane	n-butylbenzene	n-propylbenzene	Pentachloroethane	p-isopropyltoluene	sec-butylbenzene	Trichloroethene	tert-butylbenzene	Tetrachloroethene
g/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
:0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
							<0.5		<0.5
							< 0.5		< 0.5
							<0.5		<0.5

4	4	4	4	4	4	4	12	4	12
0	0	0	0	0	0	0	0	0	0
<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Appendix C

Table C3

Wastle Classification - solid waste guidelines analytical results

																										SVOCs	5					
				trans-1,3- dichloropropene	trans-1,2- dichloroethene	trans-1,4-Dichloro-2- butene	Trichlorofluoromethane	Vinyl acetate	1-naphthylamine	2-(acetylamino) fluorene	2-nitroaniline	3,3-Dichlorobenzidine	3-nitroaniline	4-(dimethylamino) azobenzene	4-bromophenyl phenyl ether	4-chloroaniline	4-chlorophenyl phenyl ether	4-nitroaniline	4-Nitroquinoline-N- oxide	5-nitro-o-toluidine	7,12- dimethylbenz(a)anthra cene	Aniline	Azobenzene	Bis(2-chloroethoxy) methane	Bis(2-chloroethyl)ether	Carbazole	Chlorobenzilate	Coronene	Hexachlorocyclopentad iene	Hexachloroethane	Hexachloropropene	lsophorone
501				mg/k	g mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL NSW FPA (2014) Ge	eneral Solid Waste CT1 (No	Leaching)		0.5	0.5	0.5	5	5	0.5	0.5	1	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.005	2.5	0.5	0.5	0.5
NSW EPA (2014) Re	stricted Solid Waste CT2 (I	No Leaching)																														
Location Code	Date	Field ID	Denth		-	-	-					-	-		-																	
BH05	7/11/2019	BH05 4.6-4.7	4.6 - 4.7																													
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45																													
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95																									<u> </u>	<u> </u>	 '		
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2										<u> </u>	<u> </u>		<u> </u>												<u> </u>	<u> </u>	 '	<u> </u>	
VC01	30/10/2019	VC01_0.4-0.6	0.4 - 0.6	_				<u> </u>	<0.5	<0.5	<10	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.005	<25	<0.5	<0.5	<0.5
VC01	30/10/2019	VC01_0.5-1.0	10-11	+	+	+			<0.5	<0.5	<1.0	<0.5	1 < 1.0	NO.5	<0.5	VU.5	~ 0.5	<0.5	<0.5	<0.5	NU.5	<0.5	~1	<0.5	<0.5	<0.5	<0.5	<0.005		<0.5		<0.5
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2	+	+	+							<u> </u>	<u> </u>		<u> </u>	<u> </u>											-0.000	<u> </u>	<u> </u>	<u> </u>	
VC02	31/10/2019	VC02 0.0-0.5	0.0 - 0.5	1	1								1	1			1											0.375		<u> </u>	<u> </u>	
VC02	31/10/2019	VC02_0.5-0.6	0.5 - 0.6																													
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																													
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2	_																								L	/	L		
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5					<u> </u>			<u> </u>		<u> </u>	<u> </u>		<u> </u>												10.005	<u> </u>	 '		<u> </u>
	30/10/2019	VC02_1.5-1.6	1.5 - 1.6					<u> </u>			<u> </u>			<u> </u>		<u> </u>	<u> </u>											<0.005	'	<u> </u>		
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2	+	+	+								<u> </u>														<0.005	<u>'</u>	├───		╂───┦
VC03	30/10/2019	VC03_0.3-0.4	0.0-0.0	<0.5	<0.5	<0.5	<5	<5					<u> </u>															<0.005	<u></u>	<u> </u>	<u> </u>	<u>├</u> ──┤
VC03	30/10/2019	VC03 0.4-0.6	0.4 - 0.6	+	-	-								<u> </u>		<u> </u>														<u> </u>	<u> </u>	
VC03	30/10/2019	VC03_0.5-1.0	0.4 - 1.0																													
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																													
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2																									L	/			
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1											<u> </u>														0.005	<u> </u>	 '	<u> </u>	\vdash
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4													I												<0.005	 '	 '	 	┥
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6	<u> </u>				<u> </u>	<0.6	<0.6	<10	<0.6	<10	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<1	<0.6	<0.6	<0.6	<0.6	<0.005	<25	<0.6	<0.6	<0.6
VC04	31/10/2019	VC04_0.3-1.0	0.7 - 0.8					<u> </u>	~0.0	<0.0	1.0	~0.0	1.0	~0.0	~0.0	~0.0	~0.0	<0.0	<0.0	<0.0	\U.U	<0.0	~1	<0.0	\U.U	<0.0	<0.0	<0.003	-2.5	~0.0		<0.0
VC04	31/10/2019	VC04 0.9-1.0	0.9 - 1.0	-																								<u> </u>	<u> </u>	<u> </u>		
VC05	30/10/2019	VC05 0.0-0.1	0.0 - 0.1										1																			
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																													
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																													
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	< 0.5	< 0.5	< 0.5	<5	<5																				<0.005	<u> </u>	 '		
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1										<u> </u>															 	'	 '	<u> </u>	
	31/10/2019	VC06_0.0-0.5	0.0 - 0.5					<u> </u>			<u> </u>			<u> </u>		<u> </u>												<u> </u>		──		
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6					<u> </u>			<u> </u>					<u> </u>												<u> </u>	'	<u> </u>		
VC06	31/10/2019	VC06 0.5-1.0	0.5 - 1.0	+	+	-								<u> </u>		<u> </u>												<u> </u>	<u> </u>	<u> </u>	<u> </u>	
VC06	31/10/2019	VC06 0.7-0.8	0.7 - 0.8																											<u> </u>		
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9																													
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2	< 0.5	< 0.5	< 0.5	<5	<5																				0.256				
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5						< 0.5	<0.5	<1.0	<0.5	<1.0	<0.5	< 0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	0.25	<2.5	<0.5	<0.5	<0.5
	30/10/2019	VC07_0.2-0.4	0.2 - 0.4	+	+																							<u> </u>	 '	 '		+
	30/10/2019	VC07_0.5-0.6	0.5 - 0.6					<u> </u>			<u> </u>			<u> </u>		<u> </u>	<u> </u>											<u> </u>	<u> </u>	 		
VC07	30/10/2019	VC07_0.3-1.0	0.7 - 0.8					<u> </u>			<u> </u>			<u> </u>		<u> </u>	<u> </u>											<u> </u>	<u> </u> '	<u> </u>		
VC07	30/10/2019	VC07 1.0-1.2	1.0 - 1.2	-																								<u> </u>	<u> </u>	<u> </u>	<u> </u>	
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1																													
VC08	31/10/2019	VC08_0.0-0.5	0.0 - 0.5																													
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4																										′			
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6																									 	<u> </u>	 '	<u> </u>	\vdash
	31/10/2019		0.5 - 1.0	+				<u> </u>	I		<u> </u>		<u> </u>	I														<u> </u>	 '	 	 	╂───┦
VC08	31/10/2019		10-11	+	+			<u> </u>			<u> </u>					<u> </u>												<u> </u>	<u>+'</u>	<u> </u>	<u> </u>	┨───┤
VC08	31/10/2019	VC08 1 0-1 5	10-15						<0.5	<0.5	<10	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5	<0.5
VC08	31/10/2019	VC08 1.3-1.4	1.3 - 1.4	1	1	1	1					1.0.0	1	1	-0.0	1				0.0	-0.0		- 1		0.0		0.0	0.000			1.0.0	
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6																													
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2																									<0.005				
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5																									\vdash		\square		
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6											 	l	 	 											 	──′	 	 	\vdash
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0				I		I					I		I	 							⊢ −				┢────	+ '	 	+	┥──┤
v C U B	30/10/2019	IACOATO:4	10.7 - 0.0		1	1	1	1	1	I	1	1	1	1	1	1	1							ı		ı		1	1	1	1	

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Appendix C

Table C3

Wastle Classification - solid waste guidelines analytical results

				trans-1,3- dichloropropene	trans-1,2- dichloroethene	trans-1,4-Dichloro-2- butene	Trichlorofluoromethane	Vinyl acetate	1-naphthylamine	2-(acetylamino) fluorene	2-nitroaniline	3, 3-Dichlorobenzidine	3-nitroaniline	4-(dimethylamino) azobenzene	4-bromophenyl phenyl ether	4-chloroaniline	4-chlorophenyl phenyl ether	4-nitroaniline	4-Nitroquinoline-N- oxide	5-nitro-o-toluidine	7,12- dimethylbenz(a)anthra cene	Aniline	Azobenzene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0																			\square	
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2																				
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5																				
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6																				
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8																				
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2																				
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5																				
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7	<0.5	<0.5	<0.5	<5	<5															
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0																				
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2																				
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5						< 0.5	< 0.5	<1.0	< 0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	< 0.5	<1
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4																				
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6																				
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																				
VC12	31/10/2019	VC12 1.0-1.1	1.0 - 1.1																				
VC13	31/10/2019	VC13 0.0-0.1	0.0 - 0.1																				
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5					1															
VC13	31/10/2019	VC13 0.3-0.4	0.3 - 0.4																				
VC13	31/10/2019	VC13 0.5-0.6	0.5 - 0.6				1	1															
VC13	31/10/2019	VC13 0.5-1.0	0.5 - 1.0		1		1	1		1													
VC13	31/10/2019	VC13 0.7-0.8	0.7 - 0.8																				
VC13	31/10/2019	VC13 1.0-1.1	1.0 - 1.1																			-+	
VC14	31/10/2019	VC14 0.0-0.1	0.0 - 0.1																				
VC14	31/10/2019	VC14 0.0-0.5	0.0 - 0.5																				
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4																				
VC14	31/10/2019	VC14 0.5-1.0	0.5 - 1.0																				
VC14	31/10/2019	VC14 0.7-0.8	0.7 - 0.8																				
VC14	31/10/2019	VC14 1.0-1.1	1.0 - 1.1	+	1			1														-+	
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4	+			<u> </u>															-+	
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6	+																		-+	
Statistics Number of Results			•	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Number of Detects					0 0	0		0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration				<0.5	< 0.5	< 0.5	<5	5 <5	< 0.5	< 0.5	<1.0	< 0.5	<1.0	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	<1
Maximum Concentration				<0.5	<u> </u>	< 0.5	<5	5 <5	<0.6	<0.6	<1.0	<0.6	<1.0	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<1

		SVOC	6					
Bis(2-chloroethoxy) methane	Bis(2-chloroethyl)ether	Carbazole	Chlorobenzilate	Coronene	Hexachlorocyclopentad iene	Hexachloroethane	Hexachloropropene	lsophorone
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
				10.005				
				<0.005				
				<0.005				
				<0.005				
<05	<0.5	<0.5	<0.5	0 126	<25	<0.5	<0.5	<0.5
-0.0	~0.5	×0.5	×0.5	0.120	~2.5	×0.5	~0.5	<0.5

5	5	5	5	17	5	5	5	5
0	0	0	0	4	0	0	0	0
<0.5	<0.5	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5	<0.5
<0.6	<0.6	<0.6	<0.6	0.375	<2.5	<0.6	<0.6	<0.6

Appendix C

Table C3

Wastle Classification - solid waste guidelines analytical results

				lethapyrilene	-nitrosodiethylamine	-nitrosodi-n- utylamine	-nitrosodi-n- ropylamine	- litrosomethylethylamin	-nitrosomorpholine	l-nitrosopiperidine	l-nitrosopyrrolidine	entachlorobenzene	erylene	henacetin	rganochlorine esticides EPAVic	other organochlorine esticides EPAVic	,4-DDE	BHC	Idrin	ldrin + Dieldrin	-BHC	hlordane	:hlordane (cis)	hlordane (trans)	-BHC	,4 DDD	4 DDT	DT+DDE+DDD - Lab
				≥ mg/kg	Z mg/kg	mg/kg	mg/kg	<u>ZZ</u> mg/kg	z mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	g mg/kg	mg/kg	mg/kg	rg/kg	 mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	 mg/kg	mg/kg	mg/kg
EQL	maral Calid Wasts CT1 (Na	Loophing)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.004	0.5	0.1	0.1	0.0005	0.0005	0.0005	0.05	0.0005	0.00025	0.00025	0.00025	0.0005	0.0005	0.0005	0.0005
NSW EPA (2014) Ge NSW EPA (2014) Re	stricted Solid Waste CT2 (N	Vo Leaching)																										
	·		_																									
Location Code	Date	Field ID	Depth		1			1				1	1		-	-	<0.05	<0.05	<0.05	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
BH05 BH06	7/11/2019	BH05_4.0-4.7 BH06_1.2-1.45	1.2 - 1.45	-							-					-	<0.05	< 0.05	<0.05		< 0.05	< 0.05	<0.05	< 0.05	< 0.05	< 0.05	<0.2	+
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95														< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	<0.05	<0.05	< 0.05	<0.2	
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																									
VC01	30/10/2019	VC01_0.4-0.6	0.4 - 0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.004	<0.5			<0.00050	<0.00050	<0.00050	<0.5	<0.00050	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	1 <0.00050
VC01	30/10/2019	VC01_0.0-1.0	1.0 - 1.1		- 10.0	~0.0		0.0	~0.5	~0.5	1 1.0	1 40.0	< 0.004	~0.0	+	+	< 0.00050	< 0.00050	< 0.00050	~0.5	< 0.00050	<0.00025	<0.00025	<0.00025	< 0.00050	< 0.00050	< 0.00050) <0.00050
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2																									
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5										0.329				<0.00050	<0.00050	<0.00050		<0.00050	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	< 0.00050
VC02	31/10/2019	VC02_0.5-0.6	0.5 - 0.6	_							<u> </u>	_															<u> </u>	
VC02	30/10/2019	VC02_0.5-1.0	10-12	-	+																						<u> </u>	+
VC02	30/10/2019	VC02 1.0-1.5	1.0 - 1.5																								<u> </u>	+
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6										< 0.004				<0.00050	<0.00050	<0.00050		<0.00050	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	/ <0.00050
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2	_	 							I			 											0.00050		
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	-									< 0.004				< 0.00050	<0.00050	<0.00050		<0.00050	<0.00025	<0.00025	<0.00025	< 0.00050	< 0.00050	< 0.00050	<0.00050
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6		+		<u> </u>		<u> </u>		+	<u> </u>	1 10.004		+	+	1 <0.00030	~0.00030	<0.00000		<0.00030	1 40.00020	1 <0.00020	<0.00020	<0.00000	~0.00000	1 40.000000	~0.00030
VC03	30/10/2019	VC03_0.5-1.0	0.4 - 1.0																									
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																									
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2									 			 												 	
VC04 VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1	-	<u> </u>							<u> </u>	<0.004		-	-	<0.00050	<0 00050	<0.00050		<0.00050	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050) <0.00050
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6	1	1						1	1										0.00020	0.00020	0.00020	0.00000	0.00000		
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<1.0	<0.6	< 0.005	<0.6			<0.00050	<0.00050	<0.00050	<0.5	<0.00050	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8									<u> </u>			<u> </u>		L										<u> </u>	
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0		+						-					+											<u> </u>	+
VC05	30/10/2019	VC05 0.5-0.7	0.5 - 0.7		<u> </u>							<u> </u>			-	-											<u> </u>	+
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																									
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	_									< 0.004				<0.00050	< 0.00050	< 0.00050		< 0.00050	<0.00025	<0.00025	< 0.00025	< 0.00050	< 0.00050	<0.00050	/ <0.00050
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1	_					<u> </u>								<0.05	< 0.05	<0.05		< 0.05	< 0.05	<0.05	<0.05	<0.05	< 0.05	<0.2	
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4	-	+							<u> </u>				-											<u> </u>	+
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																									
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																									
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8			<u> </u>	<u> </u>	<u> </u>		<u> </u>	<u> </u>		<u> </u>		<u> </u>												 	
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9				-				-		0 136			+	<0.00050	<0.00050	<0.00050		<0.00050	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050) <0.00050
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	< 0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	0.174	<0.5	<u> </u>	1	< 0.00050	< 0.00050	< 0.00050	<0.5	< 0.00050	<0.00025	<0.00025	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4																									
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6	_							<u> </u>	I	ļ		 		ļ										<u> </u>	
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0	_					<u> </u>																		<u> </u>	
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2		+							<u> </u>															<u> </u>	+
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1														<0.05	<0.05	< 0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	
VC08	31/10/2019	VC08_0.0-0.5	0.0 - 0.5																								L	
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4																								<u> </u>	
VC08	31/10/2019	VC08_0.5-0.0	0.5 - 1.0	-		<u> </u>	<u> </u>		<u> </u>	<u> </u>	-		-		-	+	-					-	-					+
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8		1							1																+
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1																									
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	< 0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<1.0	<0.5	< 0.004	<0.5			< 0.00050	< 0.00050	< 0.00050	<0.5	<0.00050	< 0.00025	< 0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050
VC08	31/10/2019	VC08_1.3-1.4	1.5 - 1.4			<u> </u>	<u> </u>			<u> </u>																	<u> </u>	+
VC09	30/10/2019	VC09 0.0-0.2	0.0 - 0.2	-									< 0.004			1	< 0.00050	< 0.00050	< 0.00050		< 0.00050	< 0.00025	<0.00025	<0.00025	<0.00050	< 0.00050	< 0.00050	<0.00050
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5																									
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6														ļ										<u> </u>	
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0			<u> </u>										-											<u> </u>	+
	00/10/2013	1.000_0.1-0.0	0.0 - 0.0		-		L				1	1				1				I								

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Appendix C Table C3

Wastle Classification - solid waste guidelines analytical results

			Methapyrilene	N-nitrosodiethylamine	N-nitrosodi-n- butylamine	N-nitrosodi-n- propylamine	N- Nitrosomethylethylamin e	N-nitrosomorpholine	N-nitrosopiperidine	N-nitrosopyrrolidine	Pentachlorobenzene	Perylene	Phenacetin	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	1
30/10/2019	VC09_0.8-1.0	0.8 - 1.0																			
31/10/2019	VC10_0.0-0.2	0.0 - 0.2																			\square
31/10/2019	VC10_0.0-0.5	0.0 - 0.5										< 0.004				< 0.00050	< 0.00050	< 0.00050		< 0.00050	<0
31/10/2019	VC10_0.5-0.6	0.5 - 0.6																			\square
30/10/2019	VC10_0.7-0.8	0.7 - 0.8										< 0.004				< 0.00050	< 0.00050	< 0.00050		< 0.00050	<(
30/10/2019	VC11_0.0-0.2	0.0 - 0.2																			\square
30/10/2019	VC11_0.0-0.5	0.0 - 0.5																			\square
30/10/2019	VC11_0.5-0.7	0.5 - 0.7										< 0.004				< 0.00050	< 0.00050	< 0.00050		< 0.00050	<(
30/10/2019	VC11_0.5-1.0	0.5 - 1.0																			\square
30/10/2019	VC11_1.0-1.2	1.0 - 1.2																			\square
31/10/2019	VC12_0.0-0.5	0.0 - 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<1.0	< 0.5	0.055	< 0.5			< 0.00050	< 0.00050	< 0.00050	< 0.5	< 0.00050	<0
31/10/2019	VC12_0.3-0.4	0.3 - 0.4																			\square
31/10/2019	VC12_0.5-0.6	0.5 - 0.6																			\square
31/10/2019	VC12_0.8-0.9	0.8 - 0.9																			\square
31/10/2019	VC12_1.0-1.1	1.0 - 1.1														< 0.05	< 0.05	< 0.05		< 0.05	—
31/10/2019	VC13_0.0-0.1	0.0 - 0.1														< 0.05	< 0.05	< 0.05		< 0.05	· ·
31/10/2019	VC13_0.0-0.5	0.0 - 0.5																			\square
31/10/2019	VC13_0.3-0.4	0.3 - 0.4																			\square
31/10/2019	VC13_0.5-0.6	0.5 - 0.6																			\square
31/10/2019	VC13 0.5-1.0	0.5 - 1.0																			
31/10/2019	VC13_0.7-0.8	0.7 - 0.8																			\square
31/10/2019	VC13_1.0-1.1	1.0 - 1.1																			\square
31/10/2019	VC14_0.0-0.1	0.0 - 0.1																			\square
31/10/2019	VC14_0.0-0.5	0.0 - 0.5																			\square
31/10/2019	VC14_0.3-0.4	0.3 - 0.4																			\square
31/10/2019	VC14_0.5-1.0	0.5 - 1.0																			\square
31/10/2019	VC14 0.7-0.8	0.7 - 0.8				1		1	1	1	1	1			1			1	1		
31/10/2019	VC14_1.0-1.1	1.0 - 1.1													1	< 0.05	< 0.05	< 0.05		< 0.05	· ·
31/10/2019	VC14_1.3-1.4	1.3 - 1.4																			\square
31/10/2019	VC14-0.5-0.6	0.5 - 0.6																			
		·					•		-				-		-	•	-	•			
				-	-	-	-		-	-	-	1 47	-				1			1	
			5	1 5	1 5	y 5	5	y 5	5	1 5	5	1/	5	0	0	25	25	25	5	25	←

 Statistics

 Number of Results
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Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	4,4 DDD	4,4 DDT	DDT+DDE+DDD - Lab Calc
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050
00005	-0.00005	-0.00005	-0.00050	10 00050	-0.00050	-0.00050
J.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050
00025	<0 00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050
	0.00020	0.00020	0.00000	0.00000	0.00000	0.00000
0.00025	<0.00025	< 0.00025	< 0.00050	< 0.00050	< 0.00050	<0.00050
.0.05	.0.05	-0.05	-0.05	.0.05	.0.0	
< 0.05	<0.05	<0.05	< 0.05	< 0.05	<0.2	
<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	
<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	
5.00	0.00	0.00	0.00	0.00	0.2	

25	25	25	25	25	25	17
0	0	0	0	0	0	0
0.00025	< 0.00025	< 0.00025	< 0.0005	<0.0005	<0.0005	<0.0005
<0.05	< 0.05	< 0.05	<0.05	<0.05	<0.2	<0.0005

Appendix C Table C3 Wastle Classification - solid waste guidelines analytical results

	OC Pestic	cides																						
	Dieldrin	Endosulfan	Endosulfan I (alpha)	Endosulfan II (beta)	Endosulfan Sulfate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Oxychlordane	Toxaphene	Tokuthion	Azinphos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorfenvinphos E	Chlorpyrifos	Chlorpyrifos-methyl
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.00025	0.0005	0.0005	0.0005	0.0005	0.0005	1	0.2	0.01	0.2	0.01	0.01	0.2	0.01	0.01	0.01
NSW EPA (2014) General Solid Waste CT1 (No Leaching)		60																					4	
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)		240																					16	

Location Code	Date	Field ID	Depth																							
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05										< 0.05	
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	<0.05	< 0.05										< 0.05	
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95	< 0.05		<0.05	<0.05	< 0.05	<0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05										< 0.05	
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																							
VC01	30/10/2019	VC01_0.4-0.6	0.4 - 0.6																							
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050		<0.01		< 0.01 <	:0.01	<0.5	<0.0100	<0.01	< 0.01
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050		< 0.01		< 0.01 <	0.01		< 0.0100	<0.01	< 0.01
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2																							
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00050		< 0.01		< 0.01 <	:0.01		<0.0100	< 0.01	< 0.01
VC02	31/10/2019	VC02_0.5-0.6	0.5 - 0.6																							
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																							
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																							
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5																							
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050		< 0.01		< 0.01 <	0.01		< 0.0100	<0.01	< 0.01
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2																							
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00050	-	< 0.01		< 0.01 <	:0.01		<0.0100	< 0.01	< 0.01
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050		< 0.01		< 0.01 <	:0.01		< 0.0100	<0.01	< 0.01
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6																							
VC03	30/10/2019	VC03_0.5-1.0	0.4 - 1.0																							
VC03	30/10/2019	VC03 0.6-0.7	0.6 - 0.7																							
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2																							
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1																							
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050		< 0.01		< 0.01 <	:0.01		<0.0100	< 0.01	< 0.01
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6																							
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00050		< 0.01		< 0.01 <	:0.01	<0.6	<0.0100	< 0.01	< 0.01
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																							
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0																							
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1																							
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																							
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																							
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00050	-	< 0.01		< 0.01 <	:0.01		<0.0100	< 0.01	< 0.01
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1	< 0.05		<0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	<0.05	< 0.05										< 0.05	
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5																							
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4																							
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																							
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																							
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8																							
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9																							
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050		<0.01		< 0.01 <	:0.01		<0.0100	<0.01	< 0.01
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00025	< 0.00050	<0.00050	< 0.00050	<0.00050	< 0.00050		<0.01		< 0.01 <	:0.01	<0.5	<0.0100	<0.01	< 0.01
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4																							
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6																							
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0																						/	
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.8																							
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2																							
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1	<0.05		<0.05	<0.05	< 0.05	<0.05	< 0.05		< 0.05	< 0.05	<0.05	< 0.05										<0.05	
VC08	31/10/2019	VC08_0.0-0.5	0.0 - 0.5																						/	
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4																			$ \rightarrow $				
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6																			\rightarrow				
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0																			$ \rightarrow $				
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																			$ \rightarrow $				
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1																$ \rightarrow $			$ \rightarrow $]	
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.00050	<0.00050	<0.00050	< 0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	[.]	<0.01		<0.01 <	0.01	<0.5	<0.0100	<0.01	<0.01
VC08	31/10/2019	VC08_1.3-1.4	1.3 - 1.4																$ \longrightarrow $			$ \longrightarrow $]	
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6]	
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	< 0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		<0.01		<0.01 <	0.01	'	<0.0100	<0.01	<0.01
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5																$ \longrightarrow $			$ \longrightarrow $]	
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6																\longrightarrow			$ \rightarrow $]	\vdash
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0	ļ														\longrightarrow	\longrightarrow	\longrightarrow	\longrightarrow	\rightarrow	\longrightarrow]	I
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8																							

Appendix C Table C3 Wastle Classification - solid waste guidelines analytical results

				OC Pesti	cides											. <u> </u>	·	
				Dieldrin	Endosulfan	Endosulfan I (alpha)	Endosulfan II (beta)	Endosulfan Sulfate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Oxychlordane	Toxaphene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0											ļ'	Ļ	<u> </u>		
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2											ļ'	L	_		—
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	< 0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6															
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00050	i i
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2															1
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5															i —
VC11	30/10/2019	VC11 0.5-0.7	0.5 - 0.7	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	
VC11	30/10/2019	VC11 0.5-1.0	0.5 - 1.0										1			1		
VC11	30/10/2019	VC11 1.0-1.2	1.0 - 1.2										1			1		
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025	<0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4															
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6									1	1		1	+	++	<u> </u>
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9									l			<u> </u>	+	++	<u> </u>
VC12	31/10/2019	VC12_1.0-1.1	10-11	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	+	++	
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1	<0.00		<0.00	<0.00	<0.00	<0.00	<0.00		<0.00	<0.00	<0.00	<0.00		++	
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5	~0.05		~0.05	~0.05	~0.00	~0.00	~0.00		~0.00	~0.00	0.00	~0.05	+	++	
VC13	31/10/2019	VC13_0.3_0.4	0.0 - 0.5									<u> </u>		├ ────′	<u> </u>	+	++	<u> </u>
VC13	21/10/2019	VC12_0.5-0.4	0.5 - 0.4											├ ────′	I	+	───┦	<u> </u>
VC13	21/10/2019	VC13_0.5-0.0	0.5 - 0.0											'	<u> </u>	+	──┤	
	31/10/2019	VC13_0.5-1.0	0.5 - 1.0											ļ'	───	<u> </u>	───┦	<u> </u>
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8									l		 '	───	───	──┤	<u> </u>
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1									l		Į′	───		──┤	<u> </u>
VC14	31/10/2019	VC14_0.0-0.1	0.0 - 0.1									l		Į′	───		──┤	<u> </u>
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5											ļ'			───┦	—
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4											ļ'		<u> </u>	\downarrow	
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0												<u> </u>		\downarrow	
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8												L	<u> </u>		
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	_		
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4															
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6															i
Statistics																		
Number of Result	te			25	17	25	25	25	25	25	17	25	25	25	25	17	17	<u> </u>
Number of Detect	10 to			20	17	20	25	20	20	20		20	20	20	20			,
Minimum Concern	15																	<u> </u>
Maximum Concen	ntration			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005				<u> </u>	<0.0005	<0.0005		<u> </u>
Iviaximum Concer	ntration			< 0.05	< 0.0005	< 0.05	<0.05	<0.05	<0.05	<0.05	<0.0005	<0.05	<u> </u>	<0.05	<0.05	<0.0005	<0.0005	i

Circular Quay Investigation Port Authority of NSW

	Tokuthion	Azinphos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorfenvinphos E	Chlorpyrifos	Chlorpyrifos-methyl
/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		< 0.01		<0.01	<0.01		<0.0100	<0.01	<0.01
		<0.01		<0.01	<0.01		<0.0100	<0.01	<0.01
		<0.01		<0.01	<0.01		<0.0100	<0.01	<0.01
		.0.04		.0.01	.0.04	-0.5	.0.0400	.0.04	.0.01
		<0.01		<0.01	<0.01	<0.5	<0.0100	<0.01	<0.01
								<0.05	
								<0.05	
_								~0.00	
								<0.05	

0	0	17	0	17	17	5	17	25	17
0	0	0	0	0	0	0	0	0	0
		<0.01		<0.01	<0.01	<0.5	<0.0100	<0.01	<0.01
		<0.01		<0.01	<0.01	<0.6	< 0.0100	<0.05	<0.01

Appendix C Table C3

Wastle Classification - solid waste guidelines analytical results

															OP Pes	ticides																	
				soho	0-4	n-S	n-S-methyl	Ē	rfenvinphos	SO	ate	ц			٩	soho	noir	othion	Ē	ц		barathion	ios (Phosdrin)	otophos	Jibrom)	ate	Ę		os-ethyl	os-methyl	so	hos	
				Coumap	Demeto	Demeto	Demetor	Diazinor	cis-Chlo	Dichlorv	Dimetho	Disulfoto	EPN	Ethion	Ethopro	Fenamip	Fenitroth	Fensulfo	Fenthior	Malathic	Merphos	Methyl p	Mevinph	Monocro	Naled (D	Ometho	Parathic	Phorate	Pirimpho	Pirimiph	Prothiof	Pyrazop	Ronnel
FOI				mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	g mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg r	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NSW EPA (2014) G	eneral Solid Waste CT1 (No	o Leaching)		2	0.2	0.2	0.01	0.01	0.01	0.01	0.01	0.2	0.2	0.01	0.2	0.01	0.2	0.2	0.01	0.01	0.2	0.01	0.2	0.01	0.2	2	0.01	0.2	0.01	0.2	0.01	0.2	0.2
NSW EPA (2014) Re	estricted Solid Waste CT2 ((No Leaching)																															
Location Code	Date	Field ID	Denth																														
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7																														
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45																														
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95															+ -										+		+	!	──	+
VC01	30/10/2019	VC01_0.0-0.2	0.4 - 0.6		-		1						+				-	+ +										+		+		<u> </u>	+
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0				<0.01	<0.01	<0.01	<0.01	<0.01			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01			<0.01		<0.01		<0.01		
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1				<0.01	<0.01	<0.01	<0.01	<0.01			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01			<0.01		<0.01	\longrightarrow	<0.01	—	<u> </u>
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2	_	+		<0.01	<0.01	<0.01	<0.01	<0.01		+	<0.01		<0.01	-	+ +	<0.01	<0.01		<0.01		<0.01			<0.01	+	<0.01		<0.01	──	+
VC02	31/10/2019	VC02_0.5-0.6	0.5 - 0.6		-				40.01	-0.01	1 10.01			40.01		10.01			-0.01	40.01		40.01		40.01				+		-+	-0.01	<u> </u>	+
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																														
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2											<u> </u>														+-+			!	──	
VC02	30/10/2019	VC02_1.0-1.5	1.5 - 1.6	_	+		<0.01	<0.01	<0.01	< 0.01	<0.01			<0.01		< 0.01	-		< 0.01	<0.01		< 0.01		< 0.01			<0.01	+	<0.01	\rightarrow	< 0.01	<u> </u>	+
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2		+			0.01	0.01	0.01			1				+	+ +	0.01	0.01		0.01		0.01			0.01			+	0.01	<u> </u>	1
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5				< 0.01	<0.01	< 0.01	< 0.01	<0.01			< 0.01		< 0.01			< 0.01	< 0.01		< 0.01		< 0.01			< 0.01		<0.01		<0.01	\square	
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4				<0.01	<0.01	<0.01	<0.01	<0.01			<0.01		< 0.01			<0.01	<0.01		<0.01		<0.01			<0.01	└── ┤	<0.01	\longrightarrow	<0.01	──	
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6		-												-	+										+				<u> </u>	+
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																													<u> </u>	
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2																														
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1	_	<u> </u>		10.01	10.01	10.01	-0.04	10.01		<u> </u>	10.01		10.04	_		-0.04	10.01		10.01		10.01			10.01	+-+	10.01	 	10.01	──	
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4	_	+		<0.01	<0.01	<0.01	<0.01	< 0.01			< 0.01		< 0.01	-	+ +	< 0.01	< 0.01		<0.01		<0.01			< 0.01	<u> </u>	<0.01		<0.01	──	+
VC04	30/10/2019	VC04_0.5-0.0	0.5 - 1.0		+		<0.01	<0.01	<0.01	<0.01	<0.01		-	<0.01		<0.01			< 0.01	< 0.01		<0.01		<0.01			<0.01	+	<0.01		<0.01	<u> </u>	+
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																														
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0																												!		
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1											<u> </u>														+-+			!	<u> </u>	
VC05	30/10/2019	VC05 0.5-0.9	0.5 - 0.9		-																							+				<u> </u>	+
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9				<0.01	<0.01	<0.01	<0.01	<0.01			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01			<0.01		<0.01		<0.01		
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1											ļ														+		\longrightarrow	!	 	_
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5											<u> </u>													<u> </u>	+		+	!	──	
VC06	31/10/2019	VC06 0.5-0.6	0.5 - 0.6	-	1								1				1	+ +										+		+		<u> </u>	+
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																														
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8																													<u> </u>	
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9				<0.01	<0.01	<0.01	<0.01	<0.01			<0.01		<0.01		+	<0.01	<0.01		<0.01		<0.01			<0.01	+	<0.01	\rightarrow	<0.01	──	+
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2		+	-	<0.01	< 0.01	< 0.01	< 0.01	< 0.01		+	< 0.01		< 0.01	1	+ +	< 0.01	< 0.01		< 0.01		< 0.01			<0.01	<u>├</u> ──┼	<0.01	-+	<0.01	<u> </u>	+
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4																														
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6																														
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0													<u> </u>		+ -										+-+			!	──	+
VC07	30/10/2019	VC07_0.7-0.8	1.0 - 1.2		+		+						+	<u> </u>			+	+ +										+		-+		<u> </u>	+
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1																														
VC08	31/10/2019	VC08_0.0-0.5	0.0 - 0.5																													<u> </u>	
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4	_	+								+				+	+ -										──┼		\rightarrow	!	──	+
VC08	31/10/2019	VC08_0.5-0.0	0.5 - 0.0		-	-	-				<u> </u>	-	-		-	<u> </u>	-	+ -									<u> </u>	+		\rightarrow]	<u> </u>	+
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																														
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1																														
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5				<0.01	<0.01	<0.01	<0.01	< 0.01			< 0.01		< 0.01			<0.01	<0.01		<0.01		<0.01			< 0.01	 	<0.01	$ \rightarrow $	<0.01	──	
VC08	31/10/2019	VC00_1.3-1.4 VC08_1.5-1.6	1.5 - 1.6		+	-							+			<u> </u>	-	+ -										+		-+		<u> </u>	+
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2		1		<0.01	<0.01	<0.01	<0.01	<0.01		1	<0.01		<0.01			<0.01	<0.01		<0.01		<0.01			<0.01	+	<0.01	-+	<0.01	<u> </u>	+
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5																														
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6	_																								+		$ \rightarrow $!	—	
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0		+	-							+			<u> </u>	+	+ -									<u> </u>	+		\rightarrow	!	<u> </u>	+
L	00/10/2013	1.000_0.1-0.0	10.1 0.0		1	1	1	1			1	1	1	1	1		1	1		1	I						I	L				<u>ــــــ</u>	

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Appendix C Table C3 Wastle Classification - solid waste guidelines analytical results

															OP Pes	ticides																
				Coumaphos	Demeton-O	Demeton-S	Demeton-S-methyl	Diazinon	cis-Chlorfenvinphos	Dichlorvos	Dimethoate	Disulfoton	EPN	Ethion	Ethoprop	Fenamiphos	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Parathion	Phorate Dirimphos-ethvl	Pirimiphos-methyl	Prothiofos	Pyrazophos	Ronnel
				mg/kg	mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg mg	/kg mg/	kg mg/k	g mg/l	kg mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0																													
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2																													
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5				<0.01	<0.01	<0.01	<0.01	<0.01			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01			<0.01	<0	.01	<0.0	1	
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6																													
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8				<0.01	<0.01	<0.01	<0.01	<0.01			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01			<0.01	<0	.01	<0.0	1	
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2																													
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5																													
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7				< 0.01	<0.01	< 0.01	<0.01	< 0.01			< 0.01		< 0.01			< 0.01	< 0.01		< 0.01		< 0.01			<0.01	<0	.01	< 0.0	1	
VC11	30/10/2019	VC11 0.5-1.0	0.5 - 1.0																													
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2																													
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5				< 0.01	< 0.01	< 0.01	<0.01	< 0.01			< 0.01		< 0.01			< 0.01	< 0.01		< 0.01		< 0.01			< 0.01	<0	.01	< 0.0	1	
VC12	31/10/2019	VC12 0.3-0.4	0.3 - 0.4		1						1		1			1	1		1	1												
VC12	31/10/2019	VC12 0.5-0.6	0.5 - 0.6								1		1			1			1	1												
VC12	31/10/2019	VC12 0.8-0.9	0.8 - 0.9																													-
VC12	31/10/2019	VC12 1.0-1.1	1.0 - 1.1																													
VC13	31/10/2019	VC13 0.0-0.1	0.0 - 0.1																													
VC13	31/10/2019	VC13 0.0-0.5	0.0 - 0.5																													-
VC13	31/10/2019	VC13 0.3-0.4	0.3 - 0.4	1	1								1																			
VC13	31/10/2019	VC13 0.5-0.6	0.5 - 0.6																													
VC13	31/10/2019	VC13 0.5-1.0	0.5 - 1.0	1	1						1		1				<u> </u>	1		1										-		
VC13	31/10/2019	VC13 0.7-0.8	0.7 - 0.8	-	<u> </u>	<u> </u>										<u> </u>														_	_	
VC13	31/10/2019	VC13 1.0-1.1	1.0 - 1.1	+	<u> </u>	<u> </u>							<u> </u>			<u> </u>	<u> </u>													<u> </u>	_	
VC14	31/10/2019	VC14_0_0-0_1	0.0 - 0.1		<u> </u>																											
VC14	31/10/2019	VC14 0.0-0.5	0.0 - 0.5	-																										_		
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4	+	+	+					1	<u> </u>	1			<u> </u>	<u> </u>	-	<u> </u>												-	
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0	-	<u> </u>																										-	
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8	+	+	+						1					<u> </u>															
VC14	31/10/2019	VC14_1.0-1.1	10-11	+	+	+				<u> </u>	+	<u> </u>	+			<u> </u>	<u> </u>	+	<u> </u>	<u> </u>										+		
VC14	31/10/2019	VC14_1_3-1_4	13-14	+	+	+				<u> </u>	<u> </u>	<u> </u>	+			<u> </u>	<u> </u>		<u> </u>	<u> </u>										+	-	
VC14	31/10/2019	VC14-0 5-0 6	0.5 - 0.6	+	+											<u> </u>	<u> </u>														-	
Statistics	01110/2013	1014-0.0-0.0	0.0 - 0.0	1	1	1		1	1	1	1	1	1	1		1	1	1	1	1	II					1	1			-1		
Number of Results				(0 0	17	17	17	17	/ 17	0	0 0	17	0	17	0	0 0	17	17	0	17	0	17	0	0	17	0	17	0 1	7	0 0
Number of Detects				(0 0	0	0	0	0	0 0	0 0	0 0	0	0	0	0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
Minimum Concentration							< 0.01	<0.01	<0.01	<0.01	< 0.01			< 0.01		<0.01			<0.01	< 0.01		<0.01		< 0.01			<0.01	<0	.01	<0.0)1	
Maximum Concentration							< 0.01	<0.01	< 0.01	< 0.01	<0.01			< 0.01		< 0.01			< 0.01	< 0.01		< 0.01		< 0.01			< 0.01	<0	.01	<0.0)1	

Circular Quay Investigation

Port Authority of NSW

Appendix C

Table C3

Wastle Classification - solid waste guidelines analytical results

											Halog	enated				D	OD ₂				Llarhiaidea									
							Ð	IVI.	υ		Hyaroo	carbons ⊆		1				1			Herbicides							Ð	<u> </u>	
				Terbufos	Trichloronate	Tetrachlorvinphos	1,2,4-trimethylbenzen	Styrene	1,3,5-trimethylbenzen	lsopropylbenzene	Bromomethane	Dichlorodifluorometha e	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Total)	Pronamide	1,1,1,2- tetrachloroethane	1,1,1-trichloroethane	1,1,2,2- tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,4-trichlorobenzene	1,2-dibromo chloropropane	1,2-dichlorobenzene
50				mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg r	ng/kg	mg/kg
EQL NSW FPA (2014) Gene	eral Solid Waste CT1 (No	l eaching)		0.2	0.2	0.2	0.5	0.5	0.5	0.5	5	5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.5	200	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW EPA (2014) Restr	icted Solid Waste CT2 (N	No Leaching)						240												50		800	2,400	104	96	56				344
Location Code	Data	Field ID	Donth																											
BH05	7/11/2019	BH05 4.6-4.7	4.6 - 4.7					<0.5						1		1	1	1	1	<0.1		< 0.5	<0.5	<0.5	<0.5	<0.5			<u> </u>	
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45					<0.5												<0.1		<0.5	<0.5	<0.5	<0.5	<0.5				
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95	_	+			<0.5												<0.1		< 0.5	<0.5	<0.5	<0.5	<0.5			—	
VC01	30/10/2019	VC01_0.0-0.2	0.4 - 0.6		+											<u> </u>						<u> </u>							\rightarrow	
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0										< 0.0050	<0.0050	<0.0050	< 0.0050	< 0.0050	< 0.0050	<0.0050	<0.0050	<0.5							<0.5		<0.5
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1	_									< 0.0050	<0.0050	<0.0050	< 0.0050	< 0.0050	< 0.0050	<0.0050	<0.0050									\rightarrow	
VC02 VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2		+								<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050									\rightarrow	
VC02	31/10/2019	VC02_0.5-0.6	0.5 - 0.6		+									0.0000		0.0000	0.0000	-0.0000	0.0000			<u> </u>								
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																											
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2	_	+																									
VC02	30/10/2019	VC02_1.0-1.5	1.5 - 1.6		+								< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0 < 0.0050	<0.0050	< 0.0050		<u> </u>							-+	
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2																										$ \rightarrow $	
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5										< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	<0.0050	< 0.0050										
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4	_	+		<0.5	< 0.5	<0.5	< 0.5	<5	<5	< 0.0050	<0.0050	<0.0050	< 0.0050	< 0.0050	< 0.0050	<0.0050	<0.0050		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VC03	30/10/2019	VC03_0.4-0.0	0.4 - 0.0		+								+	<u> </u>		<u> </u>			<u> </u>			<u> </u>							-+	
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																											
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2	_																										
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1	_									<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050									\rightarrow	
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6										<0.0050	<0.0050	<0.0050	0.0030	0.0030	0.0030	<0.0050	<0.0050									\rightarrow	
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0										< 0.0062	<0.0062	<0.0062	< 0.0062	< < 0.0062	2 < 0.0062	<0.0062	<0.0062	<0.6							<0.6		<0.6
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																											
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0	_																<0.1									\rightarrow	
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7		+								+	<u> </u>		<u> </u>	<u> </u>			<u> </u>									\rightarrow	
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																											
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9		_		<0.5	< 0.5	<0.5	<0.5	<5	<5	< 0.0050	<0.0050	<0.0050	< 0.0050	< 0.0050	< 0.0050	<0.0050	< 0.0050		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	<0.5	<0.5
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1	_				<0.5												<0.1		<0.5	<0.5	<0.5	<0.5	<0.5			\rightarrow	
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4		+								-	<u> </u>															\rightarrow	
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																											
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0	_																										
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8	_												<u> </u>						<u> </u>							\rightarrow	
VC07	30/10/2019	VC07 0.0-0.2	0.0 - 0.2		-		<0.5	<0.5	< 0.5	<0.5	<5	<5	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050		< 0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5										< 0.0050	<0.0050	<0.0050	< 0.0050	< 0.0050	0.0677	<0.0050	0.0677	<0.5							<0.5		<0.5
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4	_																									\rightarrow	
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6		+								+					-		<0.1									\rightarrow	
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.8																	-0.1									-+	
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2																											
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1	_				<0.5												<0.1		<0.5	<0.5	<0.5	<0.5	<0.5			\rightarrow	
VC08	31/10/2019	VC08_0.0-0.5	0.0 - 0.5		+								+							<0.1									-+	
VC08	31/10/2019	VC08 0.5-0.6	0.5 - 0.6																	-0.1									-+	
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0																											
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8									<u> </u>				 													\rightarrow	
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1		+								<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.5							<0.5	\rightarrow	<0.5
VC08	31/10/2019	VC08_1.3-1.4	1.3 - 1.4		1																-0.0		<u> </u>					-0.0	\rightarrow	-0.0
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6																											
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2										< 0.0050	<0.0050	<0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	<0.0050										
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5										+					+		<0.1									\rightarrow	
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0		+															-0.1									-+	
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8																											

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Maximum Concentration

Appendix C Table C3

Wastle Classification - solid waste guidelines analytical results

								M	AH		Halog Hydro	enated carbons				P	CBs				Herbicides
				Terbufos	Trichloronate	Tetrachlorvinphos	1,2,4-trimethylbenzene	Styrene	1,3,5-trimethylbenzene	lsopropylbenzene	Bromomethane	Dichlorodifluoromethan e	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Total)	Pronamide
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0																	1	
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2																		
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5										< 0.0050	< 0.0050	< 0.0050	< 0.0050	<0.0050	< 0.0050	< 0.0050	<0.0050	
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6																		
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8										<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	< 0.0050	<0.0050	< 0.0050	
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2																	!	
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5																		
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7				< 0.5	< 0.5	< 0.5	< 0.5	<5	<5	<0.0050	<0.0050	< 0.0050	<0.0050	<0.0050	< 0.0050	< 0.0050	<0.0050	
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0																	/	
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2																		
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5										<0.0050	< 0.0050	< 0.0050	<0.0050	<0.0050	0.0346	< 0.0050	0.0346	<0.5
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4																	<0.1	
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6																	<u> </u>	
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																		
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1					<0.5												<0.1	
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1					<0.5												<0.1	
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5																	!	
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4																		
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6																		
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0																		
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8																	1	
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1																		
VC14	31/10/2019	VC14_0.0-0.1	0.0 - 0.1																	1	
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5																		
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4																	1	
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0																		
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8																		
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1					<0.5												<0.1	
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4																	, j	
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																		
Statistics																					
Number of Results								12	1	1	1	1	17	17	17	17	17	17	17	20	
Number of Detects									1 0			0	<u>۱</u>	0			0	2			t i
Minimum Concentratio	on				1	<u> </u>		<0.5	<0.5	<0.5	<	<5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005		2 <0.0050	<0
Maximum Concentratio	ion			_	-		<0.5	<0.0	<0.5	<0.5	25	<5	<0.0000	<0.0000	<0.0000	<0.0000	<0.0000	0.0677	<0.0000	<0.0000	<0.
Inaxinum Concentrati					1		1 -0.0	1 -0.5	1 .0.0	1 -0.5	'I `J	1 5	-0.000Z	1.0002	-0.0002	1 \$0.0002	1 10.0002	0.0077	1 *0.0002	1 .0.1	-0.,

cides									
	1, 1, 1, 2- tetrachloroethane	1, 1, 1-trichloroethane	1, 1,2,2- tetrachloroethane	1,1,2-trichloroethane	1, 1-dichloroethene	1, 1-dichloropropene	1,2,4-trichlorobenzene	1,2-dibromo-3- chloropropane	1,2-dichlorobenzene
/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
).5							<0.5		<0.5
	<0.5	<0.5	<0.5	<0.5	<0.5				
	<0.5	<0.5	<0.5	<0.5	<0.5				
	<0.5	<0.5	<0.5	<0.5	<0.5				
	×0.3	~0.3	~0.3	~0.3	~0.3				
-									

5	12	12	12	12	12	4	9	4	9
0	0	0	0	0	0	0	0	0	0
<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.6	<0.5	<0.6

Appendix C

Table C3

Wastle Classification - solid waste guidelines analytical results

																													—			
						011																- ·						Nitrosoami			DI 11	
						Chic	rinated i	Hydrocar	bons			1							1			Explo	sives		Niti	roaroma	atics	nes	──	. 	Phth	alates
					1									1			e l		υ		Ð						ac			te		
				۵	L e	ue l	l e	e l	e le				de l	1			l ē	υ	e l		e						e	~~		30		Φ
				aŭ	ba	ba	J Ze	pa	ale				<u> </u>				et	i i	adi		L Z L	ane l	ne			5	8	λ.	Ę	Ę	υ	lat
				j t	1 2	2	l ja	2	뒫	ane i	L R	L a	<u> </u> କ	l e		Ē	2	을	Ë	۵	pe	ne	en	۵		en	[분]	he	Ϋ́ς	<u>م</u>	lat	ha
				ĮŽ	ĮĔ	ĮĔ	Ιž	Ĕ	de	ne l	j j	μ Σ	tra	۲ ۲	5	Ê	ļĔ	U U	9	ġ	itro	bo	털	en		hd	ē	i di i	Ę	5	ha l	, pt
				<u> </u>	l ē	l ē	l ē	<u>ē</u>	Ĕ	bo	일	l Pe	te	۲. E	1 E	Je l	i∺	l n	칠	ē	j.	itro	L2	žu	Le l	iq	읃	yla	te È	L L	F	5
				<u>e</u>	<u>i</u>	i je	l ⊇	<u>i</u>	5 I	50	l 5	ğ	5	Ιž	ē	ΙÈ	4	₩	5	5	Ē	i	Ē	pe	i iii	.ĕ	<u></u>	en	aaje	ے ا	1	ţ
				29	2	2	1 4	29	등	등	등	۱ E	1 5	ΙĒ	Ē	l ē	7	: 달	Xe	2	3,5	4	2	tro	E E	a	l ĝ	iž d	th %	<u>F</u>	et	Ĕ
					-	÷.	- -	5,2	, ,	5-	4	ä	ő	b	δ	`	Ci (i)	ž	Ξ	5	7	, 2	5,6	ž	5-1	4	Pe Pe	ż	щe	E E	ā	ē
				mg/kg	mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	_ mg/kg
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	0.5	0.5	0.5	4	0.5	1	1	0.5	0.5	0.5	0.5	1	5	0.5	0.5	0.5
NSW EPA (2014) Gei	neral Solid Waste CT1 (No	o Leaching)		10	1		150						10	2,000	120			172		4		2.6		40								
NSW EPA (2014) Res	stricted Solid Waste CT2 ((No Leaching)		40			600						40	8.000	480			688		16		10.4		160								
		(,																		4
Location Code	Data		Donth																													
	7/44/0040			1 -0 5		1	1						1 -0 5	1 40 5	1 -0 5		-	1 -0 5		- 11												
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7	<0.5									<0.5	<0.5	<0.5	ļ		<0.5		<4									<u> </u>	<u> </u>	<u> </u>	4
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45	< 0.5									< 0.5	<0.5	< 0.5			< 0.5		<4										<u> </u>	<u> </u>	
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95	< 0.5									<0.5	<0.5	< 0.5			< 0.5		<4										<u> </u>		
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																													
VC01	30/10/2019	VC01_0.4-0.6	0.4 - 0.6																											, , , , , , , , , , , , , , , , , , ,		
VC01	30/10/2019	VC01 0.5-1.0	0.5 - 1.0				< 0.5		< 0.5										< 0.5		< 0.5	<1.0	<1.0	<0.5	< 0.5	< 0.5	< 0.5	<1.0	<5.0	< 0.5	< 0.5	< 0.5
VC01	30/10/2019	VC01 1.0-1.1	1.0 - 1.1										1																		<u> </u>	
VC02	30/10/2019	VC02_0_0-0_2	0.0-0.2		-									-															<u> </u>	<u> </u>	<u> </u>	-
VC02	31/10/2010	VC02_0.0-0.2	0.0 0.5		-	-	-																							<u> </u> '	<u> </u>	-
VC02	31/10/2019	VC02_0.0-0.3	0.0-0.3			+											-	+											╂────	 '	 	+
VC02	31/10/2019		0.5 - 0.0			+									+	<u> </u>		+											<u> </u>	 '	 	+
V-02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0		<u> </u>		<u> </u>							<u> </u>	I	<u> </u>	<u> </u>										<u> </u>		 	 '	 	+
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2		I								I	I	I	L	<u> </u>												<u> </u>	 '	<u> </u>	+
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5																										<u> </u>	 '	<u> </u>	\perp
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6																													
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2																											, , , , , , , , , , , , , , , , , , ,		
VC03	30/10/2019	VC03 0.0-0.5	0.0 - 0.5																													
VC03	30/10/2019	VC03_0_3-0_4	0.3 - 0.4	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5		<0.5	<5									<u> </u>		<u> </u>	
VC03	30/10/2019	VC03_0.4-0.6	04-06					0.0		0.0	0.0					<u> </u>			0.0	L									<u> </u>	<u> </u>	<u> </u>	
VC03	30/10/2010	VC03_0.5_1.0	0.4 1.0			-								<u> </u>		<u> </u>														<u> </u> '	<u> </u>	
VC03	30/10/2019	VC03_0.0-1.0	0.4 - 1.0		-	-							-																	<u> </u>	—	
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7		<u> </u>		<u> </u>							<u> </u>																 '	<u> </u>	
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2																											 '	<u> </u>	
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1																											<u> </u>		
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4																													
VC04	31/10/2019	VC04 0.5-0.6	0.5 - 0.6																													
VC04	30/10/2019	VC04 0.5-1.0	0.5 - 1.0				< 0.6		<0.6										< 0.6		<0.6	<1.0	<1.0	<0.6	< 0.6	<0.6	<0.6	<1.2	<5.0	<0.6	<0.6	<0.6
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																													
VC04	31/10/2019	VC04_0 9-1 0	0.9 - 1.0																										<u> </u>		<u> </u>	-
VC05	30/10/2010	VC05_0.0-0.1	0.0 - 0.1		<u> </u>	+	<u> </u>					<u> </u>	<u> </u>	<u> </u>			<u> </u>												<u> </u>	<u> </u>	<u> </u>	
VC05	20/10/2019	VC05_0.0-0.1	0.0 - 0.1		+	+										<u> </u>													<u> </u>	<u> </u>	──	
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7		<u> </u>		<u> </u>					<u> </u>		<u> </u>		<u> </u>													<u> </u>	<u> </u>	—	
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																											<u> </u>	<u> </u>	
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		<0.5	< 0.5	<0.5	< 0.5	<0.5	< 0.5	<5	<0.5		< 0.5	<5										<u> </u>	<u> </u>	
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1	< 0.5									< 0.5	<0.5	< 0.5			< 0.5		<4										<u> </u>		
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5																													
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4																													
VC06	31/10/2019	VC06 0.5-0.6	0.5 - 0.6																													
VC06	31/10/2019	VC06 0.5-1.0	0.5 - 1.0		1																											
VC06	31/10/2019	VC06 0.7-0.8	0.7 - 0.8		1	1	1					1	1	1	1		1												<u> </u>		<u> </u>	
VC06	31/10/2019	VC06_0.8-0.9	0.8-0.9		1	1	1				1	1	1	1	1		1	1											t	<u> </u>	<u> </u>	++
VC07	30/10/2010	VC07_0_0_0_2	0.0-0.2	<05	<0.5	<05	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5		<0.5	<5									<u> </u>	<u> </u>	<u> </u>	+
VC07	30/10/2019	VC07_0.0.05	0.0-0.2		+ ~0.0	- 0.0	<0.5 Z0 5	-0.0	<0 F	~0.0	- 0.0	~0.0	+ ~0.0	×0.0	~0.0	<u> </u>	- ~0.0	+	<0.5		<05	<10	<1 A	<05	<05	<05	205	<10	<5 0	<05	-05	-05
VC07	20/10/2019		0.0-0.3		<u> </u>	-	~0.0		~0.0					<u> </u>	<u> </u>	<u> </u>			~0.0		~0.0	×1.0	×1.0	~U.U	~0.0	~0.0	~0.5	×1.0	~3.0	-0.5		~0.5
VO07	30/10/2019	<u>vcu/_0.2-0.4</u>	0.2 - 0.4			+						I		 	 	I		+									──┤			 '	 	+
VC0/	30/10/2019	VC07_0.5-0.6	0.5 - 0.6									I		 	I	I											$ \downarrow \downarrow$		I	 '	 	+
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0		L									L	L		<u> </u>													 '	<u> </u>	\perp
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.8																													
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2																													
VC08	31/10/2019	VC08 0.0-0.1	0.0 - 0.1	<0.5									< 0.5	<0.5	< 0.5			< 0.5		<4									[[]	[
VC08	31/10/2019	VC08 0.0-0.5	0.0 - 0.5																													
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4		1	1							1	1	1																\square	+
VC08	31/10/2010	VC08 0 5 0 6	0.5-0.6		1	+	<u> </u>					1	1	<u> </u>	<u> </u>	<u> </u>	1	1											<u> </u>	<u> </u>	<u> </u>	+ +
VC00	21/10/2019		0.5-0.0		-	-											-												╂────	 '	 	+
	31/10/2019	VC00_0.5-1.0	0.3 - 1.0			+									+	 		+											 	 '	 	+
	31/10/2019		0.7 - 0.8		I		I				<u> </u>			I	I	L	 										⊢ −		 	 '	—	+
8000	31/10/2019	VC08_1.0-1.1	1.0 - 1.1		I							I		I	I	 								_						<u> </u>	<u> </u>	+
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5		1		< 0.5		<0.5				1	I	I		1		<0.5		<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<5.0	<0.5	<0.5	<0.5
VC08	31/10/2019	VC08_1.3-1.4	1.3 - 1.4																													
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6																													
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2																													
VC09	30/10/2019	VC09 0.0-0.5	0.0 - 0.5	1	1	1																										
VC09	30/10/2019	VC09 0.4-0.6	0.4 - 0.6		1	1	1					1	1	1	1		1												†		<u> </u>	
VC09	30/10/2019	VC09 0 5-1 0	0.5 - 1.0		1	1	1					1	1	1	1		1												t	<u> </u>	<u> </u>	+
VC09	30/10/2010	VC09 0 7-0 8	07-08		<u> </u>	1	-						-	<u> </u>	1	<u> </u>	1												<u> </u>	<u> </u>	+	+
	00/10/2013	1.003_0.1-0.0	0.0		1	1	1				L	1	1	1	1	1	1	1	1	1						L			1			_

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Appendix C Table C3

Wastle Classification - solid waste guidelines analytical results

						Chlor	inated I	Hydroca	bons													Expl	osives	
				, 2-dichloroethane	I, 2-dichloropropane	l, 3-dichloropropane	I,4-dichlorobenzene	2,2-dichloropropane	2-chloronaphthalene	2-chlorotoluene	1-chlorotoluene	Bromobenzene	Carbon tetrachloride	Chlorobenzene	Chloroform	Chloromethane	sis-1,2-dichloroethene	Methylene chloride	Hexachlorobutadiene	/inyl chloride	I, 3,5-Trinitrobenzene	2,4-Dinitrotoluene	2,6-dinitrotoluene	
				ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka		1 m
VC09	30/10/2019	VC09 0.8-1.0	0.8 - 1.0		1.1.3,.1.3			1.1.3.1.3			1			1		1	1	1.1.3.1.3			1.1.3.1.3	1.13,113	1	1
VC10	31/10/2019	VC10 0.0-0.2	0.0 - 0.2																		<u> </u>		+	+
VC10	31/10/2019	VC10 0.0-0.5	0.0 - 0.5																		<u> </u>		+	+
VC10	31/10/2019	VC10 0.5-0.6	0.5 - 0.6																		<u> </u>		1	+
VC10	30/10/2019	VC10 0.7-0.8	0.7 - 0.8																		1		+	+
VC11	30/10/2019	VC11 0.0-0.2	0.0 - 0.2																		<u> </u>		+	+
VC11	30/10/2019	VC11 0.0-0.5	0.0 - 0.5																			<u> </u>	+	+
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5		<0.5	<5		<u> </u>	+	+
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	L ů	0.0		0.0	—			+	+
VC11	30/10/2019	VC11_1.0-1.2	10-12								<u> </u>			<u> </u>		<u> </u>					<u> </u>	<u> </u>	+	+
VC12	31/10/2019	VC12_0.0-0.5	0.0-0.5				< 0.5		< 0.5										<0.5		<0.5	<10	<10	\pm
VC12	31/10/2019	VC12_0.0-0.0	0.3 - 0.4				-0.0		-0.0										-0.0	<u> </u>	-0.0			+
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6																		<u> </u>	<u> </u>	+	+
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9		<u> </u>			<u> </u>			<u> </u>			<u> </u>		<u> </u>	<u> </u>			<u> </u>	<u> </u>	<u> </u>	+	+
VC12	31/10/2019	VC12_0.0-0.0	10-11	<0.5	<u> </u>			<u> </u>			<u> </u>		<0.5	<0.5	<0.5	<u> </u>		<0.5		<4	<u> </u>	<u> </u>	+	╋
VC13	31/10/2019	VC13_0.0_01	0.0 - 0.1	<0.5									<0.5	<0.5	<0.5			<0.5		<1	<u> </u>	<u> </u>	+	+
VC13	31/10/2019	VC13_0.0-0.5	0.0-0.5					<u> </u>			<u> </u>		-0.0	-0.0	-0.0	<u> </u>		-0.0			<u> </u>	<u> </u>	+	+
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4													<u> </u>				\vdash	<u> </u>	<u> </u>	+	+
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.4											<u> </u>		<u> </u>				\vdash	<u> </u>	<u> </u>	+	╋
VC13	31/10/2019	VC13_0.5-0.0	0.5 - 0.0																	<u> </u>		<u> </u>	+	┿
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8		<u> </u>																<u> </u>	<u> </u>	+	+
VC13	31/10/2019	VC13_1.0.1.1	10 11		<u> </u>						<u> </u>					<u> </u>	<u> </u>			<u> </u>	<u> </u>	<u> </u>	+	╋
VC14	31/10/2019	VC13_1.0-1.1	0.0 0.1																	<u> </u>	<u> </u>	<u> </u>	+	╋
VC14	31/10/2019	VC14_0.0-0.1	0.0-0.1																	<u> </u>	<u> </u>	<u> </u>	+	╋
VC14	21/10/2019	VC14_0.0-0.3	0.0 - 0.3		<u> </u>			<u> </u>			<u> </u>			<u> </u>		<u> </u>	<u> </u>			<u> </u>	──	──	+	╋
VC14	21/10/2019	VC14_0.5-0.4	0.5 - 0.4		<u> </u>			<u> </u>			<u> </u>			<u> </u>		<u> </u>	<u> </u>	<u> </u>		<u> </u>	──	──	+	╋
VC14	21/10/2019	VC14_0.3-1.0	0.3 - 1.0																	<u> </u>	──	<u> </u>	+	╋
VC14	21/10/2019	VC14_0.7-0.0	0.7 - 0.8	<0.5				<u> </u>			<u> </u>		<0.5	<0.5	<0.5	<u> </u>	<u> </u>	<0.5		-1	<u> </u>	<u> </u>	+	╋
VC14	21/10/2019	VC14_1.0-1.1	1.0 - 1.1	<0.5	<u> </u>			<u> </u>			<u> </u>		NU.5	NO.5	NU.5	<u> </u>	<u> </u>	NU.5		~4	<u> </u>	<u> </u>	+	╋
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4					<u> </u>			<u> </u>			<u> </u>		<u> </u>				<u> </u>	<u> </u>	<u> </u>	+	╋
VC 14	31/10/2019	14-0.5-0.0	10.5 - 0.0	I				1			1			1						<u> </u>	<u> </u>	L	<u> </u>	1
Statistics																								
Number of Results				12	4	4	9	4	5	4	4	4	12	12	12	4	4	8	9	12	5	5	؛ ز	از
Number of Detects				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0) ()
Minimum Concentration				<0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	<5	<0.5	< 0.5	< 0.5	<4	< 0.5	<1.0) <1.()
Maximum Concentration	า			<0.5	<0.5	<0.5	<0.6	<0.5	<0.6	<0 F	<0 E	<0 E	<0 E	<0 E	<0.5	<u> </u>	<0 F	<0.5	<0.5	< <u> 5</u>	< <u> <06</u>	<10	1 < 1(JT.

					Nitrosoami				
		Nitr	oaroma	tics	nes			Phtha	alates
	Nitrobenzene	2-Picoline	4-aminobiphenyl	Pentachloronitrobenze	8 N-Nitrosodiphenyl & Diphenylamine	Bis(2-ethylhexyl)	Butyl benzyl phthalate	Diethylphthalate	Dimethyl phthalate
]	mg/кg	mg/кg	mg/кg	mg/кg	mg/ĸg	mg/кg	mg/кg	mg/кg	mg/кg
			½ <u>+</u> <u>a</u> g/kg mg/kg mg						
_									
	<0.5	<0.5	<0.5	<0.5	<10	<5.0	<0.5	<0.5	<0.5
	-0.0	-0.0	-0.0	-0.0	41.0	-0.0	-0.0	-0.0	-0.0
_									
_									
_									

5	5	5	5	5	5	5	5	5
0	0	0	0	0	0	0	0	0
<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5
<0.6	<0.6	<0.6	<0.6	<1.2	<0.6	<0.6	<0.6	<0.6

Appendix C Table C3

Wastle Classification - solid waste guidelines analytical results

	Di-n-butyl phthalate	Di-n-octyl phthalate
	mg/kg	mg/kg
EQL	0.5	0.5
NSW EPA (2014) General Solid Waste CT1 (No Leaching)		
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)		

Location Code	Date	Field ID	Depth		
BH05	7/11/2019	BH05 4.6-4.7	4.6 - 4.7		
BH06	7/11/2019	BH06 1.2-1.45	1.2 - 1.45		
BH07	7/11/2019	BH07 2.5-2.95	2.5 - 2.95		
VC01	30/10/2019	VC01 0.0-0.2	0.0 - 0.2		
VC01	30/10/2019	VC01 0.4-0.6	0.4 - 0.6		
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	< 0.5	<0.5
VC01	30/10/2019	VC01 1.0-1.1	1.0 - 1.1		
VC02	30/10/2019	VC02 0.0-0.2	0.0 - 0.2		
VC02	31/10/2019	VC02 0.0-0.5	0.0 - 0.5		
VC02	31/10/2019	VC02 0.5-0.6	0.5 - 0.6		
VC02	30/10/2019	VC02 0.5-1.0	0.5 - 1.0		
VC02	30/10/2019	VC02 1.0-1.2	1.0 - 1.2		
VC02	30/10/2019	VC02 1.0-1.5	1.0 - 1.5		
VC02	30/10/2019	VC02 1.5-1.6	1.5 - 1.6		
VC03	30/10/2019	VC03 0.0-0.2	0.0 - 0.2		
VC03	30/10/2019	VC03 0.0-0.5	0.0 - 0.5		
VC03	30/10/2019	VC03 0.3-0.4	0.3 - 0.4		
VC03	30/10/2019	VC03 0.4-0.6	0.4 - 0.6		
VC03	30/10/2019	VC03 0.5-1.0	0.4 - 1.0		
VC03	30/10/2019	VC03 0.6-0.7	0.6 - 0.7		
VC03	30/10/2019	VC03 1.0-1.2	1.0 - 1.2		+
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1		
VC04	30/10/2019	VC04 0.3-0.4	0.3 - 0.4		
VC04	31/10/2019	VC04 0.5-0.6	0.5 - 0.6		+
VC04	30/10/2019	VC04 0.5-1.0	0.5 - 1.0	<0.6	<0.6
VC04	31/10/2019	VC04 0.7-0.8	0.7 - 0.8		
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0		
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1		
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7		
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9		
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9		
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1		+
VC06	31/10/2019	VC06_0.0-0.5	0.0-0.5		+
VC06	31/10/2019	VC06_0.3-0.4	03-04		+
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6		+
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0		+
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8		+
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9		+
VC07	30/10/2019	VC07_0_0_0_2	0.0 - 0.2		
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.5	<0.5	<0.5
VC07	30/10/2019	VC07_0.2-0.4	0.0 - 0.0	40.0	-0.0
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6		
VC07	30/10/2019	VC07_0.5-0.0	0.5 - 1.0		
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.8		
VC07	30/10/2019	VC07_1.0.1.2	10.12		
	21/10/2010	VC07_1.0-1.2	0.0 0.1		
VC08	31/10/2019	VC08_0.0-0.5	0.0 - 0.5		
	31/10/2019	VC08_0.3_0.4	0.0 - 0.3		+
	21/10/2019	VC08_0.5-0.4	0.5 - 0.4		+
	21/10/2019	VC08_0.5-0.0	0.5 - 0.6		
VC08	31/10/2019		0.5 - 1.0		
VC08	31/10/2019	VC08 1 0 1 1	10.7-0.0		+
VC08	31/10/2019	VC08 1 0 1 5	10 15		<0.5
VC08	31/10/2019		1.0 - 1.0	< <u>.</u>	~0.5
VC08	31/10/2019	VC00_1.3-1.4	1.5 1.4		
	30/10/2019		1.3 - 1.0		
VC00	20/10/2019		0.0 - 0.2		
VC09	20/10/2019		0.0 - 0.5		
VC09	30/10/2019		0.4 - 0.0		
VC00	20/10/2019		0.3 - 1.0		
V C U B	130/10/2019	10009 0.7-0.0	10.7 - 0.0	1 1	I

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Appendix C Table C3

Wastle Classification - solid waste guidelines analytical results

				Di-n-butyl phthalate	Di-n-octyl phthalate
				ma/ka	ma/ka
VC09	30/10/2019	VC09 0.8-1.0	0.8 - 1.0		
VC10	31/10/2019	VC10 0.0-0.2	0.0 - 0.2		
VC10	31/10/2019	VC10 0.0-0.5	0.0 - 0.5		
VC10	31/10/2019	VC10 0.5-0.6	0.5 - 0.6		
VC10	30/10/2019	VC10 0.7-0.8	0.7 - 0.8		
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2		
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5		
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7		
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0		
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2		
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	< 0.5	< 0.5
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4		
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6		
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9		
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1		
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1		
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5		
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4		
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6		
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0		
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8		
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1		
VC14	31/10/2019	VC14_0.0-0.1	0.0 - 0.1		
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5		
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4		
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0		
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8		
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1		
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4		
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6		

Statistics

Number of Results	5	5
Number of Detects	0	0
Minimum Concentration	< 0.5	< 0.5
Maximum Concentration	<0.6	<0.6

Circular Quay Investigation Port Authority of NSW

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	Inor	ganics								Met	als							
	Moisture (%)	Cyanide (Total)	Aluminium	Antimony	Arsenic	Cadmium	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Vanadium	Zinc
	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	1	50	0.5	1	0.1	1	0.5	1	50	1	10	0.01	1	0.1	0.1	2	1
NAGD 2009 - SQG-High Values				25	70	10	370		270		220		1	52		3.7		410
NAGD 2009 - Screening Level				2	20	1.5	80		65		50		0.15	21		1		200
ANZG 2018 GV -High				25	70	10	370		270		220		1	52		4		410
ANZG 2018 DGV				2	20	1.5	80		65		50		0.15	21		1		200

Location Code	Date	Field ID	Depth																		
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	13.5	<1	3,870	<0.50	<1.00	<0.1	3	<0.5	<1.0	1,470	1.4	<10	<0.01	<1.0	<0.1	<0.1	3.8	<1.0
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	49.1	<1	12,200	<0.50	16.1	0.5	42	4.2	120	34,900	318	88	4.25	10.4	0.6	3.0	32.6	445
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	13.1	<1	11,300	<0.50	<1.00	<0.1	10.7	0.5	<1.0	1,290	33.6	<10	0.05	2.0	0.1	<0.1	5.5	16.7
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	64.3	<1	14,600	<0.50	<1.00	<0.1	12	<0.5	<1.0	3,080	4.9	<10	<0.01	1.6	0.1	0.3	8.9	2.3
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	31.3	<1	5,550	<0.50	9.04	<0.1	16.6	2.4	189	15,600	110	37	1.61	4.4	0.3	1.5	16.2	158
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	17.5	<1	7,220	<0.50	3.11	<0.1	10.8	<0.5	<1.0	3,460	14.6	<10	0.05	1.2	0.3	0.2	21.3	3.2
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	15.4	<1	9,760	<0.50	<1.00	<0.1	6.9	<0.5	<1.0	1,360	4.6	<10	<0.01	1.3	0.1	<0.1	6.3	2.1
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	24.2	<1	4,790	<0.50	2.2	<0.1	6	<0.5	4.5	4,290	10.6	<10	0.12	<1.0	<0.1	0.2	13.5	14.4

Statistics

Number of Results	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects	8	0	8	0	4	1	8	3	3	8	8	2	5	6	6	5	8	7
Minimum Concentration	13.1	<1	3,870	<0.5	<1	<0.1	3.0	<0.5	<1.0	1,290	1.4	<10	0.01	<0.1	<0.1	<0.1	2.5	<1
Maximum Concentration	64.3	<1	14,600	<0.5	16	0.5	42	4	189	34,900	318	88	4.25	10.4	0.6	3	32.6	445





				Т	OC	Organo	Metals				BTEXN		
				Total Organic Carbon	Total Organic Carbon (used for normalisation)	Tributyltin (as Sn)	Normalised Tributyltin (as Sn)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total
				%	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.02		0.0005	0.0005	0.1	0.1	0.1	0.1	0.2	0.3
NAGD 2009 - SQG-	High Values					0.07	0.07						
NAGD 2009 - Scree	ning Level					0.009	0.009						
ANZAST 2018 GV-H	ligh					0.07	0.07						
ANZAST 2018 DGV						0.009	0.009						
ANZECC 2000 - ISC	QG - High ^a												
ANECC 2000 - ISQC	G - Low ^a												
Location Code	Date	Field ID	Depth										
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	0.06	1	< 0.0005	< 0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	2.82	2.82	0.0028	0.0010	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	0.15	1	<0.0005	< 0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	0.05	1	<0.0005	<0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	1.05	1.05	0.0204	0.0194	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	0.15	1	<0.0005	<0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	0.06	1	<0.0005	<0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5

Date	Field ID	Depth					
30/10/2019	VC01_0.5-1.0	0.5 - 1.0	0.06	1	< 0.0005	<0.0005	
31/10/2019	VC02_0.0-0.5	0.0 - 0.5	2.82	2.82	0.0028	0.0010	
30/10/2019	VC03_0.0-0.5	0.0 - 0.5	0.15	1	< 0.0005	<0.0005	
30/10/2019	VC04_0.5-1.0	0.5 - 1.0	0.05	1	<0.0005	<0.0005	
30/10/2019	VC07_0.0-0.5	0.0 - 0.5	1.05	1.05	0.0204	0.0194	_
31/10/2019	VC08_1.0-1.5	1.0 - 1.5	0.15	1	<0.0005	<0.0005	
31/10/2019	VC10_0.0-0.5	0.0 - 0.5	0.06	1	< 0.0005	<0.0005	
31/10/2019	VC12_0.0-0.5	0.0 - 0.5	0.34	0.34	0.0069	0.0203	
	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Date Field ID 30/10/2019 VC01_0.5-1.0 31/10/2019 VC02_0.0-0.5 30/10/2019 VC03_0.0-0.5 30/10/2019 VC04_0.5-1.0 30/10/2019 VC07_0.0-0.5 31/10/2019 VC08_1.0-1.5 31/10/2019 VC10_0.0-0.5 31/10/2019 VC10_0.0-0.5	Date Field ID Depth 30/10/2019 VC01_0.5-1.0 0.5 - 1.0 31/10/2019 VC02_0.0-0.5 0.0 - 0.5 30/10/2019 VC03_0.0-0.5 0.0 - 0.5 30/10/2019 VC04_0.5-1.0 0.5 - 1.0 30/10/2019 VC07_0.0-0.5 0.0 - 0.5 30/10/2019 VC07_0.0-0.5 0.0 - 0.5 31/10/2019 VC08_1.0-1.5 1.0 - 1.5 31/10/2019 VC10_0.0-0.5 0.0 - 0.5 31/10/2019 VC12_0.0-0.5 0.0 - 0.5	DateField IDDepth30/10/2019VC01_0.5-1.00.5 - 1.00.0631/10/2019VC02_0.0-0.50.0 - 0.52.8230/10/2019VC03_0.0-0.50.0 - 0.50.1530/10/2019VC04_0.5-1.00.5 - 1.00.0530/10/2019VC07_0.0-0.50.0 - 0.51.0531/10/2019VC08_1.0-1.51.0 - 1.50.1531/10/2019VC10_0.0-0.50.0 - 0.50.0631/10/2019VC12_0.0-0.50.0 - 0.50.34	Date Field ID Depth 30/10/2019 VC01_0.5-1.0 0.5 - 1.0 0.06 1 31/10/2019 VC02_0.0-0.5 0.0 - 0.5 2.82 2.82 30/10/2019 VC03_0.0-0.5 0.0 - 0.5 0.15 1 30/10/2019 VC04_0.5-1.0 0.5 - 1.0 0.05 1 30/10/2019 VC07_0.0-0.5 0.0 - 0.5 1.05 1 30/10/2019 VC07_0.0-0.5 0.0 - 0.5 1.05 1 31/10/2019 VC08_1.0-1.5 1.0 - 1.5 0.15 1 31/10/2019 VC10_0.0-0.5 0.0 - 0.5 0.06 1 31/10/2019 VC12_0.0-0.5 0.0 - 0.5 0.34 0.34	DateField IDDepth30/10/2019VC01_0.5-1.00.5 - 1.00.061<0.0005	Date Field ID Depth 30/10/2019 VC01_0.5-1.0 0.5 - 1.0 0.06 1 <0.0005

Statistics										
Number of Results	8	8	8	8	8	8	8	8	8	8
Number of Detects	8	8	3	3	0	0	0	0	0	0
Minimum Concentration	0.04	1.00	<0.0005	<0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
Maximum Concentration	2.82	2.82	0.0204	0.0194	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5

<0.2

<0.2

<0.2

<0.2

<0.2

<0.5

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is provided.



	-			TF	RH - NEPM 20)13
	BTEX (Sum of Total) - Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
EQL	0.2	3	3	3	3	
NAGD 2009 - SQG-High Values						Γ
NAGD 2009 - Screening Level						
ANZAST 2018 GV-High						Г
ANZAST 2018 DGV						
ANZECC 2000 - ISQG - High ^a						Γ
ANECC 2000 - ISQG - Low ^a						

							TF	RH - NEPM 20	13					TRH - NI	EPM 1999
				BTEX (Sum of Total) - Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.2	3	3	3	3	3	5	3	3	3	3	5
NAGD 2009 - SQG-I	High Values														
NAGD 2009 - Screen	ning Level														
ANZAST 2018 GV-H	ligh														
ANZAST 2018 DGV	2														
ANZECC 2000 - ISQ	lG - High [®]														
ANECC 2000 - ISQC	G - Low ^a														
Location Code	Date	Field ID	Depth												
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.2	<3.0	<3	<3	<3	<3	<5	<3	<3	<3	<3	<5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	<0.2	<3.0	<3	4	4	78	28	110	<3	<3	48	46
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3	<3	<3	<3	<5
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.2	<3.0	<3	<3	<3	4	<5	4	<3	<3	5	<5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.2	<3.0	<3	7	7	176	69	252	<3	<3	101	111
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.2	<3.0	<3	<3	<3	66	48	114	<3	<3	18	70
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3	<3	<3	<3	<5
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.2	<3.0	<3	<12	<12	185	72	257	<3	<6	109	112
				-											
Statistics										0					
Number of Results				8	8	ð O	ð 2	ð 2	8 5	б Б	ð F	ð O	ð O	ŏ 7	8 5
Minimum Concentrat	ion				0	0	2	2	5	5	5	0	0	1	5
Maximum Concentral	tion			<0.2	< 3	< 3	<3	< 10	5 105	<0 70	< <u>5</u> 050	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	< 3	< <u>5</u>	50 140
iviaximum Concentra	uon			<0.2	<3	<3	<12	<12	185	12	252	<3	<20	109	112

				. <u></u>			TF	RH - NEPM 20)13					TRH - NI	EPM 1999
				BTEX (Sum of Total) - Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.2	3	3	3	3	3	5	3	3	3	3	5
NAGD 2009 - SQG-H	High Values														
NAGD 2009 - Screer	ning Level														
ANZAST 2018 GV-H	ligh														
ANZAST 2018 DGV	• ··· · à													4	
ANZECC 2000 - ISQ	G - High"													<u> </u>	
ANECC 2000 - ISQG	9 - LOW														
Location Code	Date	Field ID	Depth												
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.2	<3.0	<3	<3	<3	<3	<5	<3	<3	<3	<3	<5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	<0.2	<3.0	<3	4	4	78	28	110	<3	<3	48	46
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3	<3	<3	<3	<5
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.2	<3.0	<3	<3	<3	4	<5	4	<3	<3	5	<5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.2	<3.0	<3	7	7	176	69	252	<3	<3	101	111
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.2	<3.0	<3	<3	<3	66	48	114	<3	<3	18	70
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.2	<3.0	<3	<3	<3	<3	<5	<3	<3	<3	<3	<5
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.2	<3.0	<3	<12	<12	185	72	257	<3	<6	109	112
Statistics				7											
							0			0	0	0	0		0
Number of Detects				8	8	ð O	0 2	ð 2	ŏ 5	ŏ 5	ŏ 5	ŏ O	ŏ 0	7	0 5
Minimum Concentrat	ion			-0.2	0	0	2	2 	0 -2) -5	0 -2	0	-2	1	5 -5
Maximum Concentral	tion			<0.2		~>		~10	105	70	250	~3	-3	100	110
liviaximum Concentra				SU.2	<u>``</u>	<u>``</u>	<u><u></u> <u></u></u>	<u><u></u> <u></u></u>	C01	12	202	5	<u>^</u> 20	109	112

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is



				_								
	C10-C36 (Sum of Total)	Normalised C10- C36 (Sum of Total)	Benzo(e)pyrene	Acenaphthene	Normalised Acenaphthene	Acenaphthylene	Normalised Acenaphthylene	Anthracene	Normalised Anthracene	Benz(a)anthracene	Normalised Benz(a)anthracene	Benzo(b+j+k)fluora nthene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		3	0.004	0.004		0.004		0.004		0.004	· · · · · ·	1
NAGD 2009 - SQG-High Values											· · · · · · · · · · · · · · · · · · ·	
NAGD 2009 - Screening Level	550	550										
ANZAST 2018 GV-High											· · · · · · · · · · · · · · · · · · ·	
ANZAST 2018 DGV												
ANZECC 2000 - ISQG - High ^a				0.5	0.5	0.64	0.64	1.1	1.1	1.6	· · · · · · · · · · · · · · · · · · ·	
ANECC 2000 - ISQG - Low ^a				0.016	0.016	0.04	0.04	0.09	0.085	0.26		

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Location Code	Date	Field ID	Depth												
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<3	<3	<0.004	< 0.004	<0.004	< 0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<1
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	94	33.33	0.631	0.044	0.016	0.297	0.105	0.286	0.101	1.13	0.401	
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<3	<3	<0.004	< 0.004	0.004	< 0.004	<0.004	<0.004	<0.004	<0.004	<0.004	
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	5	5	<0.005	< 0.005	0.005	< 0.005	<0.005	< 0.005	<0.005	<0.005	<0.005	<1
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	212	201.90	0.373	<0.025	< 0.024	0.202	0.192	0.116	0.110	0.8	0.762	1
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	88	88	<0.004	< 0.004	<0.004	< 0.004	<0.004	<0.004	<0.004	0.006	0.006	<1
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<3	<3	<0.004	< 0.004	< 0.004	< 0.004	<0.004	< 0.004	<0.004	<0.004	<0.004	
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	221	650	0.117	< 0.004	<0.012	0.06	0.176	0.037	0.109	0.147	0.432	<1

Statistics												
Number of Results	8	8	8	8	8	8	8	8	8	8	8	5
Number of Detects	5	5	3	1	1	3	3	3	3	4	4	1
Minimum Concentration	<3	<3	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<1
Maximum Concentration	221	221	0.631	0.044	<0.024	0.297	0.192	0.8	0.110	1.13	0.8	1

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is



								PAHs				
	Benzo(a) pyrene	Normalised Benzo(a) pyrene	Benzo[b+j]fluoranth ene	Benzo(k)fluoranthe ne	Benzo(g,h,i)perylen e	Chrysene	Normalised Chrysene	Dibenz(a,h)anthrac ene	Normalised Dibenz(a,h)anthrac ene	Fluoranthene	Normalised Fluoranthene	Naphthalene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.004		0.004	0.004	0.004	0.004		0.004		0.004		0.005
NAGD 2009 - SQG-High Values												
NAGD 2009 - Screening Level												
ANZAST 2018 GV-High												
ANZAST 2018 DGV												
ANZECC 2000 - ISQG - High ^a	1.6					2.8		0.26		5.1		2.1
ANECC 2000 - ISQG - Low ^a	0.43					0.384		0.063		0.6		0.16

Location Code	Date	Field ID	Depth												
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	< 0.004	<0.004	<0.004	< 0.004	< 0.004	<0.004	< 0.004	<0.004	0.004	< 0.004	0.004	< 0.005
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	1.57	0.55673759	1.49	0.661	1	0.997	0.354	0.219	0.078	1.89	0.670	<0.2
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	< 0.004	<0.004	<0.004	< 0.004	< 0.004	<0.004	< 0.004	<0.004	< 0.004	< 0.004	<0.004	< 0.005
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	< 0.005	< 0.005	<0.005	< 0.005	< 0.005	<0.005	< 0.005	<0.005	< 0.005	<0.005	<0.005	<0.005
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	0.872	0.83047619	0.799	0.375	0.663	0.7	0.667	0.127	0.121	1.5	1.429	0.06
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	0.01	0.01	0.009	< 0.004	0.006	0.005	0.005	<0.004	0.004	0.01	0.01	< 0.005
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	< 0.004	0.004	<0.004	< 0.004	< 0.004	<0.004	< 0.004	<0.004	< 0.004	< 0.004	<0.004	<0.005
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	0.255	0.75	0.226	0.116	0.197	0.122	0.359	0.04	0.118	0.201	0.591	0.01

Statistics												
Number of Results	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects	4	5	19	12	16	17	4	4	4	21	5	4
Minimum Concentration	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.005
Maximum Concentration	1.57	0.830	4.2	1.7	1.8	2.2	0.666	<0.5	0.121	1.89	1.4	<1

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is



	Normalised Naphthalene	Fluorene	Normalised Fluorene	Indeno(1,2,3- c,d)pyrene	Phenanthrene	Normalised Phenanthrene	Pyrene	Normalised Pyrene	PAHs (Sum of total) - Lab calc	Normalised PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(half LOR) - Lab Calc
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		0.004		0.004	0.004		0.004		0.004		0.5	0.5
NAGD 2009 - SQG-High Values												
NAGD 2009 - Screening Level												
ANZAST 2018 GV-High									50	50		
ANZAST 2018 DGV									10	10		
ANZECC 2000 - ISQG - High ^a		0.54			1.5		2.6					
ANECC 2000 - ISQG - Low ^a		0.019			0.24		0.665					

Location Code	Date	Field ID	Depth												
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	< 0.005	<0.004	<0.004	< 0.004	< 0.004	<0.004	< 0.004	<0.004	<0.004	< 0.004	<0.5	0.6
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	0.07092199	0.095	0.034	0.963	0.885	0.314	1.78	0.631	14.8	5.248		
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	< 0.005	<0.004	<0.004	< 0.004	< 0.004	<0.004	< 0.004	<0.004	<0.004	< 0.004		
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.005	<0.005	<0.005	< 0.005	< 0.005	<0.005	< 0.005	<0.005	<0.005	< 0.005	<0.5	0.7
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	0.05714286	0.041	0.039	0.517	0.7	0.667	1.5	1.429	7.5	7.143	1.0	1.3
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	< 0.005	<0.004	<0.004	0.006	0.016	0.016	0.011	0.011	0.079	0.079	<0.5	0.6
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.005	<0.004	<0.004	< 0.004	< 0.004	<0.004	< 0.004	<0.004	<0.004	< 0.004		
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	0.029	0.008	0.024	0.155	0.096	0.282	0.217	0.638	2.18	6.412	<0.5	0.6

Statistics												
Number of Results	8	8	8	8	8	8	8	8	8	8	5	5
Number of Detects	3	3	3	4	4	4	4	4	4	4	1	5
Minimum Concentration	<0.005	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.004	<0.004	<0.5	0.6
Maximum Concentration	0.071	0.095	0.039	0.963	0.885	0.667	1.78	1.429	14.8	7.142	1	1.3

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is


						PCBs					Herbicides	
	Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Bay PCBs (Total)	B Normalised PCBs (Total)	Pronamide	8 1,2,4- 5 trichlorobenzene
EQL	0.5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	mg/ng	0.5	0.5
NAGD 2009 - SQG-High Values	1 1											
NAGD 2009 - Screening Level												
ANZAST 2018 GV-High									0.28	0.28		
ANZAST 2018 DGV									0.034	0.034		
ANZECC 2000 - ISQG - High ^a												
ANECC 2000 - ISQG - Low ^a												

Location Code	Date	Field ID	Depth												
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	1.2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	<0.5	<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.002		
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005		
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	1.4	<0.0062	<0.0062	<0.0062	< 0.0062	< 0.0062	<0.0062	<0.0062	<0.0062	0.006	<0.6	<0.6
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	1.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0677	<0.0050	0.0677	0.064	<0.5	<0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	1.2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	<0.5	<0.5
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005		
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	1.2	<0.0050	<0.0050	< 0.0050	< 0.0050	<0.0050	0.0346	<0.0050	0.0346	0.102	<0.5	<0.5

Statistics												
Number of Results	5	8	8	8	8	8	8	8	8	8	5	5
Number of Detects	5	0	0	0	0	0	2	0	2	2	0	0
Minimum Concentration	1.2	< 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0062	<0.005	<0.0018	<0.5	<0.5
Maximum Concentration	1.5	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	0.0677	<0.1	0.0677	0.0645	<0.6	<0.6

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is

provided.



												Nitrosoamin
	Chlori	nated Hydroc	arbons			Explo	osives			Nitroaromatics	5	es
	1,2- dichlorobenzene	1,4- dichlorobenzene	2- chloronaphthalene	Hexachlorobutadie ne	1,3,5- Trinitrobenzene	2,4-Dinitrotoluene	2,6-dinitrotoluene	Nitrobenzene	2-Picoline	4-aminobiphenyl	Pentachloronitrobe nzene	N-Nitrosodiphenyl & Diphenylamine
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	1	1	0.5	0.5	0.5	0.5	1
NAGD 2009 - SQG-High Values												
NAGD 2009 - Screening Level												
ANZAST 2018 GV-High												
ANZAST 2018 DGV												
ANZECC 2000 - ISQG - High ^a												
ANECC 2000 - ISQG - Low ^a												

Location Code	Date	Field ID	Depth												
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5												
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5												
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.6	<0.6	<0.6	<0.6	<0.6	<1.0	<1.0	<0.6	<0.6	<0.6	<0.6	<1.2
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5												
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<1.0	<1.0	<0.5	< 0.5	<0.5	<0.5	<1.0

Statistics												
Number of Results	5	5	5	5	5	5	5	5	5	5	5	5
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<0.5	<0.5	<0.5	<1
Maximum Concentration	<0.6	<0.6	<0.6	<0.6	<0.6	<1	<1	<0.6	<0.6	<0.6	<0.6	<1.2

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is

provided.



			Phtha	alates									
	Bis(2-ethylhexyl) phthalate	Butyl benzyl phthalate	Diethylphthalate	Dimethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	5	0.5	0.5	0.5	0.5	0.5	0.1	0.1	0.0005	0.0005	0.0005	0.05	0.0005
NAGD 2009 - SQG-High Values									0.027				
NAGD 2009 - Screening Level									0.0022				
ANZAST 2018 GV-High									0.007				
ANZAST 2018 DGV									0.0014				
ANZECC 2000 - ISQG - High ^a													
ANECC 2000 - ISQG - Low ^a													

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Location Code	Date	Field ID	Depth												
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<(.00050	<0.00050	<0.00050	<0.5	<0.00050
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5							<(.00050	<0.00050	<0.00050	1	<0.00050
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5							<(.00050	<0.00050	<0.00050	1	<0.00050
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<5.0	<0.6	<0.6	<0.6	<0.6	<0.6	<(.00050	<0.00050	<0.00050	<0.5	<0.00050
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<(.00050	<0.00050	<0.00050	<0.5	<0.00050
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<(.00050	<0.00050	<0.00050	<0.5	<0.00050
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5							<(.00050	<0.00050	<0.00050	1	<0.00050
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<(.00050	<0.00050	<0.00050	<0.5	<0.00050

Statistics												
Number of Results	5	5	5	5	5	5		8	8	8	5	8
Number of Detects	0	0	0	0	0	0		0	0	0	0	0
Minimum Concentration	<5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.00050	<0.00050	<0.00050	<0.5	<0.00050
Maximum Concentration	<5	<0.6	<0.6	<0.6	<0.6	<0.6		<0.00050	<0.00050	<0.00050	<0.5	<0.00050

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is

provided.





							C	C Pesticide	s					
	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	4,4 DDD	4,4 DDT	DDT+DDE+DDD - Lab Calc	Dieldrin	Endosulfan	Endosulfan I (alpha)	Endosulfan II (beta)	Endosulfan Sulfate	Endrin	Endrin aldehyde
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.00025	0.00025	0.00025	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
NAGD 2009 - SQG-High Values	0.006				0.02	0.046		0.62					0.22	
NAGD 2009 - Screening Level	0.0005				0.002	0.0016		0.28					0.01	
ANZAST 2018 GV-High	0.009				0.02	0.046	0.005	0.07					0.06	Í
ANZAST 2018 DGV	0.0045				0.002	0.0016	0.0012	0.0028					0.0027	
ANZECC 2000 - ISQG - High ^a														
ANECC 2000 - ISQG - Low ^a														

Location Code	Date	Field ID	Depth														
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	< 0.00050	<0.00050	<0.00050	<0.00050

Statistics]													
Number of Results	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Maximum Concentration	<0.00025	<0.00025	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

^aCriteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is provided.





	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzen e	Methoxychlor	Oxychlordane	Toxaphene	Tokuthion	Azinphos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.0005	0.00025	0.0005	0.0005	0.0005	0.0005	0.0005	1	0.2	0.01	0.2	0.01	0.01	0.2
NAGD 2009 - SQG-High Values		0.001												
NAGD 2009 - Screening Level		0.00032												
ANZAST 2018 GV-High		0.0014												
ANZAST 2018 DGV		0.0009												
ANZECC 2000 - ISQG - High ^a														
ANECC 2000 - ISQG - Low ^a														
		-				-			•	•	•		-	

Location Code	Date	Field ID	Depth											
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.01	<0.01	<0.01	<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.01	<0.01	<0.01	
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.01	<0.01	<0.01	
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.01	<0.01	<0.01	<0.6
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.01	<0.01	<0.01	<0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.01	<0.01	<0.01	<0.5
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.01	<0.01	<0.01	
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.01	<0.01	<0.01	<0.5

Statistics]											
Number of Results	8	8	8	8	8	8	8		8	8	8	5
Number of Detects	0	0	0	0	0	0	0		0	0	0	0
Minimum Concentration	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		<0.01	<0.01	<0.01	<0.5
Maximum Concentration	<0.00050	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050		<0.01	<0.01	<0.01	<0.5

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is provided.



	Chlorfenvinphos E	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Demeton-S-methyl	Diazinon	cis- Chlorfenvinphos	Dichlorvos	Dimethoate	Disulfoton	N	Ethion
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.01	0.01	0.01	2	0.2	0.2	0.01	0.01	0.01	0.01	0.01	0.2	0.2	0.01
NAGD 2009 - SQG-High Values														1
NAGD 2009 - Screening Level														
ANZAST 2018 GV-High														
ANZAST 2018 DGV														
ANZECC 2000 - ISQG - High ^a			-											
ANECC 2000 - ISQG - Low ^a														
Location Code Date Field ID Depth		-		-		-				-	-			

Location Code	Date	Field ID	Depth											
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.0100	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	<0.0100	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<0.0100	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.0100	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.0100	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.0100	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.0100	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.0100	<0.01	<0.01		<0.01	<0.01	< 0.01	<0.01	<0.01		<0.01

Statistics]										
Number of Results	8	8	8		8	8	8	8	8		8
Number of Detects	0	0	0		0	0	0	0	0		0
Minimum Concentration	<0.0100	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01
Maximum Concentration	<0.0100	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is provided.



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Phorai ath eath on occurrent of the sulf o	Phorate
mg/kg	g/kg
EQL 0.2 0.01 0.2 0.01 0.01 0.2 0.01 0.2 0.01 0.2 0.01 0.2 0.01 0.2 0.01 0.2 0.01 0.2 0.01 0.2 0.01 0.2 0.01 0.2 2 0.01 0.2).2
NAGD 2009 - SQG-High Values	
NAGD 2009 - Screening Level	
ANZAST 2018 GV-High	
ANZAST 2018 DGV	
ANZECC 2000 - ISQG - High ^a	
ANECC 2000 - ISQG - Low ^a	
Location Code Date Field ID Denth	

Location Code	Date	Field ID	Depth						
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Statistics									
Number of Results	8	8		8	8	8	8	8	
Number of Detects	0	0		0	0	0	0	0	
Minimum Concentration	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	
Maximum Concentration	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is

provided.



				Pirimphos-ethyl	Pirimiphos-methyl	Prothiofos	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos	3,4-Methylphenol (m,p-cresol)	2,4,5- trichlorophenol	2,4,6- trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,6-dichlorophenol
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.01	0.2	0.01	0.2	0.2	0.2	0.2	0.2	0.4	0.5	0.5	0.5	0.5	0.5
NAGD 2009 - SQG-	High Values																
NAGD 2009 - Scree	ning Level																
ANZAST 2018 GV-I	High																
ANZAST 2018 DGV	,																
ANZECC 2000 - ISC	QG - High ^a																
ANECC 2000 - ISQ	G-Low ^a																
/#1200 2000 10 Q	0 - LOW																
Location Code	Date	Field ID	Depth		•		L										
Location Code	Date 30/10/2019	Field ID VC01_0.5-1.0	Depth 0.5 - 1.0	<0.01		<0.01						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Location Code VC01 VC02	Date 30/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5	<0.01 <0.01		<0.01 <0.01						<0.5 <1	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5
Location Code VC01 VC02 VC03	Date 30/10/2019 31/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5	<0.01 <0.01 <0.01		<0.01 <0.01 <0.01						<0.5 <1 <1	<0.5 <0.5 <0.5	<0.5 <0.5 <0.5	<0.5 <0.5 <0.5	<0.5 <0.5 <0.5	<0.5 <0.5 <0.5
Location Code VC01 VC02 VC03 VC04	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0	<0.01 <0.01 <0.01 <0.01		<0.01 <0.01 <0.01 <0.01						<0.5 <1 <1 <0.6	<0.5 <0.5 <0.5 <0.6	<0.5 <0.5 <0.5 <0.6	<0.5 <0.5 <0.5 <0.6	<0.5 <0.5 <0.5 <0.6	<0.5 <0.5 <0.5 <0.6
Location Code VC01 VC02 VC03 VC04 VC07	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5	<0.01 <0.01 <0.01 <0.01 <0.01		<0.01 <0.01 <0.01 <0.01 <0.01						<0.5 <1 <1 <0.6 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5
Location Code VC01 VC02 VC03 VC04 VC07 VC08	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 0.5 1.0 - 1.5	<0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01		<0.01 <0.01 <0.01 <0.01 <0.01 <0.01						<0.5 <1 <1 <0.6 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5	<0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01		<0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01						<0.5 <1 <1 <0.6 <0.5 <0.5 <1	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5	<0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01		<0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01						<0.5 <1 <1 <0.6 <0.5 <0.5 <1 <0.5	<0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.6 <0.6 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5

				Pirimphos-ethyl	Pirimiphos-methyl	Prothiofos	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos	3,4-Methylphenol (m,p-cresol)	2,4,5- trichlorophenol	2,4,6- trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,6-dichlorophenol
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.01	0.2	0.01	0.2	0.2	0.2	0.2	0.2	0.4	0.5	0.5	0.5	0.5	0.5
NAGD 2009 - SQG-H	High Values																
NAGD 2009 - Screen	ning Level																
ANZAST 2018 GV-H	ligh																
ANZAST 2018 DGV																	
ANZECC 2000 - ISQ)G - High ^a																
																	
ANECC 2000 - ISQG	G - Low ^a																
ANECC 2000 - ISQG	G - Low ^a																
ANECC 2000 - ISQG	Date	Field ID	Depth														
ANECC 2000 - ISQG Location Code VC01	Date 30/10/2019	Field ID VC01_0.5-1.0	Depth 0.5 - 1.0	<0.01		<0.01						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ANECC 2000 - ISQG Location Code VC01 VC02	Date 30/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5	<0.01		<0.01 <0.01						<0.5 <1	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5
ANECC 2000 - ISQG Location Code VC01 VC02 VC03	Date 30/10/2019 31/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5	<0.01 <0.01 <0.01		<0.01 <0.01 <0.01						<0.5 <1 <1	<0.5 <0.5 <0.5	<0.5 <0.5 <0.5	<0.5 <0.5 <0.5	<0.5 <0.5 <0.5	<0.5 <0.5 <0.5
ANECC 2000 - ISQG Location Code VC01 VC02 VC03 VC04	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0	<0.01 <0.01 <0.01 <0.01		<0.01 <0.01 <0.01 <0.01						<0.5 <1 <1 <0.6	<0.5 <0.5 <0.5 <0.6	<0.5 <0.5 <0.5 <0.6	<0.5 <0.5 <0.5 <0.6	<0.5 <0.5 <0.5 <0.6	<0.5 <0.5 <0.5 <0.6
ANECC 2000 - ISQG Location Code VC01 VC02 VC03 VC04 VC07	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5	<0.01 <0.01 <0.01 <0.01 <0.01 <0.01		<0.01 <0.01 <0.01 <0.01 <0.01						<0.5 <1 <1 <0.6 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5
ANECC 2000 - ISQG Location Code VC01 VC02 VC03 VC04 VC07 VC08	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5	<0.01 <0.01 <0.01 <0.01 <0.01 <0.01		<0.01 <0.01 <0.01 <0.01 <0.01 <0.01						<0.5 <1 <1 <0.6 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5
ANECC 2000 - ISQG Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5	<0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01		<0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01						<0.5 <1 <1 <0.6 <0.5 <0.5 <1	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5
ANECC 2000 - ISQG Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC12	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5	<pre><0.01 <0.01 <0.01</pre>		<0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01						<0.5 <1 <1 <0.6 <0.5 <0.5 <1 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5 <0.5	<0.5 <0.5 <0.5 <0.6 <0.5 <0.5 <0.5 <0.5 <0.5

Statistics										
Number of Results	8	8			8	8	8	8	8	8
Number of Detects	0	0			0	0	0	0	0	0
Minimum Concentration	<0.01	<0.01			<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
Maximum Concentration	<0.01	<0.01			<0.1	<0.6	<0.6	<0.6	<0.6	<0.6

^aCriteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is provided.



					Phenols												
				2-chlorophenol	2- methylnaphthalene	2-methylphenol	2-nitrophenol	3- methylcholanthren e	4-chloro-3- methylphenol	Acetophenone	Pentachlorophenol	Phenol	1,1-dichloroethane	1,2,3- trichlorobenzene	1,2,3- trichloropropane	1,2-dibromoethane	1,3- dichlorobenzene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.005	0.2	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5
NAGD 2009 - SQG-	High Values																
NAGD 2009 - Scree	ning Level														'		
ANZAST 2018 GV-F	ligh																
ANZAST 2018 DGV	C High ^a																
ANECC 2000 - 150	low ^a																
ANLOC 2000 - 13QC	5 - LOW																
Location Code	Date	Field ID	Depth														
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.5	<0.005	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5			· · · · · · · · · · · · · · · · · · ·		<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	<0.5	0.044	<0.5	<0.5		<0.5		<2	<0.5					
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<0.5	<0.005	<0.5	<0.5		<0.5		<2	<0.5					
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.6	<0.005	<0.6	<0.6	<0.6	<0.6	<0.6	<1	<0.6					<0.6
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.5	<0.025	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5					<0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.5	<0.005	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5					<0.5
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.5	<0.005	<0.5	<0.5		<0.5		<2	<0.5					
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.5	<0.005	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5					<0.5
						0	0		0		0	0					
Number of Results				8	8	8	× 0	5	× 0	5	8	8			<u> </u>	 '	ŏ 0
Minimum Concentrat	tion			<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		<0.5			 	<u> </u> '	<0.5
Maximum Concentra	ation			<0.5	0.005	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5			 	 	<0.5
				~0.0	0.044	~ 0.0	~ 0.0	~ 0.0	~ 0.0	~ 0.0	<u>~</u>	~ 0.0			1		~0.0

Location Code	Date	Field ID	Depth						
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.5	<0.005	<0.5	<0.5	<0.5	<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	<0.5	0.044	<0.5	<0.5		<0.5
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<0.5	<0.005	<0.5	<0.5		<0.5
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.6	<0.005	<0.6	<0.6	<0.6	<0.6
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.5	<0.025	<0.5	<0.5	<0.5	<0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.5	<0.005	<0.5	<0.5	<0.5	<0.5
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.5	<0.005	<0.5	<0.5		<0.5
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.5	< 0.005	<0.5	<0.5	<0.5	<0.5

Statistics						
Number of Results	8	8	8	8	5	8
Number of Detects	0	0	0	0	0	0
Minimum Concentration	<0.5	<0.005	<0.5	<0.5	<0.5	<0.5
Maximum Concentration	<0.6	0.044	<0.6	<0.6	<0.6	<0.6

^aCriteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is

provided.



													VC	DCs			
				2-butanone (MEK)	2-hexanone (MBK)	4-methyl-2- pentanone (MIBK)	Bromodichlorometh ane	Bromoform	Carbon disulfide	Chlorodibromomet hane	Chloroethane	cis-1,3- dichloropropene	cis-1,4-Dichloro-2- butene	Dibromomethane	lodomethane	n-butylbenzene	n-propylbenzene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				5	5	5	0.5	0.5	0.5	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5
NAGD 2009 - SQG-	High Values																
NAGD 2009 - Scree	ening Level																
ANZAST 2018 GV-I	High																
ANZAST 2018 DGV	1																
ANZECC 2000 - ISC	QG - High ^a							-	-	-	-	-		-			-
ANECC 2000 - ISQ	G - Low ^a																
Location Code	Date	Field ID	Depth														
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0														
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5														
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5														
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0														
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5														
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5														
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5														
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5														
Statistics																	
Number of Results																,	
Number of Detects																	
Minimum Concentra	ition																
Maximum Concentra	ation								1				1		1	· · · · · · · · · · · · · · · · · · ·	

													VC	DCs			-
				2-butanone (MEK)	2-hexanone (MBK)	4-methyl-2- pentanone (MIBK)	Bromodichlorometh ane	Bromoform	Carbon disulfide	Chlorodibromomet hane	Chloroethane	cis-1,3- dichloropropene	cis-1,4-Dichloro-2- butene	Dibromomethane	lodomethane	n-butylbenzene	n-propylbenzene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				5	5	5	0.5	0.5	0.5	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5
NAGD 2009 - SQG-	High Values																
NAGD 2009 - Scree	ning Level																
ANZAST 2018 GV-H	High																
ANZAST 2018 DGV																	
ANZECC 2000 - ISC	QG - High ^a					-	-	-	-	-	_	-					-
ANECC 2000 - ISQC	G - Low ^a																
Location Code	Date	Field ID	Depth														
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0														
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5														
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5														
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0														
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5														
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5														
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5														
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5														
Statistics					Т	1	r	1	<u>г</u>	1	1	r	r	1			
Number of Results																├ ────┘	
Number of Detects	4:				+										 	├ ──── [!]	
Navinum Concentra					+										 	┟────┘	
uviaximum Concentra	ation				1	1	1	1	1	1	1	1	1	1	1	1 '	1

Statistics]			
Number of Results				
Number of Detects				
Minimum Concentration				
Maximum Concentration				

^aCriteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is provided.



				Pentachloroethane	p-isopropyltoluene	sec-butylbenzene	Trichloroethene	tert-butylbenzene	Tetrachloroethene	trans-1,3- dichloropropene	trans-1,2- dichloroethene	trans-1,4-Dichloro- 2-butene	Trichlorofluorometh ane	Vinyl acetate	1-naphthylamine	2-(acetylamino) fluorene	2-nitroaniline
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	5	0.5	0.5	1
NAGD 2009 - SQG-H	ligh Values																
NAGD 2009 - Screen	ing Level																
ANZAST 2018 GV-H	igh																
ANZAST 2018 DGV																	
ANZECC 2000 - ISQ	G - High ^a																
ANECC 2000 - ISQG	- Low ^a																
Location Code	Date	Field ID	Depth														
Location Code	Date 30/10/2019	Field ID VC01_0.5-1.0	Depth 0.5 - 1.0		1										<0.5	<0.5	<1.0
Location Code VC01 VC02	Date 30/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5												<0.5	<0.5	<1.0
Location Code VC01 VC02 VC03	Date 30/10/2019 31/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5												<0.5	<0.5	<1.0
Location Code VC01 VC02 VC03 VC04	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0												<0.5	<0.5	<1.0
Location Code VC01 VC02 VC03 VC04 VC07	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5												<0.5 <0.6 <0.5	<0.5 <0.6 <0.5	<1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5												<0.5 <0.6 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC12	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC12 Statistics	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC10 VC12 Statistics Number of Results	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC12 Statistics Number of Results Number of Detects	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0 5 0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC10 VC12 Statistics Number of Results Number of Detects Minimum Concentrati	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5 <0.5 5 0 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5 5 0 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0 5 0 <1

				Pentachloroethane	p-isopropyltoluene	sec-butylbenzene	Trichloroethene	tert-butylbenzene	Tetrachloroethene	trans-1,3- dichloropropene	trans-1,2- dichloroethene	trans-1,4-Dichloro- 2-butene	Trichlorofluorometh ane	Vinyl acetate	1-naphthylamine	2-(acetylamino) fluorene	2-nitroaniline
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	5	0.5	0.5	1
NAGD 2009 - SQG-H	ligh Values																
NAGD 2009 - Screen	ing Level																
ANZAST 2018 GV-Hi	igh																
ANZAST 2018 DGV																	
ANZECC 2000 - ISQ	G - High ^a																
ANECC 2000 - ISQG	- Low ^a																
Location Code	Date	Field ID	Depth									-					
Location Code	Date 30/10/2019	Field ID VC01_0.5-1.0	Depth 0.5 - 1.0												<0.5	<0.5	<1.0
Location Code VC01 VC02	Date 30/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5												<0.5	<0.5	<1.0
Location Code VC01 VC02 VC03	Date 30/10/2019 31/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5												<0.5	<0.5	<1.0
Location Code VC01 VC02 VC03 VC04	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0												<0.5	<0.5	<1.0
Location Code VC01 VC02 VC03 VC04 VC07	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 30/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5												<0.5 <0.6 <0.5	<0.5 <0.6 <0.5	<1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5												<0.5 <0.6 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC12	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC12	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC10 VC12 Statistics Number of Results	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC10 VC12 Statistics Number of Results Number of Detects	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC10_0.0-0.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0 5 0
Location Code VC01 VC02 VC03 VC04 VC07 VC08 VC10 VC10 VC12 Statistics Number of Results Number of Detects Minimum Concentration	Date 30/10/2019 31/10/2019 30/10/2019 30/10/2019 30/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019 31/10/2019	Field ID VC01_0.5-1.0 VC02_0.0-0.5 VC03_0.0-0.5 VC04_0.5-1.0 VC07_0.0-0.5 VC08_1.0-1.5 VC12_0.0-0.5	Depth 0.5 - 1.0 0.0 - 0.5 0.0 - 0.5 0.5 - 1.0 0.0 - 0.5 1.0 - 1.5 0.0 - 0.5 0.0 - 0.5												<0.5 <0.6 <0.5 <0.5 <0.5 5 0 <0.5	<0.5 <0.6 <0.5 <0.5 <0.5 5 0 <0.5	<1.0 <1.0 <1.0 <1.0 <1.0 5 0 <1

				Pentachloroethane	p-isopropyltoluene	sec-butylbenzene	Trichloroethene	tert-butylbenzene	Tetrachloroethene	trans-1,3- dichloropropene	trans-1,2- dichloroethene	trans-1,4-Dichloro- 2-butene	Trichlorofluorometh ane	Vinyl acetate	1-naphthylamine	2-(acetylamino) fluorene	2-nitroaniline
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	5	0.5	0.5	1
NAGD 2009 - SQG-H	ligh Values																
NAGD 2009 - Screen	ing Level																
ANZAST 2018 GV-Hi	igh																
ANZAST 2018 DGV																	
ANZECC 2000 - ISQ	G - High ^a						-				-		-	_			
ANECC 2000 - ISQG	- Low ^a																
Location Code	Date	Field ID	Depth														
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0												<0.5	<0.5	<1.0
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5														
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5														
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0												<0.6	<0.6	<1.0
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5												<0.5	<0.5	<1.0
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5												<0.5	<0.5	<1.0
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5														
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5												<0.5	<0.5	<1.0
Chatistics				_													
Statistics					1	1	1	1	1	1	1				F	F	F
Number of Detects				_											5	5	5
Minimum Concentrati	on				+											<0.5	U
															NU.0	NU.U	
Maximum Concentrat	ion														<0.6	<0.6	<u>~1</u>

^aCriteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is provided.



EQL				5.0 Dichlorobenzidine	mg/kg	G a 4-(dimethylamino) G x azobenzene	G da 4-bromophenyl G dy phenyl ether	mg/kg 5.0	G a 4-chlorophenyl G bhenyl ether	5.0 gm/stroaniline	0.0 by/builtroquinoline-N- 50 cxide	mg/kg 0.5	ດ ສີ 7,12- ດີ ອື່ Amethylbenz(a)ant hracene	euiline mg/kg 0.5	euezene mg/kg	o ଇ Bis(2-chloroethoxy) ସ ଇ methane	G A Bis(2- G A chloroethyl)ether
NAGD 2009 - SQG-I	High Values																
NAGD 2009 - Screer	ning Level																
ANZAST 2018 GV-H	ligh																
ANZAST 2018 DGV																	
ANZECC 2000 - ISQ	G - High ^a			_													
ANECC 2000 - ISQG	6 - Low ^a																
Location Code	Date	Field ID	Depth			-							_				
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5														
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5														
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.6	<1.0	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<1	<0.6	<0.6
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5														
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
Statistics											-			-		<u> </u>	
Number of Results				5	5	5	5	5	5	5	5	5	5	5	5	5	5
Number of Detects				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentrat	ion			<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
Maximum Concentra	tion			<0.6	<1	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<1	<0.6	<0.6

Location Code	Date	Field ID	Depth						
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5						
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5						
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.6	<1.0	<0.6	<0.6	<0.6	<0.6
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5						
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5

Statistics]					
Number of Results	5	5	5	5	5	5
Number of Detects	0	0	0	0	0	0
Minimum Concentration	<0.5	<1	<0.5	<0.5	<0.5	<0.5
Maximum Concentration	<0.6	<1	<0.6	<0.6	<0.6	<0.6

^aCriteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is

provided.



				SVOCs													
				Carbazole	Chlorobenzilate	Coronene	Hexachlorocyclope ntadiene	Hexachloroethane	Hexachloropropen e	Isophorone	Methapyrilene	N- nitrosodiethylamine	N-nitrosodi-n- butylamine	N-nitrosodi-n- propylamine	N- Nitrosomethylethyl amine	N- nitrosomorpholine	N-nitrosopiperidine
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.005	2.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NAGD 2009 - SQG-Hi	gh Values																
NAGD 2009 - Screenir	ng Level																
ANZAST 2018 GV-Hig	gh																
ANZAST 2018 DGV																	
ANZECC 2000 - ISQG	i - High ^a																
ANECC 2000 - ISQG -	· Low ^a																
Location Code	Date	Field ID	Depth														
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5			0.375											
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5			<0.005									1		
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.6	<0.6	<0.005	<2.5	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.5	<0.5	0.25	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VC10	21/10/2010		0.0 0.5			<0.005									/		

Location Code	Date	Field ID	Depth						
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5			0.375			
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5			<0.005			
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.6	<0.6	< 0.005	<2.5	<0.6	<0.6
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.5	<0.5	0.25	<2.5	<0.5	<0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5			< 0.005			
VC12	31/10/2019	VC12 0.0-0.5	0.0 - 0.5	< 0.5	<0.5	0.126	<2.5	<0.5	<0.5

Statistics														
Number of Results	5	5	8	5	5	5	5	5	5	5	5	5	5	5
Number of Detects	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Maximum Concentration	<0.6	<0.6	0.375	<2.5	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6

<0.5

<0.5

<0.5

<0.5

<0.5

<0.5

^aCriteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is

provided.

<0.5

<0.5



	N- nitrosopyrrolidine
	mg/kg
EQL	1
NAGD 2009 - SQG-High Values	
NAGD 2009 - Screening Level	
ANZAST 2018 GV-High	
ANZAST 2018 DGV	
ANZECC 2000 - ISQG - High ^a	
ANECC 2000 - ISQG - Low ^a	

Location Code	Date	Field ID	Depth				
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<1.0	<0.5	<0.004	<0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5			0.329	
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5			<0.004	
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<1.0	<0.6	<0.005	<0.6
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<1.0	<0.5	0.174	<0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5	<1.0	<0.5	<0.004	<0.5
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5			<0.004	
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<1.0	<0.5	0.055	<0.5

Statistics				
Number of Results	5	5	8	5
Number of Detects	0	0	3	0
Minimum Concentration	<1.0	<0.5	<0.004	<0.5
Maximum Concentration	<1.0	<0.6	0.329	<0.6

^a Criteria are only listed from the ANZECC (2000) where no updated criterion in the ANZAST (2018) is provided.





Analytical results NAGD phase III analysis

																						Simulta	neously	Total Mercury	Total N	Aetals in
																						Extractat	ole Metals	by FIMS - Low	Saline	∋ Water
											PAH	Compo	ounds ir	n Water								(SE	EM)	Level	Suite A	by ORC-
				Acenaphthene	Acenaphthylene	Anthracene	3enz(a)anthracene	3enzo(a) pyrene	3enzo[b+j]fluoranthene	3enzo(k)fluoranthene	3enzo(g,h,i)perylene	Chrysene	Jibenz(a,h)anthracene	luoranthene	Vaphthalene	luorene	ndeno(1,2,3- c,d)pyrene	ohenanthrene	yrene	PAHs (Sum of total) - _ab calc	fotal 8 PAHs (as BaP FEQ)(zero LOR) - Lab Calc	Copper	Silver	Mercury	Copper	Silver
				µg/L	µq/L	µq/L	µq/L	µg/L	µg/L	µq/L	µg/L	µq/L	µg/L	µq/L	µq/L	µg/L	µq/L	µg/L	µq/L	µq/L	µq/L	mmol/kg	mmol/kg	mg/L	mg/L	mg/L
EQL				0.02	0.02	0.02	0.02	0.005	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.005	0.005	Ŭ	Ŭ	0.00004	0.001	0.0001
ANZG 2018 MW 95%)														70									0.0004	0.0013	
Location Code	Date	Field ID	Depth									-					-							-		
	30/10/2019	SALTWATER		<0.02	<0.02	< 0.02	< 0.02	< 0.005	< 0.02	<0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	<0.02	< 0.02	<0.02	< 0.005	< 0.005			< 0.00004	<0.001	<0.0001
VC02	30/10/2019	VC02_0.0-0.5	0.0 - 0.5	< 0.02	<0.02	< 0.02	< 0.02	< 0.005	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	<0.02	<0.02	< 0.02	< 0.02	< 0.005	<0.005			< 0.00004	< 0.001	< 0.0001
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6																			0.11	< 0.01			
VC07	30/10/2019	VC07_0.0-0.1	0.0 - 0.1																			0.76	< 0.01			
VC07	30/10/2019	VC07 0.0-0.5	0.0 - 0.5	< 0.02	< 0.02	< 0.02	< 0.02	< 0.005	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	<0.02	< 0.02	< 0.02	< 0.02	< 0.005	< 0.005			< 0.00004	< 0.001	< 0.0001
VC12	31/10/2019	VC12 0.0-0.1	0.0 - 0.1																			0.50	<0.01			
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	< 0.02	<0.02	< 0.02	< 0.02	< 0.005	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	<0.02	<0.02	< 0.02	< 0.02	< 0.005	< 0.005	1		< 0.00004	< 0.001	< 0.0001
	-	•	•																							

Statistics																							
Number of Results	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	4	4	4
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Minimum Concentration	<0.02	<0.02	< 0.02	< 0.02	< 0.005	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.005	<0.005	0.11	<0.01	< 0.00004	<0.001	< 0.0001
Maximum Concentration	<0.02	<0.02	< 0.02	< 0.02	<0.005	< 0.02	< 0.02	< 0.02	<0.02	< 0.02	<0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.005	<0.005	0.76	<0.01	< 0.00004	<0.001	<0.0001



		Dioxins I-TEQ 0.5LOB Dioxins I-TEQ 0.5LOB Dioxins I-TEQ 0.5LOB TEQ2 (0.5 LOR) TEQ2 (0.5 LOR)																							Dio	xins I-T	EQ 0xL(JR			
다 정 1234678-HpCDD I- 당 쇼 TEQ2 (0.5 LOR)	тед2 (0.5 LOR) скартед2 (0.5 LOR)	тед (0.5 LOR) Сва ТЕД2 (0.5 LOR)	тед2 (0.5 LOR)	ୁ ଅପ୍ଟ 123478-HxCDF I- ମୁର୍ଦ୍ଧ TEQ2 (0.5 LOR)	тед 123678-НхСDD I- С б ТЕQ2 (0.5 LOR)	ୁ ଅପ୍ଟ୍ରମେ୫-HxCDF I- ମେନ୍ଦ୍ର TEQ2 (0.5 LOR)	ୁ ଅପ୍ଟ୍ର 123789-HxCDD I- ମୁର୍ଦ୍ଧ TEQ2 (0.5 LOR)	тед (0.5 LOR) С б ТЕД2 (0.5 LOR)	다 명 12378-PeCDD I-TEQ2 당 여 (0.5 LOR)	는 명 12378-PeCDF I-TEQ2 당 없 (0.5 LOR)	тед2 (0.5 LOR) Скар ТЕД2 (0.5 LOR)	ା ଅଟି 23478-PeCDF I-TEQ2 ମୁର୍ଦ୍ଧ (0.5 LOR)	୦ ଟ୍ର 2378-TCDD I-TEQ2 ମନ୍ଦ୍ର (0.5 LOR)	୦ ଟ୍ର 2378-TCDF I-TEQ2 ମନ୍ଦ୍ର (0.5 LOR)	^ය ස් OCDD I-TEQ2 (0.5 යි LOR)	လ တြ I-TEQ2 (0.5 ပြင်္က LOR)	ං ස් Total TEQ I-TEQ2 (0.5 ක් LOR)	다 명 1234678-HpCDD I- 당 여 TEQ1 (zero)	ප ස 1234678-HpCDF I- රික් TEQ1 (zero)	는 정 1234789-HpCDF I- 당	다 정 123478-HxCDD I- 당	ප හි 123478-HxCDF I- රික් TEQ1 (zero)	다 정 123678-HxCDD I- 당	다 명 123678-HxCDF I- 당 여 TEQ1 (zero)	୮ ଟ୍ର 123789-HxCDD I- ଟିର୍ଦ୍ଧ TEQ1 (zero)	123789-HxCDF I- 5 b TEQ1 (zero)	다 명 12378-PeCDD I-TEQ1 52 ᆆ (zero)	12378-PeCDF I-TEQ1 52 (zero)	1 234678-HxCDF I- 52 234678-HxCDF I- 57 25 15 234678-HxCDF I-	1 23478-PeCDF I-TEQ1 52 b) (zero)	ල ප 2378-TCDD I-TEQ1 රිකි (zero)
0.67	0.01	0.01	0.12	0.12	0.12	0.12	0.12	0.12	0.62	0.06	0.12	0.62	0.25	0.02	23.30	0.00	26.46	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24.00	4.40	0.37	3.51	3.68	12.80	1.79	9.30	0.12	16.55	0.67	0.12	10.25	18.40	1.67	48.00	1.30	156.94	24.00	4.40	0.37	3.51	3.68	12.80	1.79	9.30	0.00	16.55	0.67	0.00	10.25	18.40
1.92	0.01	0.01	0.12	0.12	0.12	0.12	0.61	0.12	0.61	0.06	0.12	0.61	0.94	0.02	63.60	0.00	69.14	1.92	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.94
1.11	0.01	0.01	0.12	0.12	0.12	0.12	0.53	0.12	0.62	0.06	0.12	0.62	0.25	0.02	34.60	0.00	38.61	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00
7.08	1.23	0.09	0.88	1.12	3.10	0.56	2.97	0.12	3.92	0.22	0.81	2.86	6.49	0.46	19.20	0.36	51.46	7.08	1.23	0.09	0.88	1.12	3.10	0.56	2.97	0.00	3.92	0.22	0.81	2.86	6.49
 1.70	0.01	0.01	0.38	0.12	0.60	0.12	1.13	0.12	1.52	0.06	0.12	0.62	0.25	0.02	19.10	0.00	25.92	1.70	0.00	0.00	0.38	0.00	0.60	0.00	1.13	0.00	1.52	0.00	0.00	0.00	0.00
 2.83	0.01	0.01	0.12	0.12	0.12	0.12	0.58	0.12	0.62	0.06	0.12	0.62	0.25	0.02	73.50	0.00	79.27	2.83	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00
 3.01	0.48	0.03	0.44	0.39	1.31	0.13	1.34	0.13	1./1	0.06	0.13	0.63	1.78	0.19	15.30	0.14	27.16	3.01	0.48	0.03	0.44	0.39	1.31	0.00	1.34	0.00	1./1	0.00	0.00	0.00	1.78
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
 0.67	0.01	0.01	0.12	0.12	0.12	0.12	0.12	0.12	0.61	0.06	0.12	0.61	0.25	0.02	15.3	0	25.92	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0
 24	4.4	0.37	3.51	3.68	12.8	1.79	9.3	0.13	16.55	0.67	0.81	10.25	18.4	1.67	73.5	1.3	156.94	24	4.4	0.37	3.51	3.68	12.8	1.79	9.3	0	16.55	0.67	0.81	10.25	18.4
5.3	0.77	0.068	0.71	0.72	2.3	0.39	2.1	0.12	3.3	0.16	0.21	2.1	3.6	0.3	37	0.23	59	5.3	0.76	0.061	0.65	0.65	2.2	0.29	2.1	0	3	0.11	0.1	1.6	3.5

											Dio	xins I-TI	EQ 0.5>	LOR															Di	oxins I-T	EQ 0xL	OR			
				1234678-HpCDD I- TEQ2 (0.5 LOR)	1234678-HpCDF I- TEQ2 (0.5 LOR)	1234789-HpCDF I- TEQ2 (0.5 LOR)	123478-HxCDD I- TEQ2 (0.5 LOR)	123478-HxCDF I- TEQ2 (0.5 LOR)	123678-HxCDD I- TEQ2 (0.5 LOR)	123678-HxCDF I- TEQ2 (0.5 LOR)	123789-HxCDD I- TEQ2 (0.5 LOR)	123789-HxCDF I- TEQ2 (0.5 LOR)	12378-PeCDD I-TEQ2 (0.5 LOR)	12378-PeCDF I-TEQ2 (0.5 LOR)	234678-HxCDF I- TEQ2 (0.5 LOR)	23478-PeCDF I-TEQ2 (0.5 LOR)	2378-TCDD I-TEQ2 (0.5 LOR)	2378-TCDF I-TEQ2 (0.5 LOR)	OCDD I-TEQ2 (0.5 LOR)	OCDF I-TEQ2 (0.5 LOR)	Total TEQ I-TEQ2 (0.5 LOR)	1234678-HpCDD I- TEQ1 (zero)	1234678-HpCDF I- TEQ1 (zero)	1234789-HpCDF I- TEQ1 (zero)	123478-HxCDD I- TEQ1 (zero)	123478-HxCDF I- TEQ1 (zero)	123678-HxCDD I- TEQ1 (zero)	123678-HxCDF I- TEQ1 (zero)	123789-HxCDD I- TEQ1 (zero)	123789-HxCDF I- TEQ1 (zero)	12378-PeCDD I-TEQ1 (zero)	12378-PeCDF I-TEQ1 (zero)	234678-HxCDF I- TEQ1 (zero)	23478-PeCDF I-TEQ1 (zero)	2378-TCDD I-TEQ1 (zero)
				pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g
EQL				1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25	0.25	5	2.5	0	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25
Location Code	Date	Field ID	Depth																																
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1	0.67	0.01	0.01	0.12	0.12	0.12	0.12	0.12	0.12	0.62	0.06	0.12	0.62	0.25	0.02	23.30	0.00	26.46	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1	24.00	4.40	0.37	3.51	3.68	12.80	1.79	9.30	0.13	16.55	0.67	0.13	10.25	18.40	1.67	48.00	1.30	156.94	24.00	4.40	0.37	3.51	3.68	12.80	0 1.79	9.30	0.00	16.55	0.67	0.00	10.25	18.40
VC03	30/10/2019	VC03_0.0-0.5	0 - 0.5	1.92	0.01	0.01	0.12	0.12	0.12	0.12	0.61	0.12	0.61	0.06	0.12	0.61	0.94	0.02	63.60	0.00	69.14	1.92	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.94
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1	1.11	0.01	0.01	0.12	0.12	0.12	0.12	0.53	0.12	0.62	0.06	0.12	0.62	0.25	0.02	34.60	0.00	38.61	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00
VC07	30/10/2019	VC07_0.0-0.5	0 - 0.5	7.08	1.23	0.09	0.88	1.12	3.10	0.56	2.97	0.12	3.92	0.22	0.81	2.86	6.49	0.46	19.20	0.36	51.46	7.08	1.23	0.09	0.88	1.12	3.10	0.56	2.97	0.00	3.92	0.22	0.81	2.86	6.49
VC08	31/10/2019	VC08_1.0-1.5	1 - 1.5	1.70	0.01	0.01	0.38	0.12	0.60	0.12	1.13	0.12	1.52	0.06	0.12	0.62	0.25	0.02	19.10	0.00	25.92	1.70	0.00	0.00	0.38	0.00	0.60	0.00	1.13	0.00	1.52	0.00	0.00	0.00	0.00
VC10	31/10/2019	VC10_0.0-0.5	0 - 0.5	2.83	0.01	0.01	0.12	0.12	0.12	0.12	0.58	0.12	0.62	0.06	0.12	0.62	0.25	0.02	73.50	0.00	79.27	2.83	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00
VC12	31/10/2019	VC12_0.0-0.5	0 - 0.5	3.01	0.48	0.03	0.44	0.39	1.31	0.13	1.34	0.13	1.71	0.06	0.13	0.63	1.78	0.19	15.30	0.14	27.16	3.01	0.48	0.03	0.44	0.39	1.31	0.00	1.34	0.00	1.71	0.00	0.00	0.00	1.78
Statistics		•		· · ·																									<u> </u>						
Number of Results	-			8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects				8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Number of Results	8	8	8	8	8	8	8	8	8	8	
Number of Detects	8	8	8	8	8	8	8	8	8	8	1
Minimum Concentration	0.67	0.01	0.01	0.12	0.12	0.12	0.12	0.12	0.12	0.61	
Maximum Concentration	24	4.4	0.37	3.51	3.68	12.8	1.79	9.3	0.13	16.55	
Average Concentration *	5.3	0.77	0.068	0.71	0.72	2.3	0.39	2.1	0.12	3.3	



Γ								Dioxin	s Total																		
					Dioxins I-TEQ 1xLOR	Dioxins Total	Dioxins Total LOR	Pe	aks				-			-	Dioxin	s WHO	TEQ 0.	5xLOR			-				
	(zero) (zero)	OCDD I-TEQ1 (zero)	OCDF I-TEQ1 (zero)	Total TEQ I-TEQ1 (zero)	Total TEQ I-TEQ3 (LOR)	Octa-Furan	Hepta-Dioxins LOR	Hepta-Dioxins No. of Peaks	Octa-Furan No. of Peaks	1234678-HpCDD WHO-TEQ2 (0.5 LOR)	1234678-HpCDF WHO-TEQ2 (0.5 LOR)	1234789-HpCDF WHO-TEQ2 (0.5 LOR)	123478-HxCDD WHO- TEQ2 (0.5 LOR)	123478-HxCDF WHO- TEQ2 (0.5 LOR)	123678-HxCDD WHO- TEQ2 (0.5 LOR)	123678-HxCDF WHO- TEQ2 (0.5 LOR)	123789-HxCDD WHO- TEQ2 (0.5 LOR)	123789-HxCDF WHO- TEQ2 (0.5 LOR)	12378-PeCDD WHO- TEQ2 (0.5 LOR)	12378-PeCDF WHO- TEQ2 (0.5 LOR)	234678-HxCDF WHO- TEQ2 (0.5 LOR)	23478-PeCDF WHO- TEQ2 (0.5 LOR)	2378-TCDD WHO- TEQ2 (0.5 LOR)	2378-TCDF WHO- TEQ2 (0.5 LOR)	OCDD WHO-TEQ2 (0.5 LOR)	OCDF WHO-TEQ2 (0.5 LOR)	Total TEQ WHO- TEQ2 (0.5 LOR)
	og/g	pg/g	pg/g	pg/g	pg/g	ng/kg	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g
(0.25	5	2.5	0	0	2.5	1.25	1.25	2.5	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25	0.25	5	2.5	0
(0.00	23.30	0.00	23.97	28.95	<5.0	5.0	2	1	0.67	0.01	0.01	0.12	0.12	0.12	0.12	0.12	0.12	1.25	0.04	0.12	0.37	0.25	0.02	6.99	0.00	10.50
	1.67	48.00	1.30	156.69	157.19	1,300.0	5.0	2	1	24.00	4.40	0.37	3.51	3.68	12.80	1.79	9.30	0.13	33.10	0.40	0.13	6.15	18.40	1.67	14.40	0.39	134.61
(0.00	63.60	0.00	67.07	71.22	<4.9	4.9	2	1	1.92	0.01	0.01	0.12	0.12	0.12	0.12	0.61	0.12	1.23	0.04	0.12	0.37	0.94	0.02	19.08	0.00	24.96
(0.00	34.60	0.00	36.24	40.97	<5.0	5.0	2	1	1.11	0.01	0.01	0.12	0.12	0.12	0.12	0.53	0.12	1.25	0.04	0.12	0.37	0.25	0.02	10.38	0.00	14.73
(0.46	19.20	0.36	51.33	51.58	363.0	5.0	2	1	7.08	1.23	0.09	0.88	1.12	3.10	0.56	2.97	0.12	7.83	0.13	0.81	1.71	6.49	0.46	5.76	0.11	40.45
(0.00	19.10	0.00	24.43	27.41	<5.0	5.0	2	1	1.70	0.01	0.01	0.38	0.12	0.60	0.12	1.13	0.12	3.04	0.04	0.12	0.37	0.25	0.02	5.73	0.00	13.79
(0.00	73.50	0.00	76.91	81.62	<5.0	5.0	2	1	2.83	0.01	0.01	0.12	0.12	0.12	0.12	0.58	0.12	1.25	0.04	0.12	0.37	0.25	0.02	22.05	0.00	28.16
(0.19	15.30	0.14	26.10	28.23	137.0	5.0	2	1	3.01	0.48	0.03	0.44	0.39	1.31	0.13	1.34	0.13	3.42	0.04	0.13	0.38	1.78	0.19	4.59	0.04	17.79
	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	8	8	8	8	8	3	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	0	15.3	0	23.97	27.41	<4.9	4.9	2	1	0.67	0.01	0.01	0.12	0.12	0.12	0.12	0.12	0.12	1.23	0.04	0.12	0.37	0.25	0.02	4.59	0	10.5
	1.67	73.5	1.3	156.69	157.19	1,300	5	2	1	24	4.4	0.37	3.51	3.68	12.8	1.79	9.3	0.13	33.1	0.4	0.81	6.15	18.4	1.67	22.05	0.39	134.61
(0.29	37	0.23	58	61	227	5	2	1	5.3	0.77	0.068	0.71	0.72	2.3	0.39	2.1	0.12	6.5	0.096	0.21	1.3	3.6	0.3	11	0.068	36

											Dioxir	ns Total																		
					•		•	Dioxins I-TEQ 1xLOR	Dioxins Total	Dioxins Total LOR	Pe	eaks				-		-		Dioxi	<u>ns WH0</u>	<u> </u>	.5xLOR				<u> </u>			
				2378-TCDF I-TEQ1 (zero)	OCDD I-TEQ1 (zero)	OCDF I-TEQ1 (zero)	Total TEQ I-TEQ1 (zero)	Total TEQ I-TEQ3 (LOR)	Octa-Furan	Hepta-Dioxins LOR	Hepta-Dioxins No. of Peaks	Octa-Furan No. of Peaks	1234678-HpCDD WHO-TEQ2 (0.5 LOR)	1234678-HpCDF WHO-TEQ2 (0.5 LOR)	1234789-HpCDF WHO-TEQ2 (0.5 LOR)	123478-H×CDD WHO- TEQ2 (0.5 LOR)	123478-H×CDF WHO- TEQ2 (0.5 LOR)	123678-HxCDD WHO- TEQ2 (0.5 LOR)	123678-HxCDF WHO- TEQ2 (0.5 LOR)	123789-HxCDD WHO- TEQ2 (0.5 LOR)	123789-HxCDF WHO- TEQ2 (0.5 LOR)	12378-PeCDD WHO- TEQ2 (0.5 LOR)	12378-PeCDF WHO- TEQ2 (0.5 LOR)	234678-HxCDF WHO- TEQ2 (0.5 LOR)	23478-PeCDF WHO- TEQ2 (0.5 LOR)	2378-TCDD WHO- TEQ2 (0.5 LOR)	2378-TCDF WHO- TEQ2 (0.5 LOR)		0.5 LOR)	Total TEQ WHU- TEQ2 (0.5 LOR)
				pg/g	pg/g	pg/g	pg/g	pg/g	ng/kg	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g r	bg/g	pg/g
EQL				0.25	5	2.5	0	0	2.5	1.25	1.25	2.5	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25	0.25	5	2.5	0
Location Code	Date	Field ID	Depth		_								-					-			-								<u>_</u>	
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1	0.00	23.30	0.00	23.97	28.95	<5.0	5.0	2	1	0.67	0.01	0.01	0.12	0.12	0.12	0.12	0.12	0.12	1.25	0.04	0.12	0.37	0.25	0.02	6.99 ().00 1	10.50
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1	1.67	48.00	1.30	156.69	9 157.19	1,300.0	5.0	2	1	24.00	4.40	0.37	3.51	3.68	12.80	1.79	9.30	0.13	33.10	0.40	0.13	6.15	18.40	1.67	14.40 ().39 <u>1</u> '	34.61
VC03	30/10/2019	VC03_0.0-0.5	0 - 0.5	0.00	63.60	0.00	67.07	71.22	<4.9	4.9	2	1	1.92	0.01	0.01	0.12	0.12	0.12	0.12	0.61	0.12	1.23	0.04	0.12	0.37	0.94	0.02	19.08 ().00 2	24.96
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1	0.00	34.60	0.00	36.24	40.97	<5.0	5.0	2	1	1.11	0.01	0.01	0.12	0.12	0.12	0.12	0.53	0.12	1.25	0.04	0.12	0.37	0.25	0.02	10.38 ().00 1	14.73
VC07	30/10/2019	VC07_0.0-0.5	0 - 0.5	0.46	19.20	0.36	51.33	51.58	363.0	5.0	2	1	7.08	1.23	0.09	0.88	1.12	3.10	0.56	2.97	0.12	7.83	0.13	0.81	1.71	6.49	0.46	5.76 ().11 4	10.45
VC08	31/10/2019	VC08_1.0-1.5	1 - 1.5	0.00	19.10	0.00	24.43	27.41	<5.0	5.0	2	1	1.70	0.01	0.01	0.38	0.12	0.60	0.12	1.13	0.12	3.04	0.04	0.12	0.37	0.25	0.02	5.73 ().00 1	13.79
VC10	31/10/2019	VC10_0.0-0.5	0 - 0.5	0.00	73.50	0.00	76.91	81.62	<5.0	5.0	2	1	2.83	0.01	0.01	0.12	0.12	0.12	0.12	0.58	0.12	1.25	0.04	0.12	0.37	0.25	0.02	22.05 ().00 2	28.16
VC12	31/10/2019	VC12_0.0-0.5	0 - 0.5	0.19	15.30	0.14	26.10	28.23	137.0	5.0	2	1	3.01	0.48	0.03	0.44	0.39	1.31	0.13	1.34	0.13	3.42	0.04	0.13	0.38	1.78	0.19	4.59 ().04 1	17.79
Statistics						-			-	-			-				- <u> </u>													
Number of Results				8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects				8	8	8	8	8	3	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Minimum Concentratio	n			0	153	0	23 97	27 41	<4.9	4 9	2	1	0.67	0.01	0.01	0 12	0 12	0 12	0 12	0 12	0 12	1 2 3	0.04	0.12	0 37	0.25	0.02	4 59	0	10 5

Number of Results	8	8	8	8	8	8	8
Number of Detects	8	8	8	8	8	3	8
Minimum Concentration	0	15.3	0	23.97	27.41	<4.9	4.9
Maximum Concentration	1.67	73.5	1.3	156.69	157.19	1,300	5
Average Concentration *	0.29	37	0.23	58	61	227	5
	-	-	-	-		-	



								Diovi	na WUC																	Diovi	na \V/⊔C					
ŀ			r	1	1	1						1										1		1					XLUK		T	
_	1234678-HpCDD WHO-TEQ1 (zero)	1234678-HpCDF WHO-TEQ1 (zero)	1234789-HpCDF WHO-TEQ1 (zero)	123478-HxCDD WHO. TEQ1 (zero)	123478-HxCDF WHO TEQ1 (zero)	123678-HxCDD WHO TEQ1 (zero)	123678-HxCDF WHO. TEQ1 (zero)	123789-HxCDD WHO TEQ1 (zero)	123789-HxCDF WHO TEQ1 (zero)	12378-PeCDD WHO- TEQ1 (zero)	12378-PeCDF WHO- TEQ1 (zero)	234678-HxCDF WHO- TEQ1 (zero)	23478-PeCDF WHO- TEQ1 (zero)	2378-TCDD WHO- TEQ1 (zero)	2378-TCDF WHO- TEQ1 (zero)	OCDD WHO-TEQ1 (zero)	OCDF WHO-TEQ1 (zero)	Total TEQ WHO- TEQ1 (zero)	1234678-НрСDD WHO-ТЕQ3 (LOR)	1234678-HpCDF WHO-TEQ3 (LOR)	1234789-НрСDF WHO-ТЕQ3 (LOR)	123478-HxCDD WHO. TEQ3 (LOR)	123478-HxCDF WHO- TEQ3 (LOR)	123678-НхСDD WHO. ТЕQ3 (LOR)	123678-НхСDF WHO- ТЕQ3 (LOR)	123789-Н×СDD WHO ТЕQ3 (LOR)	123789-HxCDF WHO. TEQ3 (LOR)	12378-PeCDD WHO- TEQ3 (LOR)	12378-PeCDF WHO- TEQ3 (LOR)	234678-HxCDF WHO- TEQ3 (LOR)	23478-PeCDF WHO- TEQ3 (LOR)	2378-TCDD WHO- TEQ3 (LOR)
	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g
	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25	0.25	5	2.5	0	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25
	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.99	0.00	7.66	0.67	0.02	0.02	0.25	0.25	0.25	0.25	0.25	0.25	2.50	0.07	0.25	0.75	0.50
	24.00	4.40	0.37	3.51	3.68	12.80	1.79	9.30	0.00	33.10	0.40	0.00	6.15	18.40	1.67	14.40	0.39	134.36	24.00	4.40	0.37	3.51	3.68	12.80	1.79	9.30	0.25	33.10	0.40	0.25	6.15	18.40
	1.92	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.94	0.00	19.08	0.00	22.55	1.92	0.02	0.02	0.25	0.25	0.25	0.25	0.61	0.25	2.45	0.07	0.25	0.74	0.94
	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.38	0.00	12.02	1.11	0.02	0.02	0.25	0.25	0.25	0.25	0.53	0.25	2.50	0.07	0.25	0.75	0.50
	7.08	1.23	0.09	0.88	1.12	3.10	0.56	2.97	0.00	7.83	0.13	0.81	1.71	6.49	0.46	5.76	0.11	40.32	7.08	1.23	0.09	0.88	1.12	3.10	0.56	2.97	0.25	7.83	0.13	0.81	1.71	6.49
	1.70	0.00	0.00	0.38	0.00	0.60	0.00	1.13	0.00	3.04	0.00	0.00	0.00	0.00	0.00	5.73	0.00	12.58	1.70	0.02	0.02	0.38	0.25	0.60	0.25	1.13	0.25	3.04	0.07	0.25	0.75	0.50
	2.83	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.05	0.00	25.46	2.83	0.02	0.02	0.25	0.25	0.25	0.25	0.58	0.25	2.49	0.07	0.25	0.75	0.50
	3.01	0.48	0.03	0.44	0.39	1.31	0.00	1.34	0.00	3.42	0.00	0.00	0.00	1.78	0.19	4.59	0.04	17.01	3.01	0.48	0.03	0.44	0.39	1.31	0.25	1.34	0.25	3.42	0.08	0.25	0.75	1.78
	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.59	0	7.66	0.67	0.02	0.02	0.25	0.25	0.25	0.25	0.25	0.25	2.45	0.07	0.25	0.74	0.5
	24	4.4	0.37	3.51	3.68	12.8	1.79	9.3	0	33.1	0.4	0.81	6.15	18.4	1.67	22.05	0.39	134.36	24	4.4	0.37	3.51	3.68	12.8	1.79	9.3	0.25	33.1	0.4	0.81	6.15	18.4
	5.3	0.76	0.061	0.65	0.65	2.2	0.29	2.1	0	5.9	0.066	0.1	0.98	3.5	0.29	11	0.068	34	5.3	0.78	0.074	0.78	0.8	2.4	0.48	2.1	0.25	7.2	0.12	0.32	1.5	3.7

											Dioxi	ins WH0	D-TEQ (0xLOR															Dioxii	ns WHO	-TEQ 1	xLOR			
				1234678-HpCDD WHO-TEQ1 (zero)	1234678-HpCDF WHO-TEQ1 (zero)	1234789-HpCDF WHO-TEQ1 (zero)	123478-HxCDD WHO- TEQ1 (zero)	123478-HxCDF WHO- TEQ1 (zero)	123678-HxCDD WHO- TEQ1 (zero)	123678-HxCDF WHO- TEQ1 (zero)	123789-HxCDD WHO- TEQ1 (zero)	123789-HxCDF WHO- TEQ1 (zero)	12378-PeCDD WHO- TEQ1 (zero)	12378-PeCDF WHO- TEQ1 (zero)	234678-HxCDF WHO- TEQ1 (zero)	23478-PeCDF WHO- TEQ1 (zero)	2378-TCDD WHO- TEQ1 (zero)	2378-TCDF WHO- TEQ1 (zero)	OCDD WHO-TEQ1 (zero)	OCDF WHO-TEQ1 (zero)	Total TEQ WHO- TEQ1 (zero)	1234678-HpCDD WHO-TEQ3 (LOR)	1234678-HpCDF WHO-TEQ3 (LOR)	1234789-HpCDF WHO-TEQ3 (LOR)	123478-HxCDD WHO- TEQ3 (LOR)	123478-HxCDF WHO- TEQ3 (LOR)	123678-HxCDD WHO- TEQ3 (LOR)	123678-HxCDF WHO- TEQ3 (LOR)	123789-НхСDD WHO- ТЕQ3 (LOR)	123789-HxCDF WHO- TEQ3 (LOR)	12378-PeCDD WHO- TEQ3 (LOR)	12378-PeCDF WHO- TEQ3 (LOR)	234678-HxCDF WHO- TEQ3 (LOR)	23478-PeCDF WHO- TEQ3 (LOR)	2378-ТСDD WHO- ТЕQ3 (LOR)
				pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g								
				1.25	1.25	1.25	1.20	1.25	1.20	1.25	1.20	1.25	1.25	1.25	1.20	1.20	0.25	0.25	5	2.5	0	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25
Location Code	Date	Field ID	Depth																																
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.99	0.00	7.66	0.67	0.02	0.02	0.25	0.25	0.25	0.25	0.25	0.25	2.50	0.07	0.25	0.75	0.50
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1	24.00	4.40	0.37	3.51	3.68	12.80	1.79	9.30	0.00	33.10	0.40	0.00	6.15	18.40	1.67	14.40	0.39	134.36	24.00	4.40	0.37	3.51	3.68	12.80	1.79	9.30	0.25	33.10	0.40	0.25	6.15	18.40
VC03	30/10/2019	VC03_0.0-0.5	0 - 0.5	1.92	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.94	0.00	19.08	0.00	22.55	1.92	0.02	0.02	0.25	0.25	0.25	0.25	0.61	0.25	2.45	0.07	0.25	0.74	0.94
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.38	0.00	12.02	1.11	0.02	0.02	0.25	0.25	0.25	0.25	0.53	0.25	2.50	0.07	0.25	0.75	0.50
VC07	30/10/2019	VC07_0.0-0.5	0 - 0.5	7.08	1.23	0.09	0.88	1.12	3.10	0.56	2.97	0.00	7.83	0.13	0.81	1.71	6.49	0.46	5.76	0.11	40.32	7.08	1.23	0.09	0.88	1.12	3.10	0.56	2.97	0.25	7.83	0.13	0.81	1.71	6.49
VC08	31/10/2019	VC08_1.0-1.5	1 - 1.5	1.70	0.00	0.00	0.38	0.00	0.60	0.00	1.13	0.00	3.04	0.00	0.00	0.00	0.00	0.00	5.73	0.00	12.58	1.70	0.02	0.02	0.38	0.25	0.60	0.25	1.13	0.25	3.04	0.07	0.25	0.75	0.50
VC10	31/10/2019	VC10_0.0-0.5	0 - 0.5	2.83	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.05	0.00	25.46	2.83	0.02	0.02	0.25	0.25	0.25	0.25	0.58	0.25	2.49	0.07	0.25	0.75	0.50
VC12	31/10/2019	VC12_0.0-0.5	0 - 0.5	3.01	0.48	0.03	0.44	0.39	1.31	0.00	1.34	0.00	3.42	0.00	0.00	0.00	1.78	0.19	4.59	0.04	17.01	3.01	0.48	0.03	0.44	0.39	1.31	0.25	1.34	0.25	3.42	0.08	0.25	0.75	1.78
Statistics		-										-																-							
Number of Results				8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects				8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

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8	8	8	8	8	8	8	8	8	8	
8	8	8	8	8	8	8	8	8	8	
0.67	0	0	0	0	0	0	0	0	0	
24	4.4	0.37	3.51	3.68	12.8	1.79	9.3	0	33.1	Γ
5.3	0.76	0.061	0.65	0.65	2.2	0.29	2.1	0	5.9	(
	8 8 0.67 24 5.3	8 8 8 8 0.67 0 24 4.4 5.3 0.76	8 8 8 8 8 8 0.67 0 0 24 4.4 0.37 5.3 0.76 0.061	8 8 8 8 8 8 8 8 0.67 0 0 0 24 4.4 0.37 3.51 5.3 0.76 0.061 0.65	8 8 8 8 8 8 8 8 8 8 0.67 0 0 0 0 24 4.4 0.37 3.51 3.68 5.3 0.76 0.061 0.65 0.65	8 9 0.67 0 <th0< th=""> 1 0 0</th0<>	8 9 0.0 0	8 9 0.0 0	8 9 9 10 10 10 10 10 10 10 10 10 10 <th10< th=""> <th10< th=""> <th< td=""><td>8 9 9 9 9 9 9 9 3 0 33.1 1 3 3 3 3</td></th<></th10<></th10<>	8 9 9 9 9 9 9 9 3 0 33.1 1 3 3 3 3



r					1																										
																									C)ioxins 8	& Furan	s			
	2378-TCDF WHO- TEQ3 (LOR)	OCDD WHO-TEQ3 (LOR)	OCDF WHO-TEQ3 (LOR)	Total TEQ WHO- TEQ3 (LOR)	, Hepta-Dioxins	, Tetra-Dioxins	, Hepta-Furans	Hepta-Furans LOR4 pg/g	Hepta-Furans No. of Peaks	Hexa-Dioxins LOR4 pg/g	Hexa-Dioxins No. of Peaks	Hexa-Furans LOR4 pg/g	Hexa-Furans No. of Peaks	Octa-Dioxin LOR4 pg/g	Octa-Dioxin No. of Peaks	Penta-Dioxins LOR4 pg/g	Penta-Dioxins No. of Peaks	Penta-Furans LOR4 pg/g	Penta-Furans No. of Peaks	Tetra-Dioxins LOR4 pg/g	Tetra-Dioxins No. of Peaks	Tetra-Furans LOR4 pg/g	Tetra-Furans No. of Peaks	,1234678-HpCDD	,1234678-HpCDF	,1234789-HpCDF	,123478-HxCDD	,123478-HxCDF	,123678-HxCDD	123678-HxCDF	123789-HxCDD
	pg/g	pg/g	pg/g	pg/g	ng/kg	ng/kg	ng/kg	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
	0.25	5	2.5	0	1.25	0.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	5	5	1.25	1.25	1.25	1.25	0.25	0.25	0.25	0.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
	0.05 1.67 0.05	6.99 14.40 19.08	0.00 0.39 0.00	13.33 134.86 27.38	144.0 7,140.0 525.0	<6.5 343.0 71.0	<2.5 1,350.0 <2.5	2.5 10.0 2.5	1 4 1	7.5 17.5 12.3	3 7 5	2.5 25.0 2.5	1 10 1	10.0 10.0 9.8	1 1 1	15.0 25.0 14.7	6 10 6	2.5 30.0 2.5	1 12 1	6.5 5.5 2.0	13 11 4	0.5 9.0 0.5	1 18 1	67.0 2,400.0 192.0	<2.5 440.0 <2.5	<2.5 37.0 <2.5	<2.5 35.1 <2.5	<2.5 36.8 <2.5	<2.5 128.0 <2.5	<2.5 17.9 <2.5	<2.5 93.0 6.1
	0.05	10.38	0.00	17.44	252.0	27.4	<2.5	2.5	1	15.0	6	2.5	1	10.0	1	17.5	7	2.5	1	3.0	6	0.5	1	111.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	5.3
	0.46	5.76	0.11	40.57	2.230.0	118.0	344.0	10.0	4	17.5	7	27.5	11	10.0	1	20.0	8	27.5	11	6.5	13	9.0	18	708.0	123.0	8.8	8.8	11.2	31.0	5.6	29.7
	0.05	5.73	0.00	15.01	1.160.0	474.0	<7.5	7.5	3	17.5	7	2.5	1	10.0	1	15.0	6	2.5	1	1.5	3	0.5	1	170.0	<2.5	<2.5	3.8	<2.5	6.0	<2.5	11.3
	0.05	22.05	0.00	30.87	1.090.0	269.0	<2.5	2.5	1	17.4	7	2.5	1	10.0	1	12.5	5	2.5	1	1.5	3	0.5	1	283.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	5.8
	0.19	4.59	0.04	18.58	894.0	95.8	128.0	10.0	4	17.5	7	27.5	11	10.0	1	20.0	8	25.0	10	6.5	13	9.0	18	301.0	47.5	2.8	4.4	3.9	13.1	<2.5	13.4
													_																		
	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	8	8	8	8	8	7	3	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	3	3	4	3	4	2	7
	0.05	4.59	0	13.33	144	<6.5	<2.5	2.5	1	7.5	3	2.5	1	9.8	1	12.5	5	2.5	1	1.5	3	0.5	1	67	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
	1.67	22.05	0.39	134.86	7,140	474	1,350	10	4	17.5	7	27.5	11	10	1	25	10	30	12	6.5	13	9	18	2,400	440	37	35.1	36.8	128	17.9	93
	0.32	11	0.068	37	1,679	175	229	5.9	2.4	15	6.1	12	4.6	10	1	17	7	12	4.8	4.1	8.2	3.7	7.4	529	77	6.9	7.1	7.3	23	3.9	21

																												<u> </u>	Dioxins &	& Furan	S			
				2378-TCDF WHO- TEQ3 (LOR)	OCDD WHO-TEQ3 (LOR)	OCDF WHO-TEQ3 (LOR)	Total TEQ WHO- TEQ3 (LOR)	Hepta-Dioxins	Tetra-Dioxins	Hepta-Furans	Hepta-Furans LOR4 pg/g	Hepta-Furans No. of Peaks	Hexa-Dioxins LOR4 pg/g	Hexa-Dioxins No. of Peaks	Hexa-Furans LOR4 pg/g	Hexa-Furans No. of Peaks	Octa-Dioxin LOR4 pg/g	Octa-Dioxin No. of Peaks	Penta-Dioxins LOR4 pg/g	Penta-Dioxins No. of Peaks	Penta-Furans LOR4 pg/g	Penta-Furans No. of Peaks	Tetra-Dioxins LOR4 pg/g	Tetra-Dioxins No. of Peaks	Tetra-Furans LOR4 pg/g	Tetra-Furans No. of Peaks	1234678-HpCDD	1234678-HpCDF	1234789-HpCDF	123478-HxCDD	123478-HxCDF	123678-HxCDD	123678-HxCDF	123789-HxCDD
				pg/g	pg/g	pg/g	pg/g	ng/kg	ng/kg	ng/kg	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
EQL				0.25	5	2.5	0	1.25	0.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	5	5	1.25	1.25	1.25	1.25	0.25	0.25	0.25	0.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Location Code	Date	Field ID	Depth	0.05	6.00		12 22		-6 F	<25	25	1 1	7.5	2	25	1	10.0	1	15.0		25	4	6.5	12	0.5	1	67.0	<2 F	<2.5	<2.5	<25	<25	<2.5	<25
	30/10/2019	VC01_0.5-1.0	0.5 - 1	0.05	0.99	0.00	13.33		< 0.5	<2.5	2.5	1	1.5	3	2.5	1	10.0		15.0	0	2.5	1	0.5	13	0.5	1	07.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1	1.67	14.40	0.39	134.86	57,140.0	343.0	1,350.0) 10.0	4	17.5	/	25.0	10	10.0	1	25.0	10	30.0	12	5.5	11	9.0	18	2,400.0	440.0	37.0	35.1	36.8	128.0	17.9	93.0
VC03	30/10/2019	VC03_0.0-0.5	0 - 0.5	0.05	19.08	0.00	27.38	525.0	/1.0	<2.5	2.5	1	12.3	5	2.5	1	9.8	1	14.7	6	2.5	1	2.0	4	0.5	1	192.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	6.1
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1	0.05	10.38	0.00	17.44	252.0	27.4	<2.5	2.5	1	15.0	6	2.5	1	10.0	1	17.5	/	2.5	1	3.0	6	0.5	1	111.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	5.3
VC07	30/10/2019	VC07_0.0-0.5	0 - 0.5	0.46	5.76	0.11	40.57	2,230.0) 118.0	344.0	10.0	4	17.5	1	27.5	11	10.0	1	20.0	8	27.5	11	6.5	13	9.0	18	/08.0	123.0	8.8	8.8	11.2	31.0	5.6	29.7
VC08	31/10/2019	VC08_1.0-1.5	1 - 1.5	0.05	5.73	0.00	15.01	1,160.0) 474.0	<7.5	7.5	3	17.5	7	2.5	1	10.0	1	15.0	6	2.5	1	1.5	3	0.5	1	170.0	<2.5	<2.5	3.8	<2.5	6.0	<2.5	11.3
VC10	31/10/2019	VC10_0.0-0.5	0 - 0.5	0.05	22.05	0.00	30.87	1,090.0	269.0	<2.5	2.5	1	17.4	7	2.5	1	10.0	1	12.5	5	2.5	1	1.5	3	0.5	1	283.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	5.8
VC12	31/10/2019	VC12_0.0-0.5	0 - 0.5	0.19	4.59	0.04	18.58	8 894.0	95.8	128.0	10.0	4	17.5	7	27.5	11	10.0	1	20.0	8	25.0	10	6.5	13	9.0	18	301.0	47.5	2.8	4.4	3.9	13.1	<2.5	13.4
Statistics					_						-	-										-		-										-
Number of Results				8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects				8	8	8	8	8	7	3	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	3	3	4	3	4	2	7
Minimum Concentration	n			0.05	4 59	0	13.33	144	< 6.5	<2.5	2.5	1	75	3	2.5	1	9.8	1	12.5	5	2.5	1	15	3	0.5	1	67	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5

Number of Results	8	8	8	8	8	8	8	8	8	8
Number of Detects	8	8	8	8	8	7	3	8	8	8
Minimum Concentration	0.05	4.59	0	13.33	144	<6.5	<2.5	2.5	1	7.5
Maximum Concentration	1.67	22.05	0.39	134.86	7,140	474	1,350	10	4	17.5
Average Concentration *	0.32	11	0.068	37	1,679	175	229	5.9	2.4	15
				-						



																							Dic	oxins &	Furans	(LOR)				
, 123789-HxCDF	2378-TCDD	12378-PeCDD	12378-PeCDF	234678-HxCDF	23478-PeCDF	2378-TCDF	, Hexa-Dioxins	Hexa-Furans	octa-Dioxin	Octa-Furan LOR4 `pg/g	Penta-Dioxins	. Penta-Furans	OCDD	OCDF	Total TEQ	, Tetra-Furans	1234678-HpCDD LOR pg/g	1234678-HpCDF LOR pg/g	1234789-HpCDF LOR pg/g	123478-HxCDD LOR pg/g	123478-HxCDF LOR pg/g	123678-HxCDD LOR pg/g	123678-HxCDF LOR pg/g	123789-HxCDD LOR pg/g	123789-HxCDF LOR pg/g	12378-PeCDD LOR pg/g	12378-PeCDF LOR pg/g	234678-HxCDF LOR pg/g	23478-PeCDF LOR pg/g	2378-TCDD LOR pg/g
ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	pg/g	ng/kg	ng/kg	ng/kg	ng/kg	-	ng/kg	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	<u>pg/g</u>	pg/g	pg/g	pg/g	pg/g	pg/g
 1.25	0.25	1.25	1.25	1.25	1.25	0.25	1.25	1.25	5	2.5	1.25	1.25	5	2.5		0.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25
<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	19.7	<2.5	23,300.0	5.0	<15.0	<2.5	23,300.0	<5.0	1	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
<2.5	18.4	33.1	13.4	<2.5	20.5	16.7	3,030.0	509.0	48,000.0	5.0	627.0	258.0	48,000.0	1,300.0	1	234.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
<2.5	0.9	<2.5	<2.5	<2.5	<2.5	<0.5	388.0	<2.5	63,600.0	4.9	67.7	<2.5	63,600.0	<4.9	1	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	115.0	<2.5	34,600.0	5.0	<17.5	<2.5	34,600.0	<5.0	1	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
<2.5	6.5	7.8	4.4	8.1	5.7	4.6	1,240.0	151.0	19,200.0	5.0	208.0	75.9	19,200.0	363.0	1	68.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
<2.5	<0.5	3.0	<2.5	<2.5	<2.5	<0.5	708.0	<2.5	19,100.0	5.0	129.0	<2.5	19,100.0	<5.0	1	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	518.0	<2.5	73,500.0	5.0	85.1	<2.5	73,500.0	<5.0	1	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
<2.5	1.8	3.4	<2.5	<2.5	<2.5	1.9	459.0	54.1	15,300.0	5.0	96.5	<25.0	15,300.0	137.0	1	18.7	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
 8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
 0	4	4	2	1	2	3	8	3	8	8	6	2	8	3	8	3	8	8	8	8	8	8	8	8	8	8	8	8	8	8
<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	19.7	<2.5	15,300	4.9	<15	<2.5	15,300	<4.9	1	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
 <0 E	10 /	22.4	12 /	01	20 E	167	2 0 2 0	E00	72 500	E	607	250	72 500	1 200	1	004	25	2 5	2 5	2 5	<u> </u>	25	25	2 5	2 5	25	25	25	25	

																											Dio	xins & F	⁻ urans (LOR)				
				123789-HxCDF	2378-TCDD	12378-PeCDD	12378-PeCDF	234678-HxCDF	23478-PeCDF	2378-TCDF	Hexa-Dioxins	Hexa-Furans	Octa-Dioxin	Octa-Furan LOR4 pg/g	Penta-Dioxins	Penta-Furans	осрр	OCDF	Total TEQ	Tetra-Furans	12346/8-прсии LUR pg/g 1221678 цъспе I СВ	pg/g	1234/89-HPCUF LUK pg/g	123478-HxCDD LOR pg/g	123478-HxCDF LOR pg/g	123678-HxCDD LOR pg/g	123678-HxCDF LOR pg/g	123789-HxCDD LOR pg/g	123789-HxCDF LOR pg/g	12378-PeCDD LOR pg/g	12378-PeCDF LOR pg/g	234678-HxCDF LOR pg/g	23478-PeCDF LOR pg/g	2378-TCDD LOR pg/g
				ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	pg/g	ng/kg	ng/kg	ng/kg	ng/kg	- n	g/kg	pg/g p	og/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g
EQL				1.25	0.25	1.25	1.25	1.25	1.25	0.25	1.25	1.25	5	2.5	1.25	1.25	5	2.5	(.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25
Location Code	Date	Field ID	Depth																															
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1	<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	19.7	<2.5	23,300.0	0 5.0	<15.0	<2.5	23,300.0	<5.0	1 <	:0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1	<2.5	18.4	33.1	13.4	<2.5	20.5	16.7	3,030.0	509.0	48,000.0	0 5.0	627.0	258.0	48,000.0	1,300.0	1 2	34.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC03	30/10/2019	VC03_0.0-0.5	0 - 0.5	<2.5	0.9	<2.5	<2.5	<2.5	<2.5	<0.5	388.0	<2.5	63,600.0	0 4.9	67.7	<2.5	63,600.0	<4.9	1 <	:0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC04	30/10/2019	VC04 0.5-1.0	0.5 - 1	<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	115.0	<2.5	34,600.0	0 5.0	<17.5	<2.5	34,600.0	<5.0	1 <	:0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC07	30/10/2019	VC07 0.0-0.5	0 - 0.5	<2.5	6.5	7.8	4.4	8.1	5.7	4.6	1,240.0	151.0	19,200.0	0 5.0	208.0	75.9	19,200.0	363.0	1 6	8.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC08	31/10/2019	VC08 1.0-1.5	1 - 1.5	<2.5	<0.5	3.0	<2.5	<2.5	<2.5	<0.5	708.0	<2.5	19,100.0	0 5.0	129.0	<2.5	19,100.0	<5.0	1 <	:0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC10	31/10/2019	VC10_0.0-0.5	0 - 0.5	<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	518.0	<2.5	73,500.0	0 5.0	85.1	<2.5	73,500.0	<5.0	1 <	:0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC12	31/10/2019	VC12_0.0-0.5	0 - 0.5	<2.5	1.8	3.4	<2.5	<2.5	<2.5	1.9	459.0	54.1	15,300.0	0 5.0	96.5	<25.0	15,300.0	137.0	1 1	8.7	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
Statistics		•				-	-				-	-				-						<u>.</u>												
Number of Results				8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects				0	4	4	2	1	2	3	8	3	8	8	6	2	8	3	8	3	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Minimum Concentratio	n			<2.5	< 0.5	<2.5	<2.5	<2.5	<2.5	<0.5	19.7	<2.5	15,300	4.9	<15	<2.5	15,300	<4.9	1 <	:0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
Maximum Canaantratic				<0 F	10 /	22.4	10 /	0.1	20 E	167	2 0 2 0	E00	72 500	F	607	250	72 500	1 200	1 4	124	25	2 5	2 E	25	25	2 5	25	25	25	25	25	25	25	0.5

																															-		-	
																											Dio	xins & F	- urans (LOR)				
				ба 123789-НхСDF	ල් කි 2378-TCDD	da dy 12378-PeCDD	d A A 12378-PeCDF	G S S 34678-HxCDF	а 3478-РеСDF б	д 378-ТСDF б	6a Mexa-Dioxins	by/Kexa-Furans	6 by/Octa-Dioxin	තු Octa-Furan LOR4 ක් pg/g	benta-Dioxins	65 Xy/ Penta-Furans 6	D D D D D D D D D D D D D D D D D D D	L D D ng/kg	- Total TEQ	C Tetra-Furans م 1 1024678-HnCDD 1 DD	а I 2340/0-ПРОЛИ ГОЛ Ф рg/g Н 1234678-НиСПЕ I ОВ	able polyton room reaction for the room room reaction rea	ದ್ದ 1234789-HpCDF LOR ಹ pg/g	සු 123478-HxCDD LOR ශ් pg/g	ଜ୍ଜୁ 123478-HxCDF LOR ଜ୍ରୁ pg/g	ස් 123678-HxCDD LOR ම pg/g	ස් 123678-HxCDF LOR ම pg/g	සු 123789-HxCDD LOR යි pg/g	д ф рg/g	ස් 12378-PeCDD LOR සි pg/g	සු 12378-PeCDF LOR යි pg/g	а 234678-HxCDF LOR а рg/g	ୟ 23478-PeCDF LOR ଭ pg/g	ස් 2378-TCDD LOR pg/g
EQL				1.25	0.25	1.25	1.25	1.25	1.25	0.25	1.25	1.25	5	2.5	1.25	1.25	5	2.5	C).25 1	1.25 1	.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25
Location Code	Date	Field ID	Depth																															
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1	<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	19.7	<2.5	23,300.0	5.0	<15.0	<2.5	23,300.0	<5.0	1 <	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1	<2.5	18.4	33.1	13.4	<2.5	20.5	16.7	3,030.0	509.0	48,000.0) 5.0	627.0	258.0	48,000.0	1,300.0	1 2	34.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC03	30/10/2019	VC03_0.0-0.5	0 - 0.5	<2.5	0.9	<2.5	<2.5	<2.5	<2.5	<0.5	388.0	<2.5	63,600.0) 4.9	67.7	<2.5	63,600.0	<4.9	1 <	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1	<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	115.0	<2.5	34,600.0) 5.0	<17.5	<2.5	34,600.0	<5.0	1 <	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC07	30/10/2019	VC07_0.0-0.5	0 - 0.5	<2.5	6.5	7.8	4.4	8.1	5.7	4.6	1,240.0	151.0	19,200.0) 5.0	208.0	75.9	19,200.0	363.0	16	68.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC08	31/10/2019	VC08_1.0-1.5	1 - 1.5	<2.5	<0.5	3.0	<2.5	<2.5	<2.5	<0.5	708.0	<2.5	19,100.0) 5.0	129.0	<2.5	19,100.0	<5.0	1 <	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC10	31/10/2019	VC10_0.0-0.5	0 - 0.5	<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	518.0	<2.5	73,500.0) 5.0	85.1	<2.5	73,500.0	<5.0	1 <	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
VC12	31/10/2019	VC12_0.0-0.5	0 - 0.5	<2.5	1.8	3.4	<2.5	<2.5	<2.5	1.9	459.0	54.1	15,300.0) 5.0	96.5	<25.0	15,300.0	137.0	1 1	8.7	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
Statistics																																		
Number of Results				8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects				0	4	4	2	1	2	3	8	3	8	8	6	2	8	3	8	3	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Minimum Concentration				<2.5	<0.5	<2.5	<2.5	<2.5	<2.5	<0.5	19.7	<2.5	15,300	4.9	<15	<2.5	15,300	<4.9	1 <	<0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
Maximum Concentration	1			<2.5	18.4	33.1	13.4	8.1	20.5	16.7	3,030	509	73,500	5	627	258	73,500	1,300	1 2	234	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5
Average Concentration *	*			1.2	3.6	6.5	3.2	2.1	4.2	3.1	810	90	37,075	5	154	44	37,075	227	1	40	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.5



0.5 0.5 0.5	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.25	0.25	p/pg	8-TCDF LOR pg/g	
10.0 10.0 10.0 10.0 10.0	10.0 10.0 10.0 10.0	10.0 10.0 10.0	10.0	10.0	100	9.8	10.0	10.0	5	5		DD LOR pg/g	
5.0 5.0 5.0 5.0 5.0	5.0 5.0 5.0 5.0	5.0 5.0 5.0	5.0 5.0	5.0	= 0	4.9	5.0	5.0	2.5	25		DF LOR pg/g	
1.11 7.08 1.70 2.83 3.01	1.02 1.11 7.08 1.70 2.83	1.02 1.11 7.08 1.70	1.11 7.08	1.11	1.02	1 4.7	24.00	0.67	1.25	1 25	5 2 123 2 ТЕ(4678-HpCDD I- 23 (LOR)	
0.02 0.02 1.23 0.02 0.02 0.48	0.02 0.02 1.23 0.02 0.02	0.02 0.02 1.23 0.02	0.02	0.02	0.02	1 1 1 2 1	4.40	0.02	1.25	1 25	д 123 2 ТЕ(4678-HpCDF I- 33 (LOR)	
0.02 0.09 0.02 0.02 0.02 0.03	0.02 0.09 0.02 0.02 0.02	0.02 0.09 0.02	0.02	0.02	0.02		0.37	0.02	1.25	1 25	2 123 D TE(4789-HpCDF I- 33 (LOR)	
0.25 0.25 0.88 0.38 0.25 0.44	0.25 0.88 0.38 0.25	0.25 0.25 0.88 0.38	0.25	0.25	0.25	111.11	3.51	0.25	1.25	1 25	123 TE(478-HxCDD I- 33 (LOR)	
0.25 0.25 1.12 0.25 0.25 0.39	0.25 0.25 1.12 0.25 0.25	0.25 0.25 1.12 0.25	0.25	0.25	0.25		3.68	0.25	1.25	1 25	5 123 5 ТЕ(478-HxCDF I- 33 (LOR)	
0.25 0.25 3.10 0.60 0.25 1.31	0.25 0.25 3.10 0.60 0.25	0.25 0.25 3.10 0.60	0.25	0.25	0.25		12.80	0.25	1.25	1 25	д 123 2 ТЕ(678-HxCDD I- D3 (LOR)	
0.25 0.25 0.56 0.25 0.25 0.25	0.25 0.25 0.56 0.25 0.25	0.25 0.25 0.56 0.25	0.25 0.25 0.56	0.25	0.25		1.79	0.25	1.25	1 25	5 2 123 2 ТЕ(678-HxCDF I- 33 (LOR)	Dioxi
0.61 0.53 2.97 1.13 0.58 1.34	0.61 0.53 2.97 1.13 0.58	0.61 0.53 2.97 1.13	0.61 0.53 2.97	0.61	0.61		9.30	0.25	1.25	1 25	2 123 2 TE(789-HxCDD I-	าร & Fu
0.25 0.25 0.25 0.25 0.25 0.25	0.25 0.25 0.25 0.25 0.25	0.25 0.25 0.25 0.25	0.25 0.25 0.25	0.25	0.25		0.25	0.25	1.25	1 25	2 123 D TE(789-HxCDF I- 23 (LOR)	rans I T
1.23 1.25 3.92 1.52 1.25 1.71	1.23 1.25 3.92 1.52 1.25	1.23 1.25 3.92 1.52	1.23 1.25 3.92	1.23	1.23		16.55	1.25	1.25	1 25	5 123 5 (LO	78-PeCDD I-TEQ3	EQ3 (L
0.12 0.12 0.22 0.12 0.12 0.13	0.12 0.12 0.22 0.12 0.12	0.12 0.12 0.22 0.12	0.12 0.12 0.22	0.12	0.12		0.67	0.12	1.25	1 25	2 123 D (LO	.78-PeCDF I-TEQ3	OR)
0.25 0.25 0.81 0.25 0.25 0.25	0.25 0.25 0.81 0.25 0.25	0.25 0.25 0.81 0.25	0.25 0.25 0.81	0.25	0.25	0 0 5	0.25	0.25	1.20	1 25	234 D 234	678-HxCDF I- 33 (LOR)	
1.23 1.25 2.86 1.25 1.25 1.25	1.23 1.25 2.86 1.25 1.25	1.23 1.25 2.86 1.25	1.23 1.25 2.86	1.23 1.25	1.23	4 00	10.25	1.25	1.20	1 25	234 (LO	78-PeCDF I-TEQ3 IR)	
0.94 0.50 6.49 0.50 0.50 1.78	0.94 0.50 6.49 0.50 0.50	0.94 0.50 6.49 0.50	0.94 0.50 6.49	0.94	0.94	0.07	18.40	0.50	0.25	0.25	237 5 (LO	8-TCDD I-TEQ3 IR)	
0.05 0.05 0.46 0.05 0.05 0.19	0.05 0.05 0.46 0.05 0.05	0.05 0.05 0.46 0.05	0.05 0.05 0.46	0.05	0.05	0.05	1.67	0.05	0.25	0.25	237 5 (LO	8-TCDF I-TEQ3 IR)	
63.60 34.60 19.20 19.10 73.50 15.30	63.60 34.60 19.20 19.10 73.50	63.60 34.60 19.20 19.10	63.60 34.60 19.20	63.60 34.60	63.60	00.00	48.00	23.30	5	<u>P9'9</u> 5		DD I-TEQ3 (LOR)	
0.00 0.00 0.36 0.00 0.00 0.14	0.00 0.00 0.36 0.00 0.00	0.00 0.00 0.36 0.00	0.00 0.00 0.36	0.00	0.00	0.00	1.30	0.00	2.5	25		DF I-TEQ3 (LOR)	
0.01 0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01	0.01 0.01 0.01	0.01	0.01	0.04	0.01	0.01	1.20	1 25	о 123 ТЕР	4678-HpCDD I- =	
0.01 0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01	0.01 0.01 0.01	0.01	0.01	0.04	0.01	0.01	1.25	1 25	0/123 WH	4678-HpCDD IO-TEF	
0.01 0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01	0.01 0.01 0.01	0.01	0.01	0.04	0.01	0.01	1.25	1 25	2 2 7 123	4678-HpCDF I- =	
0.01 0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01	0.01 0.01 0.01	0.01	0.01	0.04	0.01	0.01	1.25	1 25	00/0 WH	4678-HpCDF 0-TEF	
0.01 0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01	0.01 0.01 0.01	0.01	0.01		0.01	0.01	1.25	1 25	2 123 Д ТЕР	.4789-HpCDF I- =	
0.01 0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01	0.01 0.01 0.01	0.01	0.01	~ ~ 4	0.01	0.01	1.25	1 25	2 2 WH	4789-HpCDF O-TEF	
0.1 0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1	0.1 0.1 0.1	0.1	0.1		0.1	0.1	1.25	1 25	123	478-HxCDD I-TEF	
0.1 0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1	0.1 0.1 0.1	0.1	0.1	~ 4	0.1	0.1	1.25	1 25	123 TEF	478-HxCDD WHO-	
0.1 0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1	0.1 0.1 0.1	0.1	0.1		0.1	0.1	1.20	1 25	123	478-HxCDF I-TEF	
0.1 0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1	0.1 0.1 0.1	0.1	0.1	/\ A	0.1	0.1	1.25	1 25	0 123 TEF	478-HxCDF WHO-	
0.1 0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1	0.1 0.1 0.1	0.1	0.1		0.1	0.1	1.25	1 25	b/a 123	678-HxCDD I-TEF	
0.1 0.1 0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1	0.1 0.1 0.1	0.1	0.1		0.1	0.1	1.25	1 25	0/123	678-HxCDD WHO-	
0.1 0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1 0.1	0.1 0.1 0.1 0.1	0.1	0.1	0.1		0.1	0.1	1.25	1 25	123	678-HxCDF I-TEF	

											Dioxi	ins & Fu	rans I T	EQ3 (LC	<u>)</u> R)															<u> </u>				
				2378-TCDF LOR pg/g	OCDD LOR pg/g OCDF LOR pg/g	1234678-HpCDD I- TEQ3 (LOR)	1234678-HpCDF I- TEQ3 (LOR)	1234/89-HpCDF I- TEQ3 (LOR) 123478-HxCDD I-	TEQ3 (LOR) 123478-HxCDF I-	I Е С (L ОК) 123678-НхСDD I- TE С 3 (L OR)	123678-H×CDF I- TEQ3 (LOR)	123789-H×CDD I- TEQ3 (LOR)	123789-HxCDF I- TEQ3 (LOR)	12378-PeCDD I-TEQ3 (LOR)	12378-PeCDF I-TEQ3 (LOR)	234678-HxCDF I- TEQ3 (LOR)	23478-PeCDF I-TEQ3 (LOR)	2378-TCDD I-TEQ3 (LOR)	2378-TCDF I-TEQ3 (LOR)	OCDD I-TEQ3 (LOR)	OCDF I-TEQ3 (LOR)	1234678-HpCDD I- TEF	1234678-HpCDD WHO-TEF	1234678-HpCDF I- TEF	1234678-HpCDF WHO-TEF	1234789-HpCDF I- TEF	1234789-HpCDF WHO-TEF	123478-HxCDD I-TEF	123478-HxCDD WHO- TEF	123478-HxCDF I-TEF	123478-HxCDF WHO- TEF	123678-H×CDD I-TEF	123678-НхСИИ WHU- TEF 123678-НхСDF I-TEF	1230/ס-חגטער וייובי
					a/a pa/a	pa/a	pa/a	pa/a p	, pa	a pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a	pa/a pa	a/a
EQL				0.25	5 2.5	1.25	1.25	1.25 1.	.25 1.2	5 1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25	0.25	5	2.5	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25 1.2	25
Location Code	Date	Field ID	Depth																															
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1	0.5 1	0.0 5.0	0.67	0.02	0.02 0.	.25 0.2	0.25	0.25	0.25	0.25	1.25	0.12	0.25	1.25	0.50	0.05	23.30	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1 0.1	.1
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1	0.5 1	0.0 5.0	24.00	4.40	0.37 3.	.51 3.6	8 12.80	1.79	9.30	0.25	16.55	0.67	0.25	10.25	18.40	1.67	48.00	1.30	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1 0.	.1
VC03	30/10/2019	VC03_0.0-0.5	0 - 0.5	0.5	9.8 4.9	1.92	0.02	0.02 0.	.25 0.2	0.25	0.25	0.61	0.25	1.23	0.12	0.25	1.23	0.94	0.05	63.60	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1 0.	.1
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1	0.5 1	0.0 5.0	1.11	0.02	0.02 0.	.25 0.2	0.25	0.25	0.53	0.25	1.25	0.12	0.25	1.25	0.50	0.05	34.60	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1 0.	.1
VC07	30/10/2019	VC07_0.0-0.5	0 - 0.5	0.5 1	0.0 5.0	7.08	1.23	0.09 0.	.88 1.1	2 3.10	0.56	2.97	0.25	3.92	0.22	0.81	2.86	6.49	0.46	19.20	0.36	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1 0.1	.1
VC08	31/10/2019	VC08_1.0-1.5	1 - 1.5	0.5 1	0.0 5.0	1.70	0.02	0.02 0.	.38 0.2	0.60	0.25	1.13	0.25	1.52	0.12	0.25	1.25	0.50	0.05	19.10	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1 0.1	.1
VC10	31/10/2019	VC10_0.0-0.5	0 - 0.5	0.5 1	0.0 5.0	2.83	0.02	0.02 0.	.25 0.2	0.25	0.25	0.58	0.25	1.25	0.12	0.25	1.25	0.50	0.05	73.50	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1 0.1	.1
VC12	31/10/2019	VC12_0.0-0.5	0 - 0.5	0.5 1	0.0 5.0	3.01	0.48	0.03 0.	.44 0.3	9 1.31	0.25	1.34	0.25	1.71	0.13	0.25	1.25	1.78	0.19	15.30	0.14	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1 0.	.1
Statistics					8 8	8	8	8	8 8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		8		8	8	8 8	8

Number of Results	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of Detects	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Minimum Concentration	0.5	9.8	4.9	0.67	0.02	0.02	0.25	0.25	0.25	0.25	0.25	0.25	1.23	0.12	0.25	1.23	0.5	0.05	15.3	0	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Maximum Concentration	0.5	10	5	24	4.4	0.37	3.51	3.68	12.8	1.79	9.3	0.25	16.55	0.67	0.81	10.25	18.4	1.67	73.5	1.3	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Average Concentration *	0.5	10	5	5.3	0.78	0.074	0.78	0.8	2.4	0.48	2.1	0.25	3.6	0.2	0.32	2.6	3.7	0.32	37	0.23	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1
																						-	-			-							



		Dic	oxins &	Furans	5 TEF															
123678-HxCDF WHO- TEF	123789-HxCDD I-TEF	123789-HxCDD WHO- TEF	123789-HxCDF I-TEF	123789-HxCDF WHO- TEF	12378-PeCDD I-TEF	12378-PeCDD WHO- TEF	12378-PeCDF I-TEF	12378-PeCDF WHO- TEF	234678-HxCDF I-TEF	234678-HxCDF WHO- TEF	23478-PeCDF I-TEF	23478-PeCDF WHO- TEF	2378-TCDD I-TEF	2378-TCDD WHO- TEF	2378-TCDF I-TEF	2378-TCDF WHO- TEF	OCDD I-TEF	OCDD WHO-TEF	OCDF I-TEF	OCDF WHO-TEF
pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g
1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.25	0.25	0.25	0.25	5	5	2.5	2.5
0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1	0.5	0.3	1	1	0.1	0.1	0.001	0.0003	0.001	0.0003
0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1	0.5	0.3	1	1	0.1	0.1	0.001	0.0003	0.001	0.0003
0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1	0.5	0.3	1	1	0.1	0.1	0.001	0.0003	0.001	0.0003
0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1	0.5	0.3	1	1	0.1	0.1	0.001	0.0003	0.001	0.0003
0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1	0.5	0.3	1	1	0.1	0.1	0.001	0.0003	0.001	0.0003
0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1	0.5	0.3	1	1	0.1	0.1	0.001	0.0003	0.001	0.0003
0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1	0.5	0.3	1	1	0.1	0.1	0.001	0.0003	0.001	0.0003
0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1	0.5	0.3	1	1	0.1	0.1	0.001	0.0003	0.001	0.0003
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Location Code	Date	Field ID	Depth											
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1	0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1	0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1
VC03	30/10/2019	VC03_0.0-0.5	0 - 0.5	0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1	0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1
VC07	30/10/2019	VC07_0.0-0.5	0 - 0.5	0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1
VC08	31/10/2019	VC08_1.0-1.5	1 - 1.5	0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1
VC10	31/10/2019	VC10_0.0-0.5	0 - 0.5	0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1
VC12	31/10/2019	VC12_0.0-0.5	0 - 0.5	0.1	0.1	0.1	0.1	0.1	0.5	1	0.05	0.03	0.1	0.1
	-	-	-	-	-		-	-	-	-	-		-	

Statistics Number of Results Number of Detects Minimum Concentration Maximum Concentration Average Concentration * * A Non Detect Multiplier of 0.5 has been applied. 0.1 0.1 0.1 0.1 0.1 0.5 1 0.05 0.03 0.1 0.1 0.5 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.01 0.003 0.001 0.0003 0.001



EQL

Appendix C Table C9

Relative Percentage Differences

In	orga	nics	TOC								Met	als				-				
Moisture (%)	Moisture Content (%)	Cyanide (Total)	Total Organic Carbon	Aluminium	Antimony	Arsenic	Cadmium	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Vanadium	Zinc	Benzene
%	%	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1	1	1	0.02	50	0.5	1	01	1	0.5	1	50	1	10	0.01	1	01	01	2	1	01

Date	Field ID	Lab Report Number	Smple Type																					
30/10/2019	VC09_0.0-0.2	ES1936029 (ALS)	Parent	34.5		<1	0.08	8,120	<0.50	1.74	<0.1	10.3	0.8	<1.0	4,720	10.7	20	0.02	1.8	0.2	0.1	15.4	2.9	<0.2
30/10/2019	FD02	685895 (Eurofins)	Inter-Lab Duplicate		15	<5	<0.1																	<0.1
RPD						0	0																	0
																				-	-	-		-
30/10/2019	VC11_0.5-0.7	ES1936029 (ALS)	Parent	28.4		<1	0.53	6,760	<0.50	8.73	<0.1	12.2	1.4	3.2	17,800	7.0	28	0.03	4.3	0.4	0.4	13.6	14.0	<0.2
30/10/2019	FD01	ES1936029 (ALS)	Intra-Lab Duplicate	28.8		<1	0.39	6,720	<0.50	7.74	<0.1	11.4	1.3	2.1	17,000	5.7	27	0.02	3.8	0.3	0.5	14.2	11.8	<0.2
RPD				1		0	30	1	0	12	0	7	7	42	5	20	4	40	12	29	22	4	17	0
31/10/2019	VC10_0.0-0.5	ES1936029 (ALS)	Parent	15.4		<1	0.06	9,760	<0.50	<1.00	<0.1	6.9	<0.5	<1.0	1,360	4.6	<10	< 0.01	1.3	0.1	<0.1	6.3	2.1	<0.2
31/10/2019	FD05	ES1936029 (ALS)	Intra-Lab Duplicate	15.1		<1	0.09	10,700	< 0.50	<1.00	<0.1	7.6	< 0.5	<1.0	2,060	3.0	<10	< 0.01	1.9	0.1	0.2	13.4	2.9	<0.2
RPD				2		0	40	9	0	0	0	10	0	0	41	42	0	0	37	0	67	72	32	0

*RPDs have only been considered where a concentration is greater than 10 times the EQL.

**Elevated RPDs are highlighted. Acceptable RPDs are: No limit (1 - 10 x EQL); 50 (organics); 30 (inorganics)

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

		BTE	XN					
Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene (BTEXN)	BTEX (Sum of Total) - Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.1	0.1	0.1	0.2	0.3	0.5	0.2	3	3
<0.2	<0.2	<0.2	<0.2	<0.5		<0.2	<3.0	<3
<0.1	<0.1	<0.1	<0.2	< 0.3	<0.5		<20	<20
0	0	0	0	0			0	0
<0.2	<0.2	<0.2	<0.2	<0.5		<0.2	<3.0	<3
<0.2	<0.2	<0.2	<0.2	<0.5		<0.2	<3.0	<3
0	0	0	0	0		0	0	0
<0.2	<0.2	<0.2	<0.2	<0.5		<0.2	<3.0	<3
<0.2	<0.2	<0.2	<0.2	<0.5		<0.2	<3.0	<3
0	0	0	0	0		0	0	0



Relative Percentage Differences

PAHS
Anthracene Benz(a)anthracene Benzo(a) pyrene Benzo(b+i)fluoranthene Benzo(g,h,i)perylene Benzo(g,h,i)perylene Chrysene Chrysene Dibenz(a,h)anthracene Fluoranthene Fluoranthene Sighpyrene Fluorene Pyrene Pyrene
mg/kg
0.004 0.004 0.004 0.004 0.004 0.004 0.004 0.004 0.004 0.004 0.004 0.005 0.004 0.004 0.05 0.004 0.004 0.004
<0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.004 <0.
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*RPDs have only been considered where a concentration is greater than 10 times the EQL.

**Elevated RPDs are highlighted. Acceptable RPDs are: No limit (1 - 10 x EQL); 50 (organics); 30 (inorganics)

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any me



Relative Percentage Differences

Г														Phe	nols										SV	Cs		
	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(half LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc	3,4-Methylphenol (m,p- cresol)	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,4-dinitrophenol	2,6-dichlorophenol	2-chlorophenol	2-methylnaphthalene	2-methylphenol	2-nitrophenol	4,6-Dinitro-2- methylphenol	4,6-Dinitro-o-cyclohexyl phenol	4-chloro-3- methylphenol	4-nitrophenol	Pentachlorophenol	Phenol	tetrachlorophenols	Phenols (Total Halogenated)	Phenols (Total Non Halogenated)	Coronene	Perylene	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Т	0.004	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	5	0.5	0.5	0.005	0.2	0.5	5	20	0.5	5	1	0.5	10	1	20	0.005	0.004	0.1	0.1
Τ	< 0.004				<1	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5	< 0.005	< 0.5	< 0.5			< 0.5		<2	< 0.5				<0.005	< 0.004		
Т	<0.5	< 0.5	0.6	1.2	< 0.4	<1	<1	< 0.5	< 0.5	<5	<0.5	<0.5		<0.2	<1	<5	<20	<1	<5	<1	< 0.5	<10	<1	<20			<0.1	<0.1
	0			1	0	0	0	0	0		0	0		0	0		1	0		0	0							

EQL

Date	Field ID	Lab Report Number	Smple Type																												
30/10/2019	VC09_0.0-0.2	ES1936029 (ALS)	Parent	< 0.004				<1	< 0.5	<0.5	<0.5	<0.5		<0.5	<0.5	< 0.005	<0.5	<0.5			<0.5		<2	<0.5				< 0.005	< 0.004	1	
30/10/2019	FD02	685895 (Eurofins)	Inter-Lab Duplicate	< 0.5	<0.5	0.6	1.2	< 0.4	<1	<1	< 0.5	< 0.5	<5	< 0.5	<0.5		<0.2	<1	<5	<20	<1	<5	<1	<0.5	<10	<1	<20			<0.1	i <0.1
RPD				0				0	0	0	0	0		0	0		0	0			0		0	0							
30/10/2019	VC11_0.5-0.7	ES1936029 (ALS)	Parent	< 0.004				<1	< 0.5	<0.5	< 0.5	< 0.5		< 0.5	<0.5	<0.005	<0.5	<0.5			<0.5		<2	< 0.5				< 0.005	< 0.004	1	
30/10/2019	FD01	ES1936029 (ALS)	Intra-Lab Duplicate	< 0.004				<1	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	<0.5	< 0.005	<0.5	<0.5			<0.5		<2	<0.5				< 0.005	< 0.004	1	
RPD	•	· · ·		0				0	0	0	0	0		0	0	0	0	0			0		0	0				0	0		
31/10/2019	VC10_0.0-0.5	ES1936029 (ALS)	Parent	< 0.004				<1	< 0.5	<0.5	< 0.5	< 0.5		< 0.5	<0.5	< 0.005	<0.5	<0.5			<0.5		<2	<0.5				< 0.005	< 0.004	1	
31/10/2019	FD05	ES1936029 (ALS)	Intra-Lab Duplicate	0.009				<1	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	<0.5	< 0.005	<0.5	<0.5			<0.5		<2	<0.5				< 0.005	< 0.004	1	
RPD				77				0	0	0	0	0		0	0	0	0	0			0		0	0				0	0		

*RPDs have only been considered where a concentration is greater than 10 times the EQL.

**Elevated RPDs are highlighted. Acceptable RPDs are: No limit (1 - 10 x EQL); 50 (organics); 30 (inorganics)

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any me



Relative Percentage Differences

ļ													OC Pesti	cides		-	-				
	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	4,4 DDD	4,4 DDT	DDT+DDE+DDD - Lab Calc	Dieldrin	Endosulfan	Endosulfan I (alpha)	Endosulfan II (beta)	Endosulfan Sulfate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	0.0005	0.0005	0.0005	0.05	0.0005	0.00025	0.00025	0.00025	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.00025

EQL

Date	Field ID	Lab Report Number	Smple Type																					
30/10/2019	VC09_0.0-0.2	ES1936029 (ALS)	Parent	< 0.00050	< 0.00050	< 0.00050		< 0.00050	< 0.00025	<0.00025	< 0.00025	< 0.00050	< 0.00050	<0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025
30/10/2019	FD02	685895 (Eurofins)	Inter-Lab Duplicate	< 0.05	< 0.05	<0.05	< 0.05	<0.05	<0.1			< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	< 0.05
RPD				0	0	0		0	0			0	0	0	0	0		0	0	0	0	0	0	0
									-						-					-				-
30/10/2019	VC11_0.5-0.7	ES1936029 (ALS)	Parent	< 0.00050	<0.00050	< 0.00050		< 0.00050	< 0.00025	<0.00025	< 0.00025	< 0.00050	< 0.00050	< 0.00050	<0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00050	< 0.00050	< 0.00025
30/10/2019	FD01	ES1936029 (ALS)	Intra-Lab Duplicate	< 0.00050	< 0.00050	< 0.00050		< 0.00050	< 0.00025	< 0.00025	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025
RPD	-			0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31/10/2019	VC10_0.0-0.5	ES1936029 (ALS)	Parent	< 0.00050	< 0.00050	< 0.00050		< 0.00050	< 0.00025	< 0.00025	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	<0.00025
31/10/2019	FD05	ES1936029 (ALS)	Intra-Lab Duplicate	< 0.00050	< 0.00050	< 0.00050		< 0.00050	< 0.00025	< 0.00025	< 0.00025	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00025
RPD				0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*RPDs have only been considered where a concentration is greater than 10 times the EQL.

**Elevated RPDs are highlighted. Acceptable RPDs are: No limit (1 - 10 x EQL); 50 (organics); 30 (inorganics)

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any me



Relative Percentage Differences

																		_
Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Oxychlordane	Toxaphene	Tokuthion	Azinphos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorfenvinphos E	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
0.0005	0.0005	0.0005	0.0005	0.0005	1	0.2	0.01	0.2	0.01	0.01	0.2	0.01	0.01	0.01	2	0.2	0.2	Ī

EQL

Date	Field ID	Lab Report Number	Smple Type																			
30/10/2019	VC09_0.0-0.2	ES1936029 (ALS)	Parent	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050			< 0.01		<0.01	< 0.01		< 0.0100	<0.01	<0.01			Τ	Т
30/10/2019	FD02	685895 (Eurofins)	Inter-Lab Duplicate	< 0.05	< 0.05	< 0.05	< 0.05		<1	<0.2	<0.2	<0.2			<0.2		<0.2	<0.2	<2	<0.2	<0.2	T
RPD				0	0	0	0				0						0	0				Τ
					-	-	-										-					
30/10/2019	VC11_0.5-0.7	ES1936029 (ALS)	Parent	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050			<0.01		<0.01	<0.01		<0.0100	<0.01	<0.01				Т
30/10/2019	FD01	ES1936029 (ALS)	Intra-Lab Duplicate	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050			<0.01		<0.01	<0.01		<0.0100	<0.01	<0.01				Τ
RPD				0	0	0	0	0			0		0	0		0	0	0				Т
																					-	_
31/10/2019	VC10_0.0-0.5	ES1936029 (ALS)	Parent	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050			<0.01		<0.01	<0.01		<0.0100	<0.01	<0.01				Т
31/10/2019	FD05	ES1936029 (ALS)	Intra-Lab Duplicate	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050			< 0.01		<0.01	< 0.01		<0.0100	<0.01	< 0.01				T
RPD				0	0	0	0	0			0		0	0		0	0	0				Γ

*RPDs have only been considered where a concentration is greater than 10 times the EQL.

**Elevated RPDs are highlighted. Acceptable RPDs are: No limit (1 - 10 x EQL); 50 (organics); 30 (inorganics)

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any me

								OP Pesi
Demeton-S-methyl	Diazinon	cis-Chlorfenvinphos	Dichlorvos	Dimethoate	Disulfoton	EPN	Ethion	Ethoprop
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.01	0.01	0.01	0.01	0.01	0.2	0.2	0.01	0.2
<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	
	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	0		0	0			0	
<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	
< 0.01	<0.01	< 0.01	<0.01	<0.01			<0.01	
0	0	0	0	0			0	
< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01	
< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01	
0	0	0	0	0			0	



Relative Percentage Differences

icides		_																			Halog	enated				PC	Bs
Fenamiphos	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Parathion	Phorate	Pirimphos-ethyl	Pirimiphos-methyl	Prothiofos	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos	Bromomethane	Dichlorodifluoromethan e	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/k
0.01	0.2	0.2	0.01	0.01	0.2	0.01	0.2	0.01	0.2	2	0.01	0.2	0.01	0.2	0.01	0.2	0.2	0.2	0.2	0.2	5	5	0.005	0.005	0.005	0.005	0.00

EQL

Date	Field ID	Lab Report Number	Smple Type																												
30/10/2019	VC09_0.0-0.2	ES1936029 (ALS)	Parent	< 0.01			< 0.01	<0.01		< 0.01		< 0.01			< 0.01		<0.01		<0.01								< 0.0050	< 0.0050	< 0.0050	< 0.0050	0 < 0.0050
30/10/2019	FD02	685895 (Eurofins)	Inter-Lab Duplicate		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2			<0.1	<0.1	<0.1	<0.1	<0.1
RPD	•	• • •	• •				0	0		0		0			0												0	0	0	0	0
30/10/2019	VC11_0.5-0.7	ES1936029 (ALS)	Parent	< 0.01			<0.01	<0.01		< 0.01		< 0.01			<0.01		<0.01		<0.01						<5	<5	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0 <0.0050
30/10/2019	FD01	ES1936029 (ALS)	Intra-Lab Duplicate	< 0.01			< 0.01	<0.01		< 0.01		< 0.01			< 0.01		< 0.01		<0.01								< 0.0050	< 0.0050	< 0.0050	< 0.0050	0 < 0.0050
RPD	•		• •	0			0	0		0		0			0		0		0								0	0	0	0	0
31/10/2019	VC10_0.0-0.5	ES1936029 (ALS)	Parent	< 0.01			< 0.01	<0.01		< 0.01		< 0.01			< 0.01		< 0.01		<0.01								< 0.0050	< 0.0050	< 0.0050	< 0.0050	0 < 0.0050
31/10/2019	FD05	ES1936029 (ALS)	Intra-Lab Duplicate	<0.01			< 0.01	< 0.01		< 0.01		< 0.01			< 0.01		< 0.01		<0.01								< 0.0050	< 0.0050	< 0.0050	< 0.0050	0 < 0.0050
RPD		-	·	0			0	0		0		0			0		0		0								0	0	0	0	0

*RPDs have only been considered where a concentration is greater than 10 times the EQL.

**Elevated RPDs are highlighted. Acceptable RPDs are: No limit (1 - 10 x EQL); 50 (organics); 30 (inorganics)

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any me



Appendix C Table C9 Relative Percentage Differences

			Herbicides
Arochlor 1254	Arochlor 1260	PCBs (Total)	Dinoseb
mg/kg	mg/kg	mg/kg	mg/kg
0.005	0.005	0.005	20

FOL

Date	Field ID	Lab Report Number	Smple Type				
30/10/2019	VC09_0.0-0.2	ES1936029 (ALS)	Parent	< 0.0050	< 0.0050	< 0.0050	
30/10/2019	FD02	685895 (Eurofins)	Inter-Lab Duplicate	<0.1	<0.1	<0.1	<20
RPD				0	0	0	
30/10/2019	VC11_0.5-0.7	ES1936029 (ALS)	Parent	< 0.0050	< 0.0050	< 0.0050	
30/10/2019	FD01	ES1936029 (ALS)	Intra-Lab Duplicate	< 0.0050	< 0.0050	< 0.0050	
RPD				0	0	0	
31/10/2019	VC10_0.0-0.5	ES1936029 (ALS)	Parent	< 0.0050	< 0.0050	< 0.0050	
31/10/2019	FD05	ES1936029 (ALS)	Intra-Lab Duplicate	< 0.0050	< 0.0050	< 0.0050	
RPD				0	0	0	

*RPDs have only been considered where a concentration is greater than 10 times the EQL.

**Elevated RPDs are highlighted. Acceptable RPDs are: No limit (1 - 10 x EQL); 50 (organics); 30 (inorganics)

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any me



EQL

			BTEXN				TRH - 201	NEPM	TRH - NEPM	ΡΔΗς
						-	20	15	1999	
Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	C6-C9 Fraction	Naphthalene
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.2	0.5	0.5	0.5	0.5	0.5	0.2	10	10	10	1

Date	Field ID	Sample Type	Matrix Type											
30/10/2019	TB1	Trip Blank	soil	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<10	<10	<1
31/10/2019	TB2	Trip Blank	soil	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<10	<10	<1
7/11/2019	Trip blank	Trip Blank	soil	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<10	<10	<1

				Me	etals						BTEX	N					TRH -	NEPM	2013			-	rrh - Ne	PM 199	9								PAHs		
	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p) Vylana Tatal	BTEX (Sum of	10(al) - Lab Calc F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Sum of polycyclic aromatic hydrocarbons	Acenaphthene	Acenaphthylene	Benz(a)anthrace	ne Benzo(a) pyrene	Benzo[b+j]fluoran thene	Benzo(k)fluoranth ene	Benzo(g,h,i)peryl ene	Chrysene Dibenz(a,h)anthr	acene Fluoranthene
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	μg/L μg	J/L μg/	L µg/L	. µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	μg/L μ	g/L µg/	L µg/L	. µg/L	mg/L	µg/L	μg/L μg	J/L μg/	L µg/L	µg/L	µg/L	µg/L	μg/L μ	J/L µg/L
EQL	0.001	0.0001	0.001	0.001	0.001	0.0001	0.001	0.005	1	2	2	2	2 2	2 1	20	20	100	100	100	100	100	20	50 10) 50	50	0.0005	1	1 1	1	0.5	1	1	1	1	1 1
Date Field ID Sample Type Matrix Type																															-				
30/10/2019 RIN_01 Rinsate Blank water	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2 <	2 <1	<20	<20	<100	<100	<100	<100	<100	<20 <	50 <10	0 <50	<50	<0.0005	<1.0	<1.0 <1	.0 <1.	0 <0.5	<1.0	<1.0	<1.0	<1.0 <	1.0 <1.0
31/10/2019 RIN_02 Rinsate Blank water	<0.001	< 0.0001	<0.001	<0.001	<0.001	< 0.0001	< 0.001	< 0.005	<1	<2	<2	<2	<2 <	2 <1	<20	<20	<100	<100	<100	<100	<100	<20 <	50 <10	0 <50	<50	< 0.0005	<1.0	<1.0 <1	.0 <1.	0 < 0.5	<1.0	<1.0	<1.0	<1.0 <	1.0 <1.0
7/11/2019 RB Rinsate Blank water	<0.001	< 0.0001	<0.001	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.005																		< 0.0005	<1.0	<1.0 <1	.0 <1.	0 < 0.5	<1.0	<1.0	<1.0	<1.0 <	1.0 <1.0
7/11/2019 RIN_03 Rinsate Blank water																										< 0.0005	<1.0	<1.0 <1	.0 <1.	0 < 0.5	<1.0	<1.0	<1.0	<1.0 <	1.0 <1.0

Date	Field ID	Sample Type	Matrix Type																
30/10/2019	RIN_01	Rinsate Blank	water	<0.001	< 0.0001	<0.001	<0.001	<0.001	<0.0001	<0.001	< 0.005	<1	<2	<2	<2	<2	<2	<1	<20
31/10/2019	RIN_02	Rinsate Blank	water	< 0.001	< 0.0001	<0.001	<0.001	<0.001	< 0.0001	< 0.001	< 0.005	<1	<2	<2	<2	<2	<2	<1	<20
7/11/2019	RB	Rinsate Blank	water	< 0.001	< 0.0001	<0.001	<0.001	< 0.001	< 0.0001	< 0.001	< 0.005								
7/11/2019	RIN 03	Rinsate Blank	water																



EQL

Naphthalene	Fluorene	Indeno(1,2,3- c,d)pyrene	Phenanthrene	Pyrene	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1	1	1	1	1	0.5

Date	Field ID	Sample Type	Matrix Type						
30/10/2019	RIN_01	Rinsate Blank	water	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
31/10/2019	RIN_02	Rinsate Blank	water	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
7/11/2019	RB	Rinsate Blank	water	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
7/11/2019	RIN_03	Rinsate Blank	water	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5



	Cyanides	Inorg	ganics		Leach	ate		Major lons	TOC											Metals	
	Cyanide (WAD)	Moisture (%)	Cyanide (Total)	pH (Initial)	pH (after HCL)	pH (Final)	TCLP Fluid	Fluoride	Total Organic Carbon	Aluminium	Antimony	Arsenic	Beryllium	Cadmium	Chromium (III+VI)	Chromium (hexavalent)	Cobalt	Copper	Iron	Lead	Lead (filtered)
	mg/kg	%	mg/kg	pH Units	pH Units	pH Units	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L
EQL	1	0.1	1	0.1	0.1	0.1	1	40	0.02	50	0.5	1	1	0.1	1	0.5	0.5	1	50	1	0.1
NSW EPA (2014) General Solid Waste SCC1 (with TCLP)			5,900					10,000				500	100	100	1,900	1,900				1,500	
NSW EPA (2014) General Solid Waste TCLP1																					5
NSW EPA (2014) Restricted Solid Waste SCC2 (with TCLP)			23,600					40,000				2,000	400	400	7,600	7,600				6,000	
NSW EPA (2014) Restricted Solid Waste TCLP2																					20

Location Code	Date	Field ID	Depth																				
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7	<'	1 47	<1	9.2	5.4	6.3	2	160				10	<1	<1		<0.5			127	7 <0.1
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45	<'	1 23.7	<1	9.2	5.2	5.8	2	170				6	<1	<1		<0.5			36	3
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95	<'	1 18.2	<1	5.4	1.4	5.1	1	40				<5	<1	<1		<0.5			<;	5
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6		13.8																	<;	5
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2		29		9	4.1	6.4	1												156	3 <0.1
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0		13.5	<1						0.06	3870	<0.50	<1.00		<0.1	3	<0	.5 <1.0	J 147() <u>1.</u> 2	4
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1		14.5	<1						0.04	2820	<0.50	<1.00		<0.1	2.5	<0	5 <1.0	J 1020	J 1.1	1
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2		43.8		8.8	5.5	5.7	2												223	3 0.2
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6		22.4		8.1	1.4	5.1	1												6F	3
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0		21.4																	F	3
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2		20.7		8.6	1.4	4.9	1												13	3 <0.1
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5		17.6																	3	3
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6		13	<1						0.07	8610	<0.50	1.22		<0.1	8.9	<0	5 <1.0	5400	<u>ງ</u> 3.1	1
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5		49.1	<1	9.1	5.2	4.8	2		2.82	12200	<0.50	16.1		0.5	42	4	2 120	34900) 318	3
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2		20.4		8.8	1.6	5	1												14	4 0.7
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5		13.1	<1						0.15	11300	<0.50	<1.00		<0.1	10.7	0	5 <1.0	J 1290	J 33.f	3
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4		12.1	<1					40	0.16	11800	<0.50	<1.00		<0.1	12.5	<0	.5 <1.0) 124(J 13.5	5
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6		20.2																	29	Э
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0		18.5																	</td <td>5</td>	5
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7		19.3																	Ę	5
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2		17.3																	<;	5
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1		24		6.7	1.4	5	1												16	ડે <0.1
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4		17.1	<1						0.1	14800	<0.50	<1.00		<0.1	13.2	<0	.5 <1.0) 2510) 28	3
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0		64.3	<1						0.05	14600	<0.50	<1.00		<0.1	12	<0	.5 <1.0) 3080) 4.የ	Э
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6		15.9																	7	7
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8		19.2		6.7	1.3	4.9	1												<;	5 <0.1
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0		20.1																	</td <td>5</td>	5
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1		23.5		9.2	2	6.5	1												5f	ડે <0.1
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7		17.8																	</td <td>5</td>	5
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9		14.7																	Ę	5
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9		4.3	<1					<40	0.11	4150	<0.50	3.22		<0.1	4.3	<0	5 <1.0) 3840	ጋ 1.6	3
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1	<'	1 48.2	<1	9.1	5.4	5.2	2	90	2.05			18	<1	<1		<0.5			224	4 0.8
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5		20																	11	1
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4		18.1		8	1.4	5.1	1												3	3
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6		18.9																	11	1
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0		21.4																	30	J
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8		22.1																	36	3
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9		21.6																	18	3
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2		1.5	<1					80	1.28	3930	<0.50	6.28		<0.1	12.5	1	4 38.2	11800	<u>) 67.7</u>	1
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5		31.3	<1	8.9	5.2	6	2		1.05	5550	<0.50	9.04		<0.1	16.6	2	4 189	15600	<u>) 11(</u>	J 0.1
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4		32.7		9.2	5.2	6.1	2												<u> </u>	Э
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6		19		8.7	1.4	5.1	1												10)
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0		22.3																	7	7
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7		20.6																	6)
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2		17.4		8.5	1.4	5.1	1												198	3
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1	<'	1 31.1	<1					120	1.2			14	<1	<1		<0.5			117	/ <0.1
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4		46		9.2	5.2	6.1	2												216	3
VC08	31/10/2019	VC08_0.0-0.5	0.0-0.5		36.7																	111	
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6		31.3																	19	J
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0		27.3																	7	1
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8		27.1																	F	3
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1		18.6																<u> </u>	F	<u>ن</u>
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5		17.5	<1						0.15	7220	<0.50	3.11		<0.1	10.8	<0	5 <1.0	<u>) 3460</u>	<u>) 14.</u> €	3
VC08	31/10/2019	VC08_1.3-1.4	1.3 - 1.4		18.7																<u> </u>	ć) J
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6		15.4																<u> </u>	1	<u> </u>
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2		34.5	<1						0.08	8120	<0.50	1.74		<0.1	10.3	0	8 <1.0	<u>, 4720</u>	<u>) 10.7</u>	/
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5		14.5																<u> </u>	<u> <</u> Ę	ذ
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6		16.3																<u> </u>	17	/
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0		17.8																_	22	2
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8		17.2		8.2	1.7	5	1												10) <0.1



Appendix C Table C4 Analytical results - Waste classification TCLP

				Cyanides	Inor	ganics		Leach	ate		Major lons	TOC											Metals	
				Cyanide (WAD)	e Moisture (%)	Cyanide (Total)	PH (Initial)	PH (after HCL)	E pH (Final)	TCLP Fluid	Fluoride	R Total Organic Carbon	Aluminium	Antimony	Arsenic	Beryllium	Cadmium	Chromium (III+VI)	Chromium (hexavalent)	Cobalt	Copper	lon	Lead	Lead (filtered)
	30/10/2019		0.8 - 1.0	піў/ку	70 15.6	під/ку				шу/ку	під/ку	70	піў/ку	тту/ку	шу/ку	тіу/ку	під/ку	тту/ку	під/ку	піў/ку	тіу/ку	піў/ку	nig/kg 5	mg/L
VC10	30/10/2019	VC10_0.7-0.8	0.0 - 1.0		18.8	<1	1					0.12	14600	<0.50	<1.00		<0.1	11 (9	<0.5	<1.0	1230	24.5	
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2		10.0		, ,	17	5.1	1		0.12	14000	-0.00	1.00			11.		-0.0	1.0	1200	29	<0.1
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5		15.4	<1			0.1	•		0.06	9760	< 0.50	<1.00		< 0.1	6.9	9	< 0.5	<1.0	1360	4.6	
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6		20.4							0.00	0.00	0.00			0.1	0.0		0.0	1.0		9	
VC11	30/10/2019	VC11 0.0-0.2	0.0 - 0.2		28.6		9.2	5.3	6.1	2												,	55	<0.1
VC11	30/10/2019	VC11 0.0-0.5	0.0 - 0.5		28.4																	,	5	
VC11	30/10/2019	VC11 0.5-0.7	0.5 - 0.7		28.4	<1					150	0.53	6760	<0.50	8.73		<0.1	12.2	2	1.4	3.2	17800	7	
VC11	30/10/2019	VC11 0.5-1.0	0.5 - 1.0		29			1														,,	9	
VC11	30/10/2019	VC11 1.0-1.2	1.0 - 1.2		27.7																	,,	6	
VC12	31/10/2019	VC12 0.0-0.5	0.0 - 0.5		24.2	<1		1				0.34	4790	< 0.50	2.2		<0.1	6	6	< 0.5	4.5	4290	10.6	
VC12	31/10/2019	VC12 0.3-0.4	0.3 - 0.4		19.3																	,,	<5	
VC12	31/10/2019	VC12 0.5-0.6	0.5 - 0.6		19.6			1														,,	<5	
VC12	31/10/2019	VC12 0.8-0.9	0.8 - 0.9		16.6		8.2	1.6	4.9	1												,,	<5	<0.1
VC12	31/10/2019	VC12 1.0-1.1	1.0 - 1.1	<1	19.9	<1	I	1			80	0.13			<5	<1	<1		<0.5			,,	42	
VC13	31/10/2019	VC13 0.0-0.1	0.0 - 0.1	<1	32.2	<1	9	5.4	6	2	180	1.45			13	<1	<1		<0.5				154	<0.1
VC13	31/10/2019	VC13 0.0-0.5	0.0 - 0.5		30																		84	
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4		30.5		9.3	5.1	5.8	2												·	18	
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6		15.4																	·	6	
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0		15																	, ,	9	
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8		14.8																	, ,	16	
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1		13.6																	, ,	7	
VC14	31/10/2019	VC14 0.0-0.1	0.0 - 0.1		35.7		9.3	5.2	6	2													57	<0.1
VC14	31/10/2019	VC14 0.0-0.5	0.0 - 0.5		38																		14	
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4		34																	, ,	20	
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0		31.7																	, ,	6	
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8		26.1		9.4	5.3	6	2												, ,	<5	<0.1
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1	<1	24.9	<1					70	0.29			9	<1	<1		<0.5			, ,	<5	
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4		17.9																	, ,	8	
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6		30.8																	·;	6	
Statistics																								
Number of Results				8	90	25	5 27	27	27	27	12	2 22	17	17	25	8	25	17	7 8	17	17	17	90	18
Number of Detects				 	90) 27	27	27	27	11	22	17	0	15	0	1	17	7 0	6		17	77	
Minimum Concentrat	tion			<1	1.5	<1	54	13	4.8	1	<40	0.04	2820	<0.50	<1	<1	<0.1	2 !	5 < 0.5	<0.5	<1.0	1020	<5	<0.1
Maximum Concentra	ition			<1	64.3	<1	9.4	5.5	6.5	2	180	2.82	14800	<0.50	18	<1	0.5	42	2 <0.5	4.2	189	34900	318	0.8
				I	00		5.	. 0.0	0.0	-	.00			0.00			0.0							



									-		1	Organo Metals				BIEXN						<u> </u>	NEPM
				ganese	sury sury (filtered)	bdenum	a	nium	-	adium		ıtyltin (as Sn)	zene	ene	lbenzene	ne (o)	ne (m & p)	ne Total	X (Sum of Total) - Calc	C6-C10 minus X)	C10 Fraction	 C10-C16 minus nthalene) 	0-C16 Fraction
				1an	Aero			ele	silve	an;	linc	ribu	eni	olu	ithy	ýle	(yle	(yle	ab ab	1 (C	9.0	lapl	õ
				 ma/ka	<u> </u>	/l ma/	ka ma/ka		ma/ka	> ma/ka	na/ka	 	ma/ka	⊢ ma/ka	ma/ka	× ma/ka	× ma/ka	<u> </u>				<u>⊥∠</u> ma/ka ⊥r	<u></u> ma/ka
EQL				10	0.01 0.00	<u> </u>	1	0.1	0.1	2	1	0.0005	0.1	0.1	0.1	0.1	0.2	0.3	0.2	3	3	3	3
NSW EPA (2014) Ge	eneral Solid Waste SCC1 (with	th TCLP)			50	1,0	00 1,050	50	180				18	518	1,080			1,800					
NSW EPA (2014) Ge	eneral Solid Waste TCLP1				0.2	2																	
NSW EPA (2014) Re	estricted Solid Waste SCC2 (v	with TCLP)			200	4,0	00 4,200	200	720				72	2,073	4,320			7,200		\square			
NSW EPA (2014) Re	estricted Solid Waste ICLP2				0.8	3																	
Location Code	Date	Field ID	Denth																				
BH05	7/11/2019	BH05 4.6-4.7	4.6 - 4.7		1.1		<2	5 <5	5 <2	2			<0.2	<0.5	<0.5	<0.5	<0.5			,	<10	— — — — — — — — — — — — — — — — — — —	
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45		0.2		<2	2 <5	5 <2	2			< 0.2	< 0.5	< 0.5	< 0.5	< 0.5			 	<10		
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95		<0.1		<2	5 <5	5 <2	2			<0.2	<0.5	<0.5	<0.5	<0.5				<10		
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6			0.4.0		_												↓ !	⊢		
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2	~1(1.9 < 0.0	010		0 < 0 1	1 <01	20	<10	<0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<20	<2	<u></u>	
VC01	30/10/2019	VC01_0.3-1.0	10-11	<10	0.01		<1	0 <0.	1 <0.1	2.5	<1.0	0.0003	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	<3	<3
VC02	30/10/2019	VC02 0.0-0.2	0.0 - 0.2		0.01				. 0.1	2.0			0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.0			
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6		0.9 <0.0	010																	
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																	L			
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2		<0.1 <0.0	010								┝──┤				ļ		──┘	┌───┤	<u> </u>	
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.0	<i>ح</i> 10) <0.01			1 0 3	2 <01	1/1 8	1 0		<0.2	<0.2	<0.2	<0.2	<0.0	<0.5	<0.0	<20	< 2	< 2	
VC02	31/10/2019	VC02_1.3-1.0	0.0 - 0.5	88	3 4.25 <0.0	010	10	4 0.6	5 3	32.6	445	0.0028	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	4	4
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2																				
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<1(0.05			2 0.1	1 <0.1	5.5	16.7	< 0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	<3	<3
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4	<1(0.04		1	.9 <0.1	1 0.1	5.1	6.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	<3	<3
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6					-												───┘	┌───┼─		
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0		+			-												┢───┦	/─── 		
VC03	30/10/2019	VC03 1.0-1.2	1.0 - 1.2																	├ ──┤			
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1		<0.1 <0.0	010															(
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4	<1(0 <0.01			2 0.2	2 0.1	10.4	3.4		<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	<3	<3
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<1(0 <0.01		1	.6 0.1	1 0.3	8.9	2.3	< 0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	<3	<3
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6																	────┦	·		
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																	├ ───┦			
VC05	30/10/2019	VC05 0.0-0.1	0.0 - 0.1		0.6 < 0.0	010														├ ──┤			
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																				
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																				
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	<1(0 < 0.01		<1	.0 <0.1	1 0.1	15.6	1.5	5	< 0.2	< 0.2	<0.2	<0.2	< 0.2	<0.5	< 0.2	<3.0	<3	<3	<3
VC06	31/10/2019		0.0 - 0.5		3.4		<2	0 <:	o <2	2			<0.2	<0.5	<0.5	<0.5	<0.5			┢───┦	< 10		
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4		<0.1 <0.0	010																	
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																		(
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																				
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8		+ $+$							 		 						└── ┘	┌─── ┼		
	31/10/2019		0.8 - 0.9	3/	1 0.84			3 0.3	2 03	110	06.6	<u> </u>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<30	<u> </u>		
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	37	7 1.61		4	4 0.2	<u> </u>	5 16.2	158	0 0204	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3		<u> </u>
VC07	30/10/2019	VC07 0.2-0.4	0.2 - 0.4		1 <0.0	010							0.2	0.2		0.2		0.0	0.2				
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6		<0.1 <0.0	010																	
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0																	<u>ا</u> ــــــــــــــــــــــــــــــــــــ			
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7		<01 <0.0	010		-												───┘	┌───┼─		
VC07	31/10/2019	VC07_1.0-1.2	0.0 - 0.1			010	<2	6 <	5 <2	>			<0.2	<0.5	<0.5	<0.5	<0.5			┢───┦	<10		
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4		2.5 < 0.0	010	~2		, <u>~</u> 2	-			×0.2	×0.5	-0.5	×0.0	-0.0						
VC08	31/10/2019	VC08_0.0-0.5	0.0-0.5						1													†	
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6																				
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0		↓			_						[└── ⁷	⊢−−−		
	31/10/2019		0.7 - 0.8																	───┘	┌─── ┼─		
VC08	31/10/2019		1.0 - 1.1	<11	0.05		1	2 03	3 0.2	0 21 2	3.0	<0 0005	<0.2	<0.2	<0.2	<0.2	<0.0	<0 5	<0.0	<30	< 2	< 2	
VC08	31/10/2019	VC08 1.3-1.4	1.3 - 1.4		0.00		<u> </u>		0.2		0.2	-0.0000	-0.2	-0.2	-0.2	-0.2	-0.2	-0.0	-0.2	-0.0			
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6																				
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2	20	0.02		1	.8 0.2	2 0.1	15.4	2.9)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	<3	<3
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5		+ $+$									┝───┼						───┘	┌───┼	\longrightarrow	
VC09	30/10/2019		0.4 - 0.0		+ $+$			+				<u> </u>							<u> </u>	┢────┘	+	\longrightarrow	
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8		+			+				<u> </u>	<u> </u>						<u> </u>	├─── ┤		-+	
	33/10/2010				1			1	1	1	1	1	1						1		L		

					1								Organo Metals				BIEXN						<u> IRH - N</u>	IE PM
																				-		,	S	
													-							ltal	S	Ī		Ę
						(p							Sn)					_		Ĕ	nu	E i	Ē	otic
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				Se		filte	un				_		(a			en		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ota	Ę	9) <u>a</u>	ר ב	ш
				Ŭ	>	.) Х	en		Ę		μn		ltin	e	Ø	ZUŚ	0	<u>ل</u>	Ĕ	ပ်ပါ	Ý			2
				ga	L L	nr	þq	<u>e</u>	, Dic	5	adi		lty	zer	eu	lle	ne	ne	ne	ы с С Х	άx	500	¢ ₽ 2	4
				an	erc	erc	<u>v</u>	Š	<u>e</u>	<u>Ve</u>	ana	ЦС	ibu	EU e	nlo	Ş	/le	/le	/e	Щġ	ЭШ	0-0-2		5
				Σ	Š	Ň	Š	ž	Ň	<u>i</u>	Š	Ņ	Ľ	ă	Ĕ	Ш	Ń	- X	- X	<u>Ľ ď</u>	<u>ш</u> р	<u> </u>	<u>l z _</u>	Ň
				mg/kg	mg/kg	mg/L	mg/kg	mg/kg n	ng/kg m	ig/kg m	ng/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg m	ıg/kg m	ıg/kg
EQL				10	0.01	0.001	2	1	0.1	0.1	2	1	0.0005	0.1	0.1	0.1	0.1	0.2	0.3	0.2	3	3	3	3
NSW EPA (2014) Gen	eral Solid Waste SCC1 (wit	h TCLP)			50		1,000	1,050	50 ´	180				18	518	1,080			1,800					
NSW EPA (2014) Gen	eral Solid Waste TCLP1	,				0.2																		
NSW FPA (2014) Res	tricted Solid Waste SCC2 (v	with TCLP)			200		4 000	4 200	200 7	720				72	2 073	4 320			7 200					
NSW EPA (2014) Res	tricted Solid Waste TCLP2				200	0.8	1,000	1,200		0					2,010	1,020			.,200					
						0.0																		
Leastion Code	Data	Field ID	Donth																					
					1 4 4	1									0.5	- 0 E	.0.5		1	1	-			
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7		1.1		<2	5	<5	<2				<0.2	<0.5	<0.5	<0.5	<0.5				<10		
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45		0.2		<2	2	<5	<2				<0.2	<0.5	<0.5	<0.5	<0.5				<10		
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95		<0.1		<2	5	<5	<2				<0.2	<0.5	<0.5	<0.5	<0.5				<10		
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6																					
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2		1.9	<0.0010																		
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<10	<0.01			<1.0	<0.1	<0.1	3.8	<1.0	<0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	<3	<3
VC01	30/10/2019	VC01 1.0-1.1	1.0 - 1.1	<10	<0.01			<1.0	<0.1	<0.1	2.5	<1.0		<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	<3	<3
VC02	30/10/2019	VC02 0.0-0.2	0.0 - 0.2									-						1						
VC02	30/10/2019	VC02 0 5-0 6	0.5 - 0.6		0.9	<0.0010												1				<u> </u>	-+	
VC02	30/10/2019	VC02_0.5-10	0.5 - 1.0		1 3.0	0.0010	├											1				\rightarrow	-+	$ \longrightarrow $
VC02	30/10/2010	VC02_0.0-1.0	10-12		<∩ 1	<0.0010																	-+	
VC02	30/10/2019		1.0 1.2		<u>\</u> .1	~U.UU IU															┝───┤	—	<u> </u>	
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5	- 110	10.01			4	0.0	10.4	44.0	1.0		10.0	-0.0	-0.0			-0 F	-0.0	-0.0			2
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6	<10	< 0.01	0.00/0		1	0.2	<0.1	14.8	1.9		<0.2	<0.2	<0.2	<0.2	< 0.2	<0.5	< 0.2	<3.0	<3	<3	<3
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	88	4.25	<0.0010		10.4	0.6	3	32.6	445	0.0028	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	4	4
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2																					
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<10	0.05			2	0.1	<0.1	5.5	16.7	<0.0005	<0.2	<0.2	<0.2	<0.2	< 0.2	<0.5	<0.2	<3.0	<3	<3	<3
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4	<10	0.04			1.9	<0.1	0.1	5.1	6.2		<0.2	<0.2	<0.2	<0.2	<0.2	< 0.5	<0.2	<3.0	<3	<3	<3
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6																					
VC03	30/10/2019	VC03 0.5-1.0	0.5 - 1.0																					
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																					
VC03	30/10/2019	VC03 1.0-1.2	1.0 - 1.2																					
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1		<0.1	<0.0010																		
VC04	30/10/2019		0.3 - 0.4	<10	<0.1	30.0010		2	0.2	0.1	10.4	31		<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<30	< 3	< 3	< 3
VC04	30/10/2019	VC04_0.5-0.4	0.5 1.0	<10	<0.01			1.6	0.2	0.1	0.4	0.4	<0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<	-2	-3
VC04	30/10/2019		0.5 - 1.0	<10	<u> <0.01</u>			1.0	0.1	0.3	0.9	2.3	<0.0005	<0.Z	<0.Z	<0.Z	<0.Z	<0.2	<0.5	<0.2	<3.0	<u> </u>	<u> </u>	<3
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6																					
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																					
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0																					
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1		0.6	<0.0010																		
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																					
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																					
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	<10	<0.01			<1.0	<0.1	0.1	15.6	1.5		<0.2	<0.2	<0.2	<0.2	< 0.2	< 0.5	<0.2	<3.0	<3	<3	<3
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1		3.4		<2	10	<5	<2				<0.2	<0.5	<0.5	<0.5	<0.5				<10		
VC06	31/10/2019	VC06 0.0-0.5	0.0 - 0.5																					
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4		< 0.1	<0.0010																		
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6		_																			
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																					
VC06	31/10/2019	VC06 0 7-0 8	07-08		1	<u>├</u>	├											1				-+	-+	$ \longrightarrow $
VC06	31/10/2019		0.8 - 0.9																					
VC07	30/10/2010		0.0 - 0.0	01	0.04	<u> </u>		3	0.2	03	11 0	96.6		د ۲۵	<0.0	<0.0	<u>~</u> 0 0	-0.0	~0 F	~n o	~2 O	~2		1
VC07	30/10/2019		0.0 - 0.2	27	1 61			1 1	0.2	1.5	16.2	90.0 150	0.0204	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<		- 4
	20/10/2019				1.01	<0.0040		4.4	0.3	1.5	10.2	100	0.0204	~ 0.∠	<u></u> ∼0.2	<u></u> ∼∪.∠	~ 0.2	<u>~0.2</u>	c.u>	<u>~0.2</u>	<u>∽</u> 3.0	<u> </u>		
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4		1 10 1	<0.0010																		
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6		<0.1	<0.0010																		
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0																					
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7																					
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2		<0.1	<0.0010																		
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1		1.8		<2	6	<5	<2				<0.2	<0.5	<0.5	<0.5	< 0.5				<10		
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4		2.5	<0.0010																		
VC08	31/10/2019	VC08 0.0-0.5	0.0-0.5																					
VC08	31/10/2019	VC08 0.5-0.6	0.5 - 0.6																					
VC08	31/10/2019	VC08 0 5-1 0	0.5 - 1.0		1													1						
VC08	31/10/2019	VC08 07-08	07-08		1	<u>├</u>	├											1				-+	-+	\rightarrow
VC08	31/10/2010	<u> </u>	10-11			<u> </u>	<u>├</u>															<u> </u>	-+	$ \longrightarrow $
VC08	21/10/2010				0.05	<u> </u>		1.0	0.2	0.0	01.0	2.0	~0.0005	~0.0	~^ ^	-0.0	~^ ^	-0.0	-0 F	-0.0	~2.0			
VC00	21/10/2019			<10	0.05		┝───┤	1.2	0.3	0.2	21.3	<u>ی</u> .2	<u><u></u> <u.0005< u=""></u.0005<></u>	~ 0.∠	<u></u> ∼0.2	<u></u> ∼∪.∠	<u>~0.2</u>	<u>~0.2</u>	<0.5	<u>~0.2</u>	<u>∽</u> 3.0	<u> </u>	<u> ~></u>	<u></u> ~3
VU08	31/10/2019		1.3 - 1.4		 	<u> </u>	┞───┤														ļļ			
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6			ļ											=		-					
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2	20	0.02			1.8	0.2	0.1	15.4	2.9		<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	<3	<3
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5																					
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6]
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0																					
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8																					
																						<u>.</u>		



					_								Organo Metals				BTEXN						TRH -	NEPM
				Manganese	Mercury	Mercury (filtered)	Molybdenum	Nickel	Selenium	Silver	Vanadium	Zinc	Tributyltin (as Sn)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction
1/000	20/40/0040			mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	30/10/2019		0.8 - 1.0	<10	0.01	1			<0.1	-0.1	47	4.0		<0.0	<0.2	<0.2	<0.2	<0.0	<0 F	<0.2	<2.0			
	30/10/2019		0.7 - 0.8	<((2	<0.1	<0.1	4.7	4.2		<0.Z	<0.Z	<0.Z	<0.Z	<0.Z	<0.5	<0.Z	<3.0	<3	<3	<3
	31/10/2019	VC10_0.0-0.2	0.0 - 0.2	<10	0.1			1.0	0.1	<0.1	6.2	0.1	<0.0005	<0.0	<0.2	<0.2	<0.0	<0.0	<0 F	<0.2	<2.0			- 2
VC10	31/10/2019	VC10_0.0-0.3	0.0 - 0.5			1		1.3	0.1	~ 0.1	0.3	Z. I	<0.0005	~ 0.2	<u> </u>	NU.Z	\U.Z	<0.Z	NU.5	~ 0.2	~ 3.0			
VC10	30/10/2019	VC10_0.0-0.0	0.0 0.2		0.8	2 <0.0010									+								+	
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5		0.0	5 \0.0010																		
VC11	30/10/2019	VC11_0.0-0.3	0.0 - 0.3	28	0.03	2		13	0.4	0.4	13.6	1/		<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	< 3.0	< 3	< 3	< 3
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 0.7	20	0.00	, 		4.0	0.4	0.4	15.0	14		~0.2	~0.Z	~0.2	~0.2	NO.2	-0.5	~0.2	N 0.0			
VC11	30/10/2019	VC11_0.0-1.0	10-12																				+	
VC12	31/10/2019	VC12 0 0-0 5	0.0 - 0.5	<1(0 12			<1.0	<0.1	0.2	13.5	14 4	0.0069	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3	<12	<12
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4		0.12	-		\$1.0		0.2	10.0	17.7	0.0000	×0.2	NO.2	NO.2	×0.2	×0.2	-0.0	۰U.Z	×0.0			
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6																				+	
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																				+	
VC12	31/10/2019	VC12_1.0-1.1	10-11		<0.1	1	<2	2 4	<5	<2				<0.2	< 0.5	<0.5	<0.5	<0.5				<10		
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1		2.2	2	<2	2 7	<5	<2				< 0.2	< 0.5	< 0.5	< 0.5	< 0.5				<10		
VC13	31/10/2019	VC13 0.0-0.5	0.0 - 0.5			-								0.2		0.0	0.0	0.0						
VC13	31/10/2019	VC13 0.3-0.4	0.3 - 0.4		0.3	3 < 0.0010																	+	
VC13	31/10/2019	VC13 0.5-0.6	0.5 - 0.6																					
VC13	31/10/2019	VC13 0.5-1.0	0.5 - 1.0																					
VC13	31/10/2019	VC13 0.7-0.8	0.7 - 0.8																					
VC13	31/10/2019	VC13 1.0-1.1	1.0 - 1.1																					
VC14	31/10/2019	VC14 0.0-0.1	0.0 - 0.1		0.7	7 <0.0010																		
VC14	31/10/2019	VC14 0.0-0.5	0.0 - 0.5			1																		
VC14	31/10/2019	VC14 0.3-0.4	0.3 - 0.4			1																		
VC14	31/10/2019	VC14 0.5-1.0	0.5 - 1.0			1																		
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8		<0.1	1 < 0.0010																		
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1		<0.1	1	<2	2 3	<5	<2				<0.2	< 0.5	<0.5	<0.5	<0.5				<10		
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4																					
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																					
Statistics					-			-						-										
Number of Results				17	40	0 16	8	3 25	25	25	17	17	8	25	25	25	25	25	17	17	17	25	17	17
Number of Detects				5	5 24	4 0	C) 21	11	11	17	15	3	0	0	0	0	0	0	0	0	0	3	3
Minimum Concentration	วท			<1() <0.01	1 <0.0010	<2	2 <1.0	<0.1	<0.1	2.5	<1.0	< 0.0005	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<3.0	<3.0	<3.0	<3.0
Maximum Concentrati	on			88	3 4.25	5 <0.0010	<2	2 10.4	0.6	3	32.6	445	0.0204	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<3.0	<10	7	7



				2013	8		TRH -	- NEPM 20	013 - SG	Cleanup		TRF	H - NEPM	1999		TRH -	NEPM 1	999 - SG	Cleanup						
				B F3 (>C16-C34	BX/Fraction) B F4 (>C34-C40	AY Fraction) ■ ■ >C10-C40 (Sum of ★ Total)	a >C10-C16 SG Cleanup	a >C16-C34 SG by/Cleanup	물 >C34-C40 SG 장 Cleanup	3 >C10-C40 (sum) SG 장 Cleanup	ma/ba	by/c10-C14 Fraction	gy C15-C28 Fraction	a C29-C36 Fraction	BX C10-C36 (Sum of Total)	by/c10-C14 SG Cleanup	by/c15-C28 SG Cleanup	by/c29-C36 SG Cleanup	B C10-C36 (sum) SG Cleanup	B Sum of polycyclic aromatic hydrocarbons	a Benzo(e)pyrene	ay/ba	a Acenaphthylene	ax/ Anthracene	Benz(a)anthracene
EQL					3 5	5 3	50	100	100	50	3	3	3	5	3	50	100	100	50	0.5	0.004	0.004	0.004	0.004	0.004
NSW EPA (2014) Ge	eneral Solid Waste SCC1 (with	n TCLP)								_	650				10,000				10,000						
NSW EPA (2014) G	eneral Solid Waste TCLP1										2,600				40.000				40.000						4
NSW EPA (2014) Re	estricted Solid Waste TCLP2	in reer)									2,000				40,000				40,000						
					•			•											•						
Location Code	Date	Field ID	Depth																					. <u> </u>	
BH05 BH06	7/11/2019	BH05_4.6-4.7	4.6 - 4.7				<5	0 320	$\frac{1}{100}$		(-10)					<50	220	140	360	30.9		< 0.5	0.5		<u>j 2.4</u>
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95				<5	50 <u>850</u> 50 <100) <10	0 <50) <10					<50	<100	400 <100	<50	<0.5	5	<0.5	<0.5	<0.5	5 < 0.5
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6																	< 0.5	6	< 0.5	< 0.5	<0.5	5 < 0.5
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																	13	6	<0.5	<0.5	<0.5	5 1.2
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0		<3	<5 <	<3				<3	<3	<3	<5	<3						< 0.004	< 0.004	< 0.004	< 0.004	4 < 0.004
VC01	30/10/2019		1.0 - 1.1		<3	<5 <	<3				<3	<3	<3	<5	<3					17.7	<0.004	< 0.004	< 0.004	< 0.004	+ <0.004 5 1.5
VC02 VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6																	1		<0.5	<0.5	<0.5	5 < 0.5
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																	< 0.5	5	< 0.5	< 0.5	<0.5	5 < 0.5
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																	<0.5	j	<0.5	<0.5	<0.5	5 <0.5
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5																	<0.5		<0.5	< 0.5	<0.5	5 < 0.5
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6		<3	<5 <	<3				<3	<3	<3	<5	<3	-					< 0.004	< 0.004	< 0.004	< 0.004	4 0.005
VC02 VC03	30/10/2019	VC02_0.0-0.3	0.0 - 0.2		10	20 1	10				~3	< 3	40	40	94					<0.5	0.031	0.044	0.297	0.200	5 1.13 5 <0.5
VC03	30/10/2019	VC03 0.0-0.5	0.0 - 0.5		<3	<5 <	<3				<3	<3	<3	<5	<3					-0.0	< 0.004	< 0.004	<0.004	< 0.004	4 < 0.004
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4		<3	<5 <	<3				<3	<3	<3	<5	<3						< 0.004	< 0.004	< 0.004	< 0.002	4 < 0.004
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6																	<0.5	5	<0.5	<0.5	<0.5	5 <0.5
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0					_												< 0.5	5	< 0.5	< 0.5	<0.5	5 < 0.5
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																	< 0.5) :	< 0.5	<0.5	<0.5	$\frac{3}{5}$ < 0.5
VC03	30/10/2019	VC04_0 0-0 1	0.0 - 0.1																	<0.5	5	<0.5	<0.5	<0.5	5 < 0.5
VC04	30/10/2019	VC04 0.3-0.4	0.3 - 0.4		<3	<5 <	<3				<3	<3	<3	<5	<3					10.0	< 0.004	< 0.004	< 0.004	< 0.002	4 < 0.004
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0		4	<5	4				<3	<3	5	<5	5						< 0.005	< 0.005	<0.005	< 0.005	5 < 0.005
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6																	<0.5	5	<0.5	<0.5	<0.5	5 <0.5
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																	< 0.5		< 0.5	< 0.5	< 0.5	5 < 0.5
VC04 VC05	31/10/2019	VC04_0.9-1.0	0.9 - 1.0																	<0.5)	<0.5	<0.5	<0.5	$\frac{3}{5} < 0.5$
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																	<0.5	, ;	< 0.5	<0.5	<0.5	5 < 0.5
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																	< 0.5	5	< 0.5	< 0.5	<0.5	5 < 0.5
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9		<3	<5 <	<3				<3	<3	<3	<5	<3						< 0.004	< 0.004	<0.004	< 0.002	4 < 0.004
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1				<5	610) 19	0 800) <10					<50	350	370	720	14		<0.5	< 0.5	<0.5	<u>5</u> 1
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5													-				< 0.5		<0.5	<0.5	<0.5	<u>5</u> <0.5
VC06	31/10/2019	VC06_0.3-0.4	0.5 - 0.4																	<0.5		<0.5 <0.5	<0.5	<0.5 <0.7	5 <0.5 5 <0.5
VC06	31/10/2019	VC06_0.5-0.0	0.5 - 1.0																	<0.5	5	<0.5	<0.5	<0.5	5 < 0.5
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8																	< 0.5	5	<0.5	<0.5	<0.5	5 < 0.5
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9																	<0.5	5	<0.5	<0.5	<0.5	5 <0.5
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2		122	49 17	75	_			<3	<3	68	79	147		ļ				0.307	< 0.025	0.132	0.103	3 0.417
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5		176	69 25	52				<3	<3	101	111	212					2.6	0.373	< 0.025	<0.5	<0.5	$\frac{0.8}{5}$
VC07 VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4																	<0.5		<0.5	<0.5	<0.0	5 <0.5
VC07	30/10/2019	VC07 0.5-1.0	0.5 - 1.0																	< 0.5	5	< 0.5	<0.5	<0.5	5 < 0.5
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7																	< 0.5	5	<0.5	<0.5	<0.5	5 < 0.5
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2																	<0.5	5	<0.5	<0.5	<0.5	5 <0.5
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1				<5	50 190) <10	U 190) <10					<50	110	110	220	5.9)	< 0.5	< 0.5	< 0.5	<u>5 0.6</u>
	31/10/2019		0.3 - 0.4																	26.4	•	<0.5	<0.5	0.8	<u>3 2</u>
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6				_													<0.5	;	<0.5	<0.5	<0.5 <0.5	5 < 0.5
VC08	31/10/2019	VC08 0.5-1.0	0.5 - 1.0							1										< 0.5	5	< 0.5	<0.5	<0.5	5 < 0.5
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																	< 0.5	i	< 0.5	< 0.5	<0.5	5 < 0.5
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1																	<0.5	6	<0.5	<0.5	<0.5	5 <0.5
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5		66	48 1´	14				<3	<3	18	70	88						< 0.004	< 0.004	<0.004	< 0.002	4 <0.5

				-3 (>C16-C34 -raction)	-4 (>C34-C40 -raction) >C10-C40 (Sum of	-c10-c16 SG Cleanup	C16-C34 SG Cleanup	•C34-C40 SG Cleanup	-C10-C40 (sum) SG Cleanup	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	C10-C14 SG Cleanup	C15-C28 SG Cleanup	229-C36 SG Cleanup	C10-C36 (sum) SG Cleanup	Sum of polycyclic aromatic hydrocarbons	3enzo(e)pyrene	Acenaphthene	Acenaphthylene	Anthracene	3enz(a)anthracene
[mg/kg	mg/kg mg/l	kg mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg mg	g/kg m	g/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	General Solid Waste SCC1 (wit			3	5 3	50	100	100	50	3	3	3	5	3 5	50 1	00	100	50	0.5	0.004	0.004	0.004	0.004	0.004
NSW EPA (2014)	General Solid Waste TCLP1									000				10,000				10,000						
NSW EPA (2014)	Restricted Solid Waste SCC2 (v	(with TCLP)								2,600				40,000				40,000						
NSW EPA (2014)	Restricted Solid Waste TCLP2																							
Location Code	Date	Field ID	Depth																					
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7			<50	0 320) <100) 320	<10					<50	220	140	360	30.9		<0.5	0.5	, <u>0.</u> €	<u>з</u> 2.4
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45			<50	0 850) 170	0 1020	<10					<50	560	400	960	9.1		<0.5	< 0.5	<0.5	<u>5 </u>
BH07 VC01	30/10/2019	BH07_2.5-2.95	2.5 - 2.95			<50	0 <100	(100) <50	<10					<50	<100	<100	<50	<0.5 <0.5		<0.5	<0.5 <0.5	<0.5 <0.7	ゝ <0.5 5 <0.5
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																13		<0.5	< 0.5	, <0.ť	5 1.2
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<	3 <5	<3				<3	<3	<3	<5	<3						< 0.004	< 0.004	< 0.004	< 0.002	4 < 0.004
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1	<	3 <5	<3		-		<3	<3	<3	<5	<3					17 7	<0.004	< 0.004	< 0.004	< 0.004	↓ <0.004
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6																17.7		<0.5	<0.5	<0.5	5 < 0.5
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																<0.5		<0.5	< 0.5	, <0.5	5 <0.5
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																< 0.5		<0.5	< 0.5	<0.5	<u>5 <0.5</u>
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5	<	2 <5	<3				<3	<3	< 3	<5	<3					<0.5	<0.004	<0.5	<0.5	<0.5	> <0.5 4 0.005
VC02	31/10/2019	VC02_1.3-1.0	0.0 - 0.5	78	3 28 1	10				<3	<3	48	46	94						0.631	0.044	0.297	0.286	ô 1.13
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2																<0.5		<0.5	<0.5	, <0. č	<u>5</u> <0.5
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<	8 <5	<3				<3	<3	<3	<5	<3						< 0.004	< 0.004	< 0.004	< 0.004	4 < 0.004
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4	<	3 <5	<3				<3	<3	<3	<5	<3					<0.5	<0.004	<u>0.004 <0.5 <0 5 <0 5 <0 5 <0 5 <0 5 <0 5 <0 5</u>	<0.004 <0.5	<0.004 <0.004	+ <0.004 5 <0.5
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0																<0.5		<0.5	<0.5	<0.5	5 < 0.5
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																<0.5		<0.5	<0.5	, <0.5	5 <0.5
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2					_											< 0.5		< 0.5	< 0.5	<0.5	<u>، <0.5</u>
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1		2 <5	<3				<3	<3	< 3	<5	<3					<0.5	<0.004	<0.5	<0.5	<0.5	> <0.5 4 <0.004
VC04	30/10/2019	VC04_0.5-0.4	0.5 - 1.0		, <u><</u> , <5	4				<3	<3	5	<5	5						<0.004	<0.004	<0.004	<0.004	5 < 0.005
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6																<0.5		<0.5	<0.5	, <0.5	5 <0.5
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																< 0.5		<0.5	< 0.5	<0.5	<u>ة <0.5</u>
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0																<0.5		<0.5	<0.5	<0.5	ッ <0.5 5 <0.5
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7			-													<0.5		<0.5	<0.5	<0.5	5 <0.5
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																<0.5		<0.5	<0.5	, <0.5	5 <0.5
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	<:	3 <5	<3		100		<3	<3	<3	<5	<3	= 0	0.50	0.70	700		< 0.004	< 0.004	< 0.004	< 0.002	4 < 0.004
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1			<50	0 610) 190	008 (<10					<50	350	370	720	14		< 0.5	< 0.5	<0.5	5 <u>∠05</u>
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4																<0.5		<0.5	<0.5	<0.5	5 < 0.5
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																<0.5		<0.5	< 0.5	, <0.5	5 <0.5
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																<0.5		<0.5	<0.5	<0.5	5 <0.5
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8																< 0.5		< 0.5	< 0.5	<0.5	5 <0.5 5 <0.5
VC00	30/10/2019	VC07_0.0-0.2	0.0 - 0.2	122	2 49 1	75				<3	<3	68	79	147					NU.5	0.307	<0.025	0.132	0.10	3 0.417
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	176	69 2	52				<3	<3	101	111	212						0.373	<0.025	< 0.5	, <0.5	5 0.8
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4																3.6		<0.5	<0.5	<0.5	5 <0.5
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6					-											< 0.5		<0.5	< 0.5	<0.5	5 <0.5 5 <0.5
VC07	30/10/2019	VC07_0.5-1.0	0.7 - 0.7																<0.5		<0.5	<0.5	<0.5	5 < 0.5
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2																< 0.5		<0.5	< 0.5	, <0.5	5 < 0.5
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1			<5(0 190) <100) 190	<10					<50	110	110	220	5.9		<0.5	<0.5	<0.5	5 0.6
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4																26.4		<0.5	< 0.5	0.8	3 2
VC08	31/10/2019	VC08_0.0-0.5	0.0-0.5																2.8 <0.5		<0.5 <0.5	<0.5 <0.5	<0.5 <0 !	 <0.5 <0.5
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0																< 0.5		< 0.5	< 0.5	, <0.5	5 < 0.5
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8		1														<0.5		<0.5	<0.5	, <0. ;	5 <0.5
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1			14			+				70	00					<0.5		< 0.5	< 0.5	<0.5	<u>i <0.5</u>
	31/10/2019	VC08_1.0-1.5 VC08_1.3-1.4	1.0 - 1.5	66	<u>48</u> 1	14	+	+	+	<3	<3	18	70	88					<0 5	<0.004	0.004 <u>></u> ۲ ۵ ۶	<0.004 <0 F	<0.004 <0.004	+ <0.5 5 <0.5
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6		1 1		1	1	+										< 0.5		<0.5	<0.5	<0.5	5 <0.5
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2	<	3 <5	<3				<3	<3	<3	<5	<3						<0.004	<0.004	< 0.004	< 0.002	4 <0.004
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5		┦──┤──				<u> </u>			-							< 0.5		< 0.5	< 0.5	<0.5	<u>ວ່ <0.5</u>
VC09	30/10/2019		0.4 - 0.6		┨──┤──		+	+	+			<u>├</u>							<0.5 <0.5	├	<0.5 <0 5	<0.5 <0 F	<0.5	<u>> <0.5</u> 5 <∩ 5
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8	<u> </u>	1														<0.5		<0.5	<0.5	, <0.5	5


				2013			TRH - N	NEPM 20	13 - SG (Cleanup		TRH	I - NEPM	1999		TRH -	NEPM 19	99 - SG	Cleanup						
				F3 (>C16-C34 Fraction)	Ft (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	>C10-C16 SG Cleanup	>C16-C34 SG Cleanup	>C34-C40 SG Cleanup	>C10-C40 (sum) SG Cleanup	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	C10-C14 SG Cleanup	C15-C28 SG Cleanup	C29-C36 SG Cleanup	C10-C36 (sum) SG Cleanup	Sum of polycyclic aromatic hydrocarbons	Benzo(e)pyrene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene
	30/10/2010			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC10	30/10/2019	VC10_0.7_0.8	0.0 - 1.0		<5	5 6	3				<3	< 3	<3	<5	< 3					~0.5	0.006	<0.0		<0.0	0.012
VC10	31/10/2019	VC10_0.7-0.0	0.0 - 0.2	~			5				~5	5	~5	~5	-5					<0.5	0.000	<0.004	<0.004	<0.004	<0.012
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5		<5	5 <	3				<3	< 3	<3	<5	<3					~0.5	<0.004	<0.0	<0.0	<0.0	<0.0
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6				<u> </u>				10			10	-0					<0.5	+0.00+	<0.004	<0.004	<0.004	<0.004
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2																	< 0.5		<0.0	<0.0	<0.0	<0.5
VC11	30/10/2019	VC11_0.0-0.5	0.0-0.5																	< 0.5		<0.0	<0.0	<0.0	<0.5
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7	F	<5	5	6				<3	<3	4	<5	4					10.0	<0 004	<0.0	<0.04	<0.04	<0.04
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0												•					<0.5	-0.001	<0.5	<0.5	<0.5	<0.5
VC11	30/10/2019	VC11_1.0-1.2	10-12																	< 0.5		<0.0	<0.5	<0.5	<0.5
VC12	31/10/2019	VC12 0 0-0 5	0.0-0.5	185	72	25	7				<3	<6	109	112	221					0.0	0 117	<0.004	<0.5	<0.5	<0.5
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4																	< 0.5	0.111	<0.5	< 0.5	< 0.5	<0.5
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6																	< 0.5		<0.5	< 0.5	< 0.5	<0.5
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																	< 0.5		< 0.5	<0.5	< 0.5	<0.5
VC12	31/10/2019	VC12 1.0-1.1	1.0 - 1.1				<50	<100	<100	<50	<10)				<50	<100	<100	<50	< 0.5		< 0.5	< 0.5	< 0.5	< 0.5
VC13	31/10/2019	VC13 0.0-0.1	0.0 - 0.1				<50	160	<100	160	<10)				<50	<100	100	100	6.9		< 0.5	< 0.5	< 0.5	0.7
VC13	31/10/2019	VC13 0.0-0.5	0.0 - 0.5								_									10.2		< 0.5	< 0.5	< 0.5	1
VC13	31/10/2019	VC13 0.3-0.4	0.3 - 0.4																	4.4		< 0.5	< 0.5	< 0.5	0.5
VC13	31/10/2019	VC13 0.5-0.6	0.5 - 0.6																	<0.5		<0.5	< 0.5	< 0.5	< 0.5
VC13	31/10/2019	VC13 0.5-1.0	0.5 - 1.0																	<0.5		<0.5	< 0.5	<0.5	<0.5
VC13	31/10/2019	VC13 0.7-0.8	0.7 - 0.8																	< 0.5		<0.5	< 0.5	<0.5	<0.5
VC13	31/10/2019	VC13 1.0-1.1	1.0 - 1.1																	<0.5		<0.5	< 0.5	<0.5	<0.5
VC14	31/10/2019	VC14 0.0-0.1	0.0 - 0.1																	<0.5		<0.5	< 0.5	<0.5	<0.5
VC14	31/10/2019	VC14 0.0-0.5	0.0 - 0.5																	<0.5		<0.5	< 0.5	<0.5	<0.5
VC14	31/10/2019	VC14 0.3-0.4	0.3 - 0.4																	<0.5		<0.5	< 0.5	<0.5	<0.5
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0																	<0.5		<0.5	< 0.5	<0.5	<0.5
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8																	<0.5		<0.5	< 0.5	<0.5	<0.5
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1				<50	<100	<100	<50	<10					<50	<100	<100	<50	<0.5		<0.5	<0.5	<0.5	<0.5
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4																	<0.5		<0.5	< 0.5	<0.5	<0.5
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																	<0.5		<0.5	<0.5	<0.5	<0.5
Statistics																									
Number of Results				17	17	7 1	7 Q	Q	Q	Q	25	17	17	17	17	Q	Q	Q	Q	72	17	۵۵		00	00
Number of Detects					5	<u>, </u>	γ 0 7 Λ	5	0 2	0 5	20 0		7	5	7	0	0 /	0	0 5	13	5	90	30	90 A	90
Minimum Concentratio	n				<5		, U 3 <50	<100	<100	-50 -50	<2 0	-22 	-22	-5	<2 1		4 <100	<100		۲۹ ۲۵۶		<0.001		+	<0.004
Maximum Concentratio	n			185	72	25	7 <50	850	100	1020	<0 <10	<	100	112	221	<50	560	400	00× 0A0	30.0	0.000	<0.004	0.004	10.004 0 R	24
maximum concondatio				100	1 14	-1 20	00	000	100	1020	017	-0	100	L 114		1 100	000	-00		50.5	0.001	-0.0	0.0	0.0	2.7



							PAHs														
	a Benzo(b+j+k)fluoranth 장 ene	benzo(a) pvrene	μg/L	යි Benzo[b+j]fluoranthen න් e	a Senzo(k)fluoranthene bar	a Solutiona Solutiona Benzo(g,h,i)perylene	Chrysene Chrysene mg/kg	G Sy Dibenz(a,h)anthracene	Mg/gm by/bm	∭ayhthalene bay	eueue Linorene mg/kg	al Indeno(1,2,3- S c,d)pyrene	Bhenanthrene	byrene mg/kg	BAHs (Sum of total) - 장 Lab calc	TEQ)(zero LOR) - Lab Calc Calc	TEQ)(zero LOR) - Lab Calc	ୁ Total 8 PAHs (as BaP ସୁ TEQ)(half LOR) - Lab ଦ୍ରି Calc	Total 8 PAHs (as BaP حصل العام (full LOR) - Lab Calc		bay/2,4,5-trichlorophenol
	1	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.5	0.005	0.5	0.5	0.4	0.5
		10	40												200						14,400
		23													800						57,600
			160																		
		4		4 2	17	1.8	22	<0.5	4 9	<0.5	<0.5	15	1 4	57		5	1	5.3	5 5	<1	<0.5
		1.1	<0.5	1.4	0.7	0.8	0.7	<0.5	1.4	<0.5	<0.5	0.6	<0.5	1.6		1.5		1.7	2	<1	< 0.5
		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2	<1	<0.5
		< 0.5	-0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2		
	<1	1.4	<0.5	<0.004	0.8	<0.004	<0.004	<0.5	<0.004	<0.5	<0.5	0.8	0.7	2.1	<0.004	1.9		2.1	2.4	<0.5	<0.5
		< 0.004		<0.004	<0.004	<0.004	<0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.004	<0.004	<0.004	<0.004	40.0		0.0	1.2	<1	< 0.5
		1.9	<0.5	2.7	0.9	1.6	1.5	<0.5	2.6	<0.5	<0.5	1.2	0.9	2.9		2.6		2.8	3.1		
		< 0.5		0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5		< 0.5		0.6	1.2		
		<0.5 <0.5	<0 5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5	<0.5	<0.5 <0.5	<0.5	<0.5	<0.5 <0.5	<0.5 <0.5		<0.5		0.6	1.2		
		<0.5	~ 0.0	<0.5	< 0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5		<0.5		0.6	1.2		
		0.004		< 0.004	< 0.004	< 0.004	0.005	< 0.004	0.011	< 0.005	< 0.004	< 0.004	0.004	0.01	0.039					<1	<0.5
		1.57	< 0.5	1.49	0.661	1	0.997	0.219	1.89	< 0.2	0.095	0.963	0.885	1.78	14.8					<1	<0.5
		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.004	<0.5		0.6	1.2	<1	<0.5
		<0.004		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.005	<0.004	< 0.004	<0.004	<0.004	<0.004					<1	< 0.5
		< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	01001	<0.5		0.6	1.2		010
		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
		< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2		
		<0.5 <0.5	<0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5		< 0.5		0.6	1.2		
		< 0.004	-0.0	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	<0.005	< 0.004	< 0.004	< 0.004	< 0.004	<0.004	40.0		0.0	1.2	<1	<0.5
	<1	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5		0.7	1.4	<0.6	<0.6
		< 0.5	-0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2		
		<0.5	<0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	0.8		<0.5		0.6	1.2		
		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
		< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-0.004	<0.5		0.6	1.2		-0.5
		20.004 1.8		20.004 1.8	0.004	<0.004 1 1	<0.004 1	<0.004	<0.004 2 3	<0.005	<0.004	0.004 <u>۵</u>	<0.004 0.7	2.6	<0.004	23		2.5	2.8	<1	<0.5
		<0.5		<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5		< 0.5		0.6	1.2	~1	-0.0
		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
		< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2		
		<0.5 <0 5		<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0 5	<0.5 <0 5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0 5		<0.5 <0.5		0.6	1.2		
		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
		0.627		0.606	0.304	0.483	0.378	0.089	0.595	<0.2	<0.025	0.375	0.226	0.639	5.72					<1	<0.5
	1	0.8	<0.5	0.799	0.375	0.5	0.7	< 0.5	1.5	< 0.2	< 0.5	< 0.5	0.7	1.5	7.5	1		1.3	1.5	<0.5	<0.5
		0.7 <0.5		0.7 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	1 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	1.2 <0.5		0.8 <0.5		1.1	1.4		
		<0.5		<0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
		< 0.5	<0 E	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2	-1	<0 E
		0.9	<0.5	3	<0.5	<0.5 1.1	0.0	< 0.5	4.6	<0.5	<0.5	<0.5 0.9	<0.5 2.7	1.5		3.8		1.4	4.2	<u> </u>	<0.5
		0.6	0.7	0.7	<0.5	<0.5	< 0.5	< 0.5	0.7	<0.5	<0.5	< 0.5	<0.5	0.8		0.7		1	1.3		
		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
		< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2		
		<0.5 <0.5		<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5		<0.5		0.0 0.6	1.2		
_	<1	<0.5		0.009	< 0.004	<0.5	<0.5	<0.004	<0.5	<0.005	<0.004	<0.5	<0.5	<0.5	<0.5	<0.5		0.6	1.2	<0.5	<0.5
		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
		< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	~0.004	<0.5		0.6	1.2	- 4	-0 F
		<0.004 <0.5		<0.004 <0.5	<0.004 <0.5	<0.004 <0.5	<0.004 <0.5	<0.004 <0.5	<0.004 <0.5	<0.005 <0.5	<0.004 <0.5	<0.004 <0.5	<0.004 <0.5	<0.004 <0.5	<0.004	<0.5		0.6	1 2	<1	<0.5
		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<u><0.5</u>	<u><0</u> .5	<0.5	<0.5		< <u>0.5</u>		0.6	1.2		
		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		

									PAHs														
				th		Le	Ð	(I)		ene							· (ч в	ab ab	d q	<u>д</u> 0	q, r	
				oran		uthe "	hen	lene		ace							(tal)	а Г	, La	Ва - Га	s Ba Lat	<u>ب</u>	eno
				lluc		oral	ant	ery		lthr					d)		of to	(as DR)	(as DR)	R) .	(as (2) -	eno	bhe
				[+K)		jflu	nor	d(i,i		h)aı	ene	ane		က်မ	rene		Б Е	NHS 0 L C	AHs o LC	LO LO	LOF	yd.	lord
				(+q)		[b+j	(k)fl	(g,h	sne	<u>r</u> (a,I	nthe	Jale	це	(1,2	nthi	(h)	lc (Su		zerc	r P∕ nalf	l III	ithy	rich
				ÖZL			IZO	IZO	Jse	enz	oral	ohth	orei	eno)pyr	ena	ene	Hs ca	င (၁ ၁	al 8 Q)(₂ c	al 8 ၁)(† င	al 8 သ)(f c	-Me sol)	,5-tl
				Ber		e Ber	Ber	Ber	Chi	Dib	Flu	Nat	Flu	c,d	Phe	Pyr	PA Lat	Cal TE	Tot TE(Cal	Tot Cal	Tot TE(Cal	3,4 cre	2,4
				mg/kg	mg/kg	µg/L mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	mg/kg	mg/kg	mg/kg	mg/kg
EQL				1	0.004	0.005 0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.5	0.005	0.5	0.5	0.4	0.5
NSW EPA (2014) (General Solid Waste SCC1 (with	n TCLP)			10	40											200						14,400
NSW EPA (2014) F	Restricted Solid Waste SCC2 (w	vith TCLP)			23	40											800						57.600
NSW EPA (2014) F	Restricted Solid Waste TCLP2					160																	
			_																				
Location Code	Date	Field ID	Depth	<u> </u>	1			4.0	0.0	-0 F	1.0	-0.5	· 10 F	4.5	4 4	F 7				<u> </u>			-0 E
BH05 BH06	7/11/2019	BH05_4.6-4.7	4.0 - 4.7		1 1	4.2	2 I.7 4 0.7	1.8	2.2	<0.5	4.9	<0.5 <0.5	<pre>0.5 </pre>	1.5 0.6	1.4 <0.5	5.7 1.6		5 15		5.3	<u> </u>	<1	<0.5
BH07	7/11/2019	BH07 2.5-2.95	2.5 - 2.95		<0.5	5 <0.5 <0.5	5 < 0.5	<0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5		< 0.5		0.6	1.2	<1	< 0.5
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6		<0.5	5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	o <0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2		1.4	<0.5 1.9	9 0.8	1.1	1.1	<0.5	1.9	<0.5	< 0.5	0.8	0.7	2.1		1.9		2.1	2.4		
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<1	< 0.004	 <0.004 <0.004 	4 < 0.004	< 0.004	< 0.004	< 0.004	< 0.004	<0.005	< 0.004	< 0.004	<0.004	< 0.004	<0.004	<0.5		0.6	1.2	< 0.5	<0.5
VC01	30/10/2019	VC02_0.0-0.2	0.0 - 0.2		< 0.002	< 0.002	4 <0.004 7 0.9	<0.004 1 6	<0.004 1 5	<0.004	<0.004 2.6	<0.005 <0.5	<0.004	<0.004	0.004× ۱۹	<0.004 2 9	<0.004	2.6		28	31	<1	<0.5
VC02	30/10/2019	VC02_0.0-0.2	0.5 - 0.6		<0.5	5 0.5	5 < 0.5	<0.5	< 0.5	<0.5	< 0.5	<0.5	 <0.5 <0.5 	< 0.5	<0.5	0.5		<0.5		0.6	1.2		
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0		<0.5	5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	i <0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2		<0.5	5 <0.5 <0.5	5 < 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5		<0.5	5 <0.5	5 < 0.5	<0.5	< 0.5	<0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.020	<0.5		0.6	1.2		<0 F
VC02	31/10/2019	VC02_1.5-1.6	1.5 - 1.6		0.002	<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>	4 <0.004 0 661	<0.004 1	0.005	<0.004	0.011	<0.005	0.004	<0.004	0.004	1 78	14.8			┢────┼		<1	<0.5
VC03	30/10/2019	VC03 0.0-0.2	0.0 - 0.2		<0.5	5 <0.5 <0.5	5 < 0.5	<0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	14.0	<0.5		0.6	1.2		-0.0
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5		< 0.004	< 0.004	4 < 0.004	<0.004	<0.004	<0.004	<0.004	<0.005	6 < 0.004	< 0.004	<0.004	<0.004	<0.004					<1	<0.5
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4		< 0.004	< 0.004	4 < 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.004	<0.004	<0.004	<0.004					<1	<0.5
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6		<0.5	5 <0.5	5 < 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2]	<u> </u>
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0		<0.5 <0.5	5 <0.5 5 <0.5	5 <0.5 5 <0.5	<0.5	<0.5	< 0.5	<0.5 <0.5	<0.5 <0.5	<pre>0.5 </pre>	< 0.5	<0.5	<0.5		<0.5		0.0	1.2		
VC03	30/10/2019	VC03 1.0-1.2	1.0 - 1.2		<0.5	5 <0.5	5 < 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2		
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1		<0.5	5 <0.5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	i <0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4		< 0.004	< 0.004	4 < 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	.0.5				<1	< 0.5
VC04	31/10/2019	VC04_0.5-1.0	0.5 - 1.0	<	<0.005		5 < 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.005	<0.005	<0.005	<0.005	< 0.5		0.7	1.4	<0.6	<0.6
VC04	31/10/2019	VC04_0.3-0.0	0.7 - 0.8		<0.5	5 < 0.5 < 0.5	5 < 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<pre>0.5 </pre>	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0		<0.5	5 <0.5	5 < 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1		<0.5	5 <0.5 <0.5	5 < 0.5	<0.5	<0.5	<0.5	0.7	<0.5	< 0.5	<0.5	<0.5	0.8		<0.5		0.6	1.2		
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7		<0.5	5 <0.5	5 < 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2]	<u> </u>
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9		<0.04		5 <0.5 4 <0.004	<0.0	<0.0	<0.5	<0.0	<0.0	<0.0	<0.0	<0.0	<0.5	<0.004	<0.5		0.0	1.2	<1	<0.5
VC06	31/10/2019	VC06 0.0-0.1	0.0 - 0.1		1.8	3 1.8	8 0.8	1.1	1	<0.5	2.3	< 0.5	< 0.5	0.9	0.7	2.6	0.001	2.3		2.5	2.8	<1	< 0.5
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5		<0.5	5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	o <0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4		<0.5	5 <0.5	5 < 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2]	<u> </u>
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6		<0.5	> <0.5	5 <0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5		0.6	1.2]	───┤
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8		<0.5	5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	o <0.5	< 0.5	<0.5	<0.5		<0.5		0.6	1.2		<u>├</u> ──┤
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9		<0.5	5 <0.5	5 < 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	i <0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2		0.627	0.606	6 0.304	0.483	0.378	0.089	0.595	<0.2	< 0.025	0.375	0.226	0.639	5.72					<1	< 0.5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	1	8.0	3 <0.5 0.799	9 0.375	0.5	0.7	< 0.5	1.5	< 0.2	2 <0.5	< 0.5	0.7	1.5	7.5	1		1.3	1.5	<0.5	<0.5
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4		0.1 <0.5	5 < 0.7	7 <0.5 5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		0.8 <0.5		0.6	1.4		
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0		<0.5	5 <0.5	5 < 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2		
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7		<0.5	5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	i <0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2		<0.5	5 <0.5	5 < 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5		0.6	1.2		-0.5
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1		0.9		1 <0.5 3 1.3	<0.5	0.6	< 0.5	1.3	<0.5	<0.5	<0.5	<0.5 2 7	1.5		1.1		1.4	1.7	<1	<0.5
VC08	31/10/2019	VC08_0.0-0.5	0.0-0.5		0.6	0.7 0.7	<0.5	<0.5	< 0.5	<0.5	0.7	<0.5	<0.5	< 0.5	< 0.5	0.8		0.7			1.3		<u>├</u> ──┤
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6		<0.5	5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	i <0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0		<0.5	5 <0.5	5 < 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8		<0.5	5 <0.5	5 <0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.5	< 0.5		<0.5		0.6	1.2]	───┤
VC08	31/10/2019	VC08 1 0-1 5	10-15	<1	>.0.2		0.0 9 <0.004	<0.5	<0.5 <0.5	<0.0	<0.5	0.5~ <0 005	<0.0	<0.5	<0.5 <0.5	<0.5	<0.5	<0.5		0.0	1.2	<0.5	<0.5
VC08	31/10/2019	VC08_1.3-1.4	1.3 - 1.4		<0.5	5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5 <u></u> <0.5	< 0.5	<0.5	< 0.5	0.0	<0.5		0.6	1.2		
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6		<0.5	5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	s <0.5	<0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2		< 0.004	< 0.004	4 < 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	<0.004	-0 -				<1	<0.5
VC09	30/10/2019		0.0 - 0.5		<0.5	> <0.5 5 - 0 #	5 < <u><0.5</u>	<0.5 <0.5	<0.5 <0.5	<0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5		<0.5 <0.5		0.0	1.2		┞───┤
VC09	30/10/2019	VC09 0.5-1.0	0.5 - 1.0		<0.5	5 <0.5	5 < 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<pre><0.5</pre>	< 0.5	<0.5	<0.5		<0.5		0.6	1.2		
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8		<0.5	5 <0.5 <0.5	5 < 0.5	<0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5		<0.5		0.6	1.2		

								PA	٨Hs													
				3enzo(b+j+k)fluoranth ⊧ne	Benzo(a) pyrene	Benzo[b+j]fluoranthen	3enzo(k)fluoranthene	Benzo(g,h,i)perylene Chrysene	Dibenz(a,h)anthracene	Iuoranthene	Vaphthalene	-luorene	ndeno(1,2,3- c,d)pyrene	chenanthrene	Jrene	PAHs (Sum of total) - _ab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(half LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc	3,4-Methylphenol (m,p- cresol)	2,4,5-trichlorophenol
				mg/kg	 mg/kg μg/L	mg/kg	mg/kg	mg/kg mg/	kg mg/kg	g mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	μg/L	mg/kg	mg/kg	mg/kg	mg/kg
				1	0.004 0.005	0.004	0.004	0.004 0.00	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.5	0.005	0.5	0.5	0.4	0.5
NSW EPA (2014) G NSW EPA (2014) G	eneral Solid Waste SCC1 (with TCLP)			40											200						14,400
NSW EPA (2014) R	estricted Solid Waste SCC2 (with TCI	LP)			23											800						57,600
NSW EPA (2014) Re	estricted Solid Waste TCLP2				160																	
Location Code	Date	Field ID	Denth																			
BH05	7/11/2019	BH05 4.6-4.7	4.6 - 4.7		4	4.2	2 1.7	1.8	2.2 <0	.5 4.9	0 < 0.5	<0.5	1.5	1.4	5.7	,,	5	,	5.3	5.5	<1	<0.5
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45		1.1 <0.5	1.4	4 0.7	0.8	0.7 <0	.5 1.4	<0.5	<0.5	0.6	<0.5	1.6		1.5	,!	1.7	2	<1	<0.5
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95		<0.5 <0.5	< 0.5	→ <0.5	< 0.5 <	<0.5 <0	.5 < 0.5	5 <0.5 <0.5	< 0.5	< 0.5	< 0.5	< 0.5	ļ	< 0.5	<u> </u>	0.6	1.2	<1	<0.5
VC01	30/10/2019	VC01_0.4-0.8	0.4 - 0.8		<0.5 1 4 <0.5	<0.0 1 9	20.5 2010	<0.5 < 1 1	<u>0.5 <0</u> 11 <0	.5 <0.5	> <0.5 > <0.5	<0.5	0.5	<0.5 0.7	21		<0.5 1.9	, 	2.1	2.4	ļ	<u> </u>
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<1	< 0.004	< 0.004	4 < 0.004	<0.004 <0.0	004 < 0.00	04 < 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	<0.004	<0.5	,/	0.6	1.2	< 0.5	<0.5
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1		<0.004	< 0.004	↓ <0.004	<0.004 <0.	004 < 0.00	04 < 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	<0.004		'			<1	<0.5
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2		1.9 < 0.5	2.7	<u> </u>	1.6	1.5 <0	.5 2.6	S <0.5	< 0.5	1.2	0.9	2.9		2.6	<u> '</u>	2.8	3.1	ļ!	<u> </u>
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6		< 0.5	0.0	<u>v <0.5</u> 5 <0.5	<0.5 <	<0.5 <0 <0.5 <0	.5 <0.5	<pre>> <0.5 > <0.5</pre>	<0.5	< 0.5	<0.5	0.5		< 0.5	, /	0.6	1.2	<u>├</u> ──┤	
VC02	30/10/2019	VC02_0.0 1.0	1.0 - 1.2		<0.5 <0.5	<0.5	ا د. حار	<0.5 <	<0.5 <0	.5 <0.5	5 < 0.5	< 0.5	< 0.5	<0.5	<0.5	ł	<0.5	,	0.6	1.2	ļļ	
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5		<0.5	<0.5	0.5> ز	<0.5 <	<0.5 <0	.5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<u>, </u>	0.6	1.2		
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6		0.004	< 0.004	+ <0.004	< 0.004 0.0	005 < 0.00	0.011	< 0.005	< 0.004	< 0.004	0.004	0.01	0.039	 '	<u> </u>	<u> </u>	!	<1	< 0.5
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5		1.57 <0.5	1.49	$\frac{1}{5}$ $\frac{0.661}{5}$		997 0.21	5 < 0.5	0 <0.2 ≤ <0.5	0.095	0.963	0.885	1.78	14.8	<0.5	/	0.6	12	<1	<0.5
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5		<0.004	< 0.004	4 < 0.004	<0.004 <0.0	004 <0.00	.3 <0.3	<0.005	< 0.004	< 0.004	<0.004	<0.004	< 0.004	<0.5	·	0.0	1.2	<1	< 0.5
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4		<0.004	< 0.004	4 <0.004	<0.004 <0.	004 < 0.00	04 < 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004					<1	< 0.5
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6		<0.5	<0.5	0.5< ز	< 0.5 <	<0.5 <0	.5 <0.5	5 <0.5	<0.5	< 0.5	<0.5	< 0.5		<0.5	,!	0.6	1.2	\square	
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0		< 0.5	< 0.5	→ <0.5	< 0.5 <	<0.5 <0	.5 < 0.5	5 <0.5 <0.5	< 0.5	< 0.5	< 0.5	< 0.5	ļ	< 0.5	<u> </u>	0.6	1.2	ļ!	
VC03	30/10/2019	VC03_0.8-0.7	10-12		<0.5	<0.5	5 < 0.5	<0.5 <	<0.5 <0 <0.5 <0	.5 <0.5	5 <0.5	<0.5	< 0.5	<0.5	<0.5	Į	<0.5	, 	0.6	1.2	<u> </u> /	<u> </u>
VC04	30/10/2019	VC04 0.0-0.1	0.0 - 0.1		<0.5 <0.5	< 0.5	o.o. 0.5 د	<0.5 <	<0.5 <0	.5 <0.5	5 < 0.5	< 0.5	< 0.5	< 0.5	<0.5	 	< 0.5	,	0.6	1.2	, 	
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4		<0.004	< 0.004	4 <0.004	<0.004 <0.	004 <0.00	04 <0.004	<0.005	< 0.004	< 0.004	< 0.004	< 0.004	<0.004				I	<1	<0.5
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<1	< 0.005	< 0.005	0.005 ز	<0.005 <0.0	005 < 0.00	05 < 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	< 0.5	<u> </u> '	0.7	1.4	<0.6	<0.6
VC04	31/10/2019	<u>VC04_0.5-0.6</u>	0.5 - 0.6		<0.5	<0.5	→ <0.5	<0.5 <	<0.5 <0	.5 <0.5	o <0.5 ≤0.5	<0.5	<0.5	<0.5	< 0.5	ļ	<0.5		0.6	1.2	ļ!	
VC04	31/10/2019	VC04_0.7-0.0	0.9 - 1.0		<0.5	<0.5		<0.5 <	<0.5 <0	5 < 0.5	5 < 0.5	<0.5	<0.5	<0.5	<0.5	, 	<0.5	, /	0.0	1.2	├ ───┦	<u> </u>
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1		<0.5 <0.5	<0.5	0.5	<0.5 <	<0.5 <0	.5 0.7	<0.5	<0.5	<0.5	<0.5	0.8	·!	< 0.5	, <u> </u> '	0.6	1.2	. !	
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7		<0.5	< 0.5	0.5 ز	< 0.5	<0.5 <0	.5 <0.5	5 <0.5	< 0.5	<0.5	<0.5	< 0.5		< 0.5	,	0.6	1.2		
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9		<0.5	<0.5	<u>(0.5 د از 0.5 از </u>	< 0.5 <	<0.5 <0.0	.5 <0.5		<0.5	<0.5	<0.5	<0.5	-0.004	<0.5	↓ ′	0.6	1.2	$\left \right $	<0.5
VC05	31/10/2019	VC06_0.0-0.1			<0.004 1 8	1.8	R 0.004	<u><0.004</u> <u><0.</u> 1_1	1 <0	5 2.3	<0.005	<0.004	<0.004	<0.004	2.6	<0.00 4	2.3	, /	2.5	2.8		< 0.5
VC06	31/10/2019	VC06 0.0-0.5	0.0 - 0.5		<0.5	<0.5	5 <0.5	<0.5 <	<0.5 <0	.5 <0.5	5 < 0.5	< 0.5	<0.5	<0.5	< 0.5	, †	<0.5	, 	0.6	1.2	. ├─── ┤	
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4		<0.5	<0.5	i <0.5	<0.5 <	<0.5 <0	.5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<u>, </u>	0.6	1.2		
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6		< 0.5	< 0.5	<u>i <0.5</u>	< 0.5 <	<0.5 <0	.5 < 0.5	5 < 0.5	< 0.5	< 0.5	< 0.5	< 0.5]	< 0.5	<u> </u> '	0.6	1.2	ļ!	<u> </u>
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0		<0.5	<0.5	→ <0.5 5 <0.5	<0.5 <	<0.5 <0	.5 <0.5	o <0.5 ≤ <0.5	<0.5	< 0.5	<0.5	< 0.5	ļ	< 0.5		0.6	1.2	ļ/	<u> </u>
VC06	31/10/2019	VC06 0.8-0.9	0.8 - 0.9		<0.5	<0.5	5 <0.5	< 0.5 <	<0.5 <0	.5 <0.5	5 < 0.5	<0.5	< 0.5	< 0.5	<0.5	ł	<0.5	,	0.6	1.2	. 	
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2		0.627	0.606	<u>کا 0.304</u>	0.483 0.3	378 0.08	39 0.595	5 <0.2	<0.025	0.375	0.226	0.639	5.72		<u> </u>			<1	<0.5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	1	0.8 < 0.5	0.799	0.375	0.5	0.7 <0	.5 1.5	5 <0.2	< 0.5	< 0.5	0.7	1.5	7.5		<u> </u> '	1.3	1.5	<0.5	<0.5
VC07	30/10/2019	<u> </u>	0.2 - 0.4		0.7	0.7	<0.5 5 <0.5	<0.5 <	<0.5 <0	.5 1	<0.5	<0.5	<0.5	<0.5	1.2	ļ	0.8		1.1	1.4	ļ!	
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0		<0.5	<0.5	5 <0.5	<0.5 <	<0.5 <0	.5 <0.5	5 <0.5	<0.5	< 0.5	< 0.5	<0.5	·	<0.5	, 	0.6	1.2	. /	
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7		<0.5	<0.5	0.5 ز	<0.5 <	<0.5 <0	.5 <0.5	5 <0.5	<0.5	<0.5	< 0.5	< 0.5		< 0.5	,	0.6	1.2		
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2		<0.5	<0.5	0.5> ز	< 0.5 <	<0.5 <0	.5 <0.5	5 <0.5	<0.5	< 0.5	< 0.5	<0.5		< 0.5	,	0.6	1.2	<u> </u>	
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1		0.9 <0.5	1	<0.5	<0.5	0.6 <0	.5 1.3	S <0.5	<0.5	< 0.5	<0.5	1.5	ļ	1.1	, '	1.4	1.7	<1	<0.5
VC08	31/10/2019	VC08_0.0-0.5	0.0-0.5		06 07	07	<0.5	<0.5 <0	<u> </u>	.5 4.0	<0.5	<0.5	<0.9	<0.5	08		0.7	├ ────′	4	4.2	┝───┦	<u> </u>
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6		<0.5	<0.5	5.0< ز	<0.5 <	<0.5 <0	.5 <0.5	5 < 0.5	< 0.5	< 0.5	< 0.5	<0.5	 	< 0.5	,	0.6	1.2	, 	
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0		<0.5	<0.5	0.5> ز	< 0.5 <	<0.5 <0	.5 <0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	<u>'</u>	0.6	1.2		
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8		< 0.5	< 0.5	<u>i <0.5</u>	< 0.5 <	<0.5 <0	.5 < 0.5	5 < 0.5	< 0.5	< 0.5	< 0.5	< 0.5]	< 0.5	<u> </u> '	0.6	1.2	ļ!	<u> </u>
VC08	31/10/2019	<u>VC08_1.0-1.1</u> VC08_1.0-1.5	1.0 - 1.1	<1	<0.5	<0.5	> <0.5	<0.5 <	<0.5 <0.00	.5 <0.5	0.5 0.005	<0.5	< 0.5	<0.5	< 0.5	<0.5	< 0.5		0.6	1.2	<0.5	<0.5
VC08	31/10/2019	VC08_1.3-1.4	1.3 - 1.4		<0.5	<0.5	5 < 0.5	<0.5 <	<0.5 <0.00	.5 <0.5	5 <u><0.005</u> 5 <0.5	<0.004	< 0.5	< 0.5	<0.5	<0.5	<0.5	, 	0.6	1.2	~0.5	<0.5
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6		<0.5	<0.5	0.5> ز	<0.5 <	<0.5 <0	.5 <0.5	5 < 0.5	<0.5	< 0.5	< 0.5	< 0.5		< 0.5	,'	0.6	1.2		
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2		<0.004	< 0.004	4 <0.004	<0.004 <0.	004 < 0.00	04 < 0.004	<0.005	< 0.004	< 0.004	< 0.004	< 0.004	<0.004	ļ'	<u> </u>			<1	<0.5
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5		< 0.5	< 0.5	<u><0.5</u>	< 0.5 <	<0.5 <0	.5 < 0.5	5 <0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	<u> </u> '	0.6	1.2	ļ/	───
VC09	30/10/2019	VC09_0.4-0.8	0.5 - 1.0		<0.5	<0.0	5 < 0.5	<0.5	<0.5 <0 <0.5 <0	5 <0.5	5 <0.5 5 <0.5	<0.5	<0.5	<0.5	<0.5	 	<0.5		0.0	1.2	├ ──┤	
VC09	30/10/2019	VC09 0.7-0.8	0.7 - 0.8		<0.5 <0.5	<0.5	5 <0.5	<0.5 <	<0.5 <0	.5 <0.5	5 < 0.5	< 0.5	< 0.5	<0.5	<0.5	 	<0.5	,	0.6	1.2	ļļ	



									PAHs													T	
				luoranth	e	ranthen	Inthene	rylene		thracene							⁻ total) -	(as BaP R) - Lab	(as BaP R) - Lab	(as BaP R) - Lab	(as BaP) - Lab	nol (m,p-	phenol
				Benzo(b+j+k)fl ene	Renzo(a) pyre	Benzo[b+j]fluo e	Benzo(k)fluora	Benzo(g,h,i)pe	Chrysene	Dibenz(a,h)an	Fluoranthene	Naphthalene	Fluorene	Indeno(1,2,3- c,d)pyrene	Phenanthrene	Pyrene	PAHs (Sum of Lab calc	Total 8 PAHs TEQ)(zero LO Calc	Total 8 PAHs TEQ)(zero LO Calc	Total 8 PAHs TEQ)(half LOF Calc	Total 8 PAHs TEQ)(full LOR Calc	3,4-Methylphe cresol)	2,4,5-trichloro
	I			mg/kg	mg/kg	µg/L mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5)	0.6	1.:	<u> </u>	
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8		0.013	0.01	0.007	0.008	0.008	< 0.004	0.016	<0.005	< 0.004	0.008	0.008	0.017	0.113	<u>,</u>			<u> </u>	<1	- <0.5
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2		<0.5	<0.5 <0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5		<0.5	,	0.6	1.2	<u>'</u>	<u> </u>
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5		< 0.004	< 0.004	< 0.004	<0.004	< 0.004	< 0.004	< 0.004	<0.005	< 0.004	< 0.004	<0.004	< 0.004	<0.004	·	<u> </u>		 	<1	<0.5
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6		<0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5		<0.5	-	0.6	1.2	<u>-</u>	<u> </u>
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2		<0.5	<0.5 <0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5		<0.5	-	0.6	1.2	<u>-</u>	_
	30/10/2019		0.0 - 0.5		C.U>	<0.0		0.02	<0.02	<0.02	<0.0	<0.05	<0.02	C.U>	<0.04	<0.02	<0.004	<u><0.5</u>	·	0.0	<u> </u>	-	1 <0/
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7		<0.004	<0.004		<0.004	<0.004	<0.004	<0.004	<0.005	<0.004	<0.004	<0.004 <0.5	<0.004	<u><u> </u></u>	-0 F	<u>.</u>	0.6	1	<u>, </u>	<u> </u>
VC11	30/10/2019	VC11_0.0-1.0	10-12		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		0.0	1.2	· ·	+
VC12	31/10/2019	VC12 0 0-0 5	0.0 - 0.5	<	<pre> <0.5 1 <0.5</pre>	0.226	0.116	<0.5	<0.5	<0.5	<0.5	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<u>√0.5</u> √ <u>√0.5</u>	;	0.0	1.2	$\frac{1}{2} < 0^{-1}$	5 < 0 4
VC12	31/10/2019	VC12_0.0-0.0	0.3 - 0.4		<0.5	<0.220	<0.110	<0.5	<0.0	<0.0	<0.5	<0.2	<0.0	<0.5	<0.5	<0.5	-0.0	<0.5	;	0.0	1.2	2	1 10.0
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6		<0.0	<0.0	<0.5	<0.5	<0.0	<0.0	< 0.5	<0.0	<0.0	<0.0	<0.0	<0.5		<0.5	;	0.0	1.2	; 	+
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9		<0.0	<0.5 <0.5	<0.5	<0.5	<0.0	<0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5		<0.5	; 	0.0	1.2	; 	+
VC12	31/10/2019	VC12 1.0-1.1	1.0 - 1.1		< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		<0.5		0.6	1.	2 <	<0.5
VC13	31/10/2019	VC13 0.0-0.1	0.0 - 0.1		1	1.1	< 0.5	0.6	0.6	< 0.5	1.4	< 0.5	< 0.5	< 0.5	< 0.5	1.5		1.2	<u>,</u>	1.5	1.	3 <	<0.5
VC13	31/10/2019	VC13 0.0-0.5	0.0 - 0.5		1	1.2	0.5	0.7	0.9	< 0.5	2	< 0.5	< 0.5	< 0.5	0.8	2.1		1.3	<u> </u>	1.6	1.	3	
VC13	31/10/2019	VC13 0.3-0.4	0.3 - 0.4		0.7	0.8	< 0.5	0.5	<0.5	< 0.5	0.9	<0.5	<0.5	<0.5	<0.5	1		8.0	<u>از</u>	1.1	1.	1	1
VC13	31/10/2019	VC13 0.5-0.6	0.5 - 0.6		<0.5	<0.5	< 0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	<i>,</i>	0.6	1.'	2	1
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	ار	0.6	1.'	2	
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8		<0.5	<0.5	< 0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	j	0.6	1.'	2	
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1		<0.5	<0.5	< 0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	j	0.6	1.'	2	
VC14	31/10/2019	VC14_0.0-0.1	0.0 - 0.1		<0.5	<0.5 <0.5	< 0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	j	0.6	1.'	2	
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	,	0.6	1.1	2	
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5)	0.6	1.:	2	
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0		<0.5	<0.5	< 0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5)	0.6	1.:	2	
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8		<0.5	<0.5 <0.5	< 0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	,	0.6	1.5	2	
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	,	0.6	1.2	<u>2 <1</u>	1 <0.5
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	,	0.6	1.2	2	
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		< 0.5	<u>,</u>	0.6	<u> </u>	<u> </u>	
Statistics																							
Number of Results					5 90	19 90	90	90	90	90	90	90	90	90	90	90	17	78	0 ز	78	7!	3 25	؛2 از
Number of Detects					1 17	1 19	12	13	14	2	18	0	1	9	11	19	5	ز 13	, 0	78 ر	7/	3 () (
Minimum Concentr	ation			<	1 < 0.004	<0.5 <0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	<0.005	< 0.004	< 0.004	< 0.004	< 0.004	<0.004	، <0 .5	,	0.6	1.'	2 <0.5	<u>: 0> ز</u>
Maximum Concent	ration				1 4	<0.5 4.2	1.7	1.8	2.2	0.219	4.9	<0.5	< 0.5	1.5	2.7	5.7	14.8	3 5	ر ار	5.3	5./	^> ز	<0.6



						Phenols																
	2,4,6-trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,6-dichlorophenol	2-chlorophenol	2-methylnaphthalene	2-methylphenol	2-nitrophenol	3-methylcholanthrene	4-chloro-3- methylphenol	Acetophenone	Pentachlorophenol	Phenol	1,1-dichloroethane	1,2,3-trichlorobenzene	1,2,3-trichloropropane	1,2-dibromoethane	1,3-dichlorobenzene	2-butanone (MEK)	2-hexanone (MBK)	4-methyl-2-pentanone (MIBK)	Bromodichloromethan e
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	0.005	0.2	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	5	5	5	0.5
NSW EPA (2014) General Solid Waste SCC1 (with TCLP)	72						7,200												7,200			
NSW EPA (2014) General Solid Waste TCLP1																						
NSW EPA (2014) Restricted Solid Waste SCC2 (with TCLP)	288						28,800												28,800			
NSW EPA (2014) Restricted Solid Waste TCLP2																						

Location Code	Date	Field ID	Depth																					
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7	<).5					<0.5			<0.5		<2	<0.5						<5		
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45	<).5					<0.5			<0.5		<2	<0.5						<5		
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95	<).5					<0.5			<0.5		<2	<0.5						<5		
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6																					
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																					
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<).5 <0.5	5 <0.5	<0.5	<0.5	< 0.005	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5					<0.5			
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1	<).5 <0.5	5 <0.5	<0.5	<0.5	< 0.005	<0.5	<0.5		<0.5		<2	<0.5								
VC02	30/10/2019	VC02 0.0-0.2	0.0 - 0.2																					
VC02	30/10/2019	VC02 0.5-0.6	0.5 - 0.6																					
VC02	30/10/2019	VC02 0.5-1.0	0.5 - 1.0																					
VC02	30/10/2019	VC02 1.0-1.2	1.0 - 1.2			1																		
VC02	30/10/2019	VC02 1.0-1.5	1.0 - 1.5																					
VC02	30/10/2019	VC02 1.5-1.6	1.5 - 1.6	<).5 <0.5	5 < 0.5	<0.5	<0.5	< 0.005	<0.5	<0.5		<0.5		<2	<0.5								
VC02	31/10/2019	VC02 0.0-0.5	0.0 - 0.5	<).5 <0.5	5 < 0.5	< 0.5	< 0.5	0.044	< 0.5	< 0.5		< 0.5		<2	< 0.5								1
VC03	30/10/2019	VC03 0.0-0.2	0.0 - 0.2																					
VC03	30/10/2019	VC03 0.0-0.5	0.0 - 0.5	<).5 <0.5	5 < 0.5	< 0.5	<0.5	< 0.005	<0.5	<0.5		<0.5		<2	<0.5								1
VC03	30/10/2019	VC03 0.3-0.4	0.3 - 0.4	<).5 <0.5	5 < 0.5	< 0.5	< 0.5	< 0.005	< 0.5	< 0.5		< 0.5		<2	< 0.5	<0.5	<0.5	< 0.5	<0.5	< 0.5	<5 <	5 <	5 < 0.5
VC03	30/10/2019	VC03 0.4-0.6	0.4 - 0.6																				-	<u> </u>
VC03	30/10/2019	VC03 0.5-1.0	0.5 - 1.0																					
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																					+
VC03	30/10/2019	VC03 1.0-1.2	1.0 - 1.2																					+
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1			1																		+
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4	<) 5 < 0 !	5 <0.5	<0.5	<0.5	<0.005	<0.5	<0.5		<0.5		<2	<0.5								
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0		0.0	3 <0.6	<0.6	<0.6	<0.005	<0.6	<0.6	<0.6	<0.6	<0.6	<1	<0.6					<0.6			
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6			, .0.0	-0.0	-0.0	10.000	.0.0	-0.0	-0.0	10.0	10.0		-0.0					-0.0			
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																					
VC04	31/10/2019	VC04_0.1 0.0	0.9 - 1.0																					
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1																					
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																					
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																					
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	5	15 <04	5 <0.5	<0.5	<0.5	<0.005	<0.5	<0.5		<0.5		<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5 <	5 <	5 <0.5
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1) 5	,	-0.0	-0.0	40.000	<0.5	-0.0		<0.5		<2	<0.5	-0.0	-0.0	40.0	-0.0	-0.0	<5		<u>, 10.0</u>
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5		/.0					-0.0			-0.0		-2	-0.0						-0		
VC06	31/10/2019	VC06_0.3-0.4	0.0 - 0.0																					
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.4																					
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 0.0																					
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8																					
VC06	31/10/2019	VC06_0.8-0.9	0.7 - 0.0																					
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2	5	15 <04	5 <0.5	<0.5	<0.5	<0.025	<0.5	<0.5		<0.5		<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5 <	5 <	5 <0.5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.2) 5 < 0.0	5 <0.5	<0.5	<0.5	<0.025	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	-0.0	-0.0	40.0	-0.0	<0.5	-0 -,		,
VC07	30/10/2019	VC07_0.2-0.4	0.0 - 0.0		/.0 .0.	,	-0.0	-0.0	40.020	-0.0	-0.0	-0.0	-0.0	-0.0	1	-0.0					-0.0			
VC07	30/10/2019	VC07_0.2-0.4	0.5 - 0.6																					
VC07	30/10/2019	<u> </u>	0.5 - 0.0						<u>├</u> ───															+
VC07	30/10/2019	VC07_0.5-1.0	0.7 - 0.7																					
VC07	30/10/2019	<u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u>	10-12						<u>├</u> ───															+
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1	5) 5					<0.5			<0.5		<2	<0.5						<5		
VC08	31/10/2019	VC08_0.3-0.4	0.0 - 0.1		/.0					-0.0			-0.0		-2	-0.0						-0		
VC08	31/10/2019	VC08_0.0-0.5	0.0-0.5																					
VC08	31/10/2019	VC08_0.5-0.6	0.5-0.6																					
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 0.0																					+
VC08	31/10/2019		0.0 - 1.0						├															
VC08	31/10/2019					+			├														+	
VC00	31/10/2019		1.0 - 1.1		15 -0 1		<0 E	-0 F	<0.005	<0 E	-0 F	-0 F	<0 E	<0 E	-1	-0 E					-0 E			
	31/10/2019		G.I - U.I 1 2 1 4		<u> <u.< u="">:</u.<></u>	0.0	<0.5	SU.2	~0.005	<0.5	<0.5	<0.5	<0.5	~U.3	<1	<u>~0.5</u>					<u.5< td=""><td></td><td></td><td></td></u.5<>			
	31/10/2019		1.3 - 1.4						<u>├</u>														-	
	31/10/2019		0.1 - 0.1		15 -0 1		<0 E	-0 F	<0.005	<0 E	-0 F		<0 E		-0	-0 E								
VC09	30/10/2019		0.0 - 0.2		<u> <u.< u="">:</u.<></u>	0.0	<0.5	SU.2	~0.005	<0.5	<0.5		<0.5		<2	<u>~0.5</u>								
VC09	30/10/2019		0.0 - 0.3		_				├															
VC09	30/10/2019				_				├															
VC09	20/10/2019								<u>├</u>														-	
14009	30/10/2019	Ινωυ9_0.7-0.8	0.7 - 0.8																					



									Phenols																
				2,4,6-trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,6-dichlorophenol	2-chlorophenol	2-methylnaphthalene	2-methylphenol	2-nitrophenol	3-methylcholanthrene	4-chloro-3- methylphenol	Acetophenone	Pentachlorophenol	Phenol	1,1-dichloroethane	1,2,3-trichlorobenzene	1,2,3-trichloropropane	1,2-dibromoethane	1,3-dichlorobenzene	2-butanone (MEK)	2-hexanone (MBK)	4-methyl-2-pentanone (MIBK)	Bromodichloromethan e
1.4000				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0	-0 F	40 F	-0 F				-0.5	·		10.5			-0.5								·'	 '
	30/10/2019		0.7 - 0.8	<0.5	<0.5	<0.5	<0.5	o <0.5	< 0.005	<0.5	o <0.5		<0.5		<2	<0.5								·'	
	31/10/2019		0.0 - 0.2	<0 F	<0 F	<0 E	-0.5	0 5	0 005	-0 F	· -0 E		<0 F		-0	<0 F								·'	┢────
	31/10/2019		0.0 - 0.5	<0.5	<0.5	<0.5	<0.5	s <0.5	<0.005	<0.5	o <0.5		<0.5		<2	<0.5								′	
	31/10/2019		0.0 - 0.0																					′	
	30/10/2019		0.0 - 0.2																					′	<u> </u>
	20/10/2019	VC11_0.0-0.5	0.0 - 0.3	<0.5	<0.5	<0.5	<0.5	<05	<0.005	<0.5	<0.5		<0.5		<2	<0.5	<0.5	<0.5	<0 F	<0.5	<0.5	-5	<u> </u>	<5	<0.5
VC11	20/10/2019	VC11_0.5-0.7	0.5 - 0.7	<0.5	\U. 5	NU.5	NU.0	S \0.0	> <0.000	-0.5	5 NU.5		NU.0		~2	~0. 5	\0.5	~0.5	NU.5	~0.5	~ 0.5	~ 0	\circlelon \circlel	<u>~0</u>	<u> </u>
VC11	20/10/2019	VC11_0.5-1.0																						′	
VC12	31/10/2019	VC12_0.0.05	0.0 0.5	<0 5	<0.5	<0.5	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	~1	<0.5					<0.5			′	'
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.3	<0.5	\U.5	NU.5	NU.0	S \0.0	~0.005	-0.5	5 <u> </u>	<0.5	N N.0	~0.5	N	~0. 5					~ 0.5			′	'
VC12	21/10/2019	VC12_0.3-0.4	0.5 - 0.4																					′	<u> </u>
VC12	21/10/2019		0.5 - 0.0																					′	<u> </u>
VC12	21/10/2019	VC12_0.0-0.9		<0 F						<0.5			<0.5		<2	<0.5						-5		′	<u> </u>
	31/10/2019	VC12_1.0-1.1	1.0 - 1.1	<0.5						<0.5) ·		<0.5		<2	<0.5						<0		′	
	31/10/2019		0.0 - 0.1	<0.5						<0.5)		<0.5		<u>~</u> 2	<0.5						<0		′	
	31/10/2019		0.0 - 0.5																					·'	i
	31/10/2019		0.3 - 0.4																					·'	
	31/10/2019		0.5 - 0.0																					·'	
VC13	31/10/2019		0.5 - 1.0				ļ																	·'	I
VC13	31/10/2019		0.7 - 0.8				ļ																	·'	I
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1																					·'	
VC14	31/10/2019	VC14_0.0-0.1	0.0 - 0.1																					·'	
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5																					·'	┢────
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4																					·'	
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0																					·'	
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8													.0.5								·'	
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1	<0.5						<0.5			<0.5		<2	<0.5						<5		·'	
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4																					·'	
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																					!	L
Statistics																									
Number of Results				25	17	17	17	7 17	17	25	17	5	25	5	25	25	4	4	4	4	9	12	4	4	4
Number of Detects				0	0		0) 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentra	ation			<0.5	<0.5	<0.5	<0.5	5 < 0.5	5 <0 005	<0.5	< 0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<0.5
Maximum Concentra	ation			<0.0	<0.6	<0.6	<0.6	S <0.6	0 044	<0.6	<0.6	<0.6	<0.6	<0.6	<2	<0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<0.5
				.0.0	.0.0	.0.0						.0.0			· ~							-0			

Statistics Number of Number of Minimum (Maximum



								VOC	Cs									F						,	
			mg/kg	og A/Carbon disulfide	o a Chlorodibromomethan b a c	n W Sy/6 b A/b Chloroethane	a cis-1,3- n ସ୍ନାdichloropropene	d cis-1,4-Dichloro-2- n X butene	by/bu by/bu by/bu	mg/kg	a b b b b b b b b b b b b b b b b b b b	a a a b a b a b a b a b a b a b a b a b	o da by by Dayloroethane	d dx/ b-isopropyltoluene	d k k k k k k k k k k k k k k k k k k k	b M/kg b	d tert-butylbenzene	ogy by/ Tetrachloroethene	ອີ trans-1,3- ກຊ/dichloropropene	o 協 trans-1,2- n 첫 dichloroethene	ອັສ trans-1,4-Dichloro-2- ກ້ຊາ butene	, data data data data data data data dat	n W M/Vinyl acetate	o d by/ by/ 1-naphthylamine	ය 2-(acetylamino) 여 첫 fluorene
Vaste SCC1 (with TCLP)			0.5	0.5	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5 18	0.5	25.2	0.5	0.5	0.5	5	5	0.5	0.5
Vaste TCLP1																									
d Waste SCC2 (with TCLP)																72		101							
d Waste TCLP2																									
	Field ID	Denth																							
019	BH05 4 6-4 7	46-47														<0.5		<0.5					<u> </u>	T	I
2019	BH06 1.2-1.45	1.2 - 1.45														< 0.5		< 0.5		 				ł	
2019	BH07_2.5-2.95	2.5 - 2.95														<0.5		<0.5							
/2019	vc01_0.4-0.6	0.4 - 0.6																		ļ				I	
/2019	VC01_0.0-0.2	0.0 - 0.2																						<0.5	<0.5
/2019	VC01_0.3-1.0	10-11																		 				~0.5	<0.5
/2019	VC02 0.0-0.2	0.0 - 0.2																		ł					
/2019	VC02_0.5-0.6	0.5 - 0.6																		t					i
/2019	VC02_0.5-1.0	0.5 - 1.0																							
/2019	VC02_1.0-1.2	1.0 - 1.2																		ļ				 	I
/2019	VC02_1.0-1.5 VC02_1.5.1.6	1.0 - 1.5																							
/2019	VC02_0.0-0.5	0.0 - 0.5																		 					
/2019	VC03_0.0-0.2	0.0 - 0.2																		ŧ				†	i
/2019	VC03_0.0-0.5	0.0 - 0.5																							
/2019	VC03_0.3-0.4	0.3 - 0.4	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	,l	<u> </u>
/2019	VC03_0.4-0.6	0.4 - 0.6]
/2019	VC03_0.5-1.0	0.5 - 1.0																		 					
/2019	VC03 1.0-1.2	1.0 - 1.2																		ł					i
/2019	VC04_0.0-0.1	0.0 - 0.1																							
/2019	VC04_0.3-0.4	0.3 - 0.4]					
/2019	VC04_0.5-1.0	0.5 - 1.0																		ļ				<0.6	<0.6
/2019	VC04_0.5-0.6	0.5 - 0.6																						ł	
/2019	VC04_0.9-1.0	0.9 - 1.0																		 					
/2019	VC05_0.0-0.1	0.0 - 0.1																		ŧ				·†	
/2019	VC05_0.5-0.7	0.5 - 0.7																							
/2019	VC05_0.5-0.9	0.5 - 0.9				_													0.5					I	
/2019	VC05_0.8-0.9	0.8 - 0.9	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<5	<5	┌────┤	
/2019	VC06_0.0-0.5	0.0 - 0.5														<0.5		<0.5							
/2019	VC06 0.3-0.4	0.3 - 0.4																		 				t	
/2019	VC06_0.5-0.6	0.5 - 0.6																							
/2019	VC06_0.5-1.0	0.5 - 1.0																		I					
/2019		0.7 - 0.8																		Į				┌────┤	
/2019	VC07_0.0-0.2	0.0 - 0.2	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5		
/2019	VC07 0.0-0.5	0.0 - 0.5	0.0	0.0	0.0	Ű	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	Ū		<0.5	<0.5
/2019	VC07_0.2-0.4	0.2 - 0.4																							
/2019	VC07_0.5-0.6	0.5 - 0.6																		ļ				I	
/2019	VC07_0.5-1.0	0.5 - 1.0																		ļ				┌────┤	
/2019	VC07_0.7-0.8	10-12																						ł	
/2019	VC08 0.0-0.1	0.0 - 0.1														<0.5		<0.5		 				ł	i
/2019	VC08_0.3-0.4	0.3 - 0.4																							
/2019	VC08_0.0-0.5	0.0-0.5																							
/2019	VC08_0.5-0.6	0.5 - 0.6																							I
/2019		0.5 - 1.0																		ļ				ł	
/2019	VC08 1.0-1.1	1.0 - 1.1																						,───┤	
/2019	VC08_1.0-1.5	1.0 - 1.5																		 				<0.5	<0.5
/2019	VC08_1.3-1.4	1.3 - 1.4																							
/2019	VC08_1.5-1.6	1.5 - 1.6																		Ţ				Ī]
/2019	VC09_0.0-0.2	0.0 - 0.2																		ļ]
/2019	VC09_0.4-0.6	0.0 - 0.5																						,───┤]
/2019	VC09_0.5-1.0	0.5 - 1.0																		 				ł	
/2019	VC09_0.7-0.8	0.7 - 0.8																							

									VOCs																
					de	omethan		ne Z	4	ane	٥	sne	hane	nene	ene	e	ene	lene	це	Ø	lloro-2-	omethan		ine	(0
				noform	oon disulfi	rodibrom	roethane	,3- oroprope	e e	omometha	tylbenzen	pylbenze	achloroet	propyltolu	butylbenz	loroether	outylbenz	achloroeth	s-1,3- oroprope	s-1,2- oroethen	s-1,4-Dich ne	lorofluoro	acetate	phthylam	cetylamin ene
				Bron	Carb	Chlo e	Chlo	cis-1 dichl	bute	Dibre	.nq-u	n-pro	Pent	p-iso	sec-	Trich	tert-b	Tetra	trans dichl	trans dichl	trans butei	Trich e	Vinyl	1-na	2-(ac fluor
EQL				mg/kg 0.5	mg/kg 0.5	mg/kg r 0.5	mg/kg 5	mg/kg m 0.5	g/kg m 0.5	ng/kg mg/k 0.5 0.5	g mg/k 0.5	kg mg/kg 5 0.5	mg/kg 0.5	mg/kg 0.5	mg/kg 0.5	mg/kg 5	mg/kg 5	mg/kg 0.5	mg/kg 0.5						
NSW EPA (2014) Gene	eral Solid Waste SCC1 (wit	h TCLP)														18		25.2							
NSW EPA (2014) Gene NSW EPA (2014) Restr	ricted Solid Waste TCLPT	with TCLP)														72		101							
NSW EPA (2014) Restr	ricted Solid Waste TCLP2																								
Location Code	Date	Field ID	Depth							······										-					
BH05 BH06	7/11/2019 7/11/2019	BH05_4.6-4.7 BH06_1.2-1.45	4.6 - 4.7 1.2 - 1.45													<0.5 <0.5		<0.5 <0.5							
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95													<0.5		< 0.5							
VC01 VC01	30/10/2019	vc01_0.4-0.6 VC01_0.0-0.2	0.4 - 0.6																				 		
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0																					<0.5	<0.5
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1								_														
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6																						
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																						
VC02 VC02	30/10/2019	VC02_1.0-1.2 VC02_1.0-1.5	1.0 - 1.2																				·		
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6																						
VC02 VC03	30/10/2019	VC02_0.0-0.5	0.0 - 0.2																				 		
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	0.5			_				_														
VC03 VC03	30/10/2019	VC03_0.3-0.4 VC03_0.4-0.6	0.3 - 0.4	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5 <0	.5 <(0.5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5		
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0																						
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																				 		
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1																						
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4																					<0.6	<0.6
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6																				 	-0.0	
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																						
VC04 VC05	30/10/2019	VC04_0.9-1.0	0.0 - 0.1																				 		
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																						
VC05 VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5 <0	.5 <0	0.5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5		
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1				-									<0.5		<0.5				-			
VC06 VC06	31/10/2019	VC06_0.0-0.5 VC06_0.3-0.4	0.0 - 0.5																				 		
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																						
VC06	31/10/2019	VC06_0.5-1.0 VC06_0.7-0.8	0.5 - 1.0																				 		
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9																						
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5 <0	.5 <0	0.5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4																					-0.0	
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6																						
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7																				·		
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2													<0 E		<0 F							
VC08 VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1													<0.5		<0.5					 		<u></u>
VC08	31/10/2019	VC08_0.0-0.5	0.0-0.5																						
VC08 VC08	31/10/2019	VC08_0.5-0.6 VC08_0.5-1.0	0.5 - 0.6								_												 		
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																						
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1																					<٥ ٢	<0.5
VC08	31/10/2019	VC08_1.3-1.4	1.3 - 1.4																					-0.0	
	31/10/2019	VC08_1.5-1.6	1.5 - 1.6																				Ţ		
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.5																				 		
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6																						
VC09	30/10/2019	VC09_0.5-1.0 VC09_0.7-0.8	0.7 - 0.8							<u> </u>	_														
B										4															



									VO	Cs																
				Bromoform	Carbon disulfide	Chlorodibromomethan e	Chloroethane	cis-1,3- dichloropropene	cis-1,4-Dichloro-2- butene	Dibromomethane	lodomethane	n-butylbenzene	n-propylbenzene	Pentachloroethane	p-isopropyltoluene	sec-butylbenzene	Trichloroethene	tert-butylbenzene	Tetrachloroethene	trans-1,3- dichloropropene	trans-1,2- dichloroethene	trans-1,4-Dichloro-2- butene	Trichlorofluoromethan e	Vinyl acetate	1-naphthylamine	2-(acetylamino) fluorene
· · · · · · · · · · · · · · · · · · ·				mg/kg	mg/kg	mg/kg	j mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0																							
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8																							
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2																							
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5				_																		<u> </u>	
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6				_																		<u> </u>	
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2				_																		<u> </u>	
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5				_																			<u> </u>
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7	<0.5	<0.5	5 <0.	5 <5	5 <0.5	<0.5	<0.5	5 <0.5	5 < 0.5	5 < 0.5	<0.5	< 0.5	<0.5	< 0.5	<0.5	5 <0.5	< 0.5	< 0.5	<0.	5 <	<u>5> ز</u>		<u> </u>
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0				_																		<u> </u>	<u> </u>
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2				_																	<u> </u>		<u> </u>
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5				_																		<0.5	< 0.5
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4				_																		<u> </u>	<u> </u>
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6				_																	4		<u> </u>
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																					<u> </u>		<u> </u>
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1														< 0.5		<0.5	5						
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1														<0.5		<0.5	, ,						
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5																							
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4																							
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6																							
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0																							
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8																					Τ		
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1																					1		
VC14	31/10/2019	VC14 0.0-0.1	0.0 - 0.1																							
VC14	31/10/2019	VC14 0.0-0.5	0.0 - 0.5																							
VC14	31/10/2019	VC14 0.3-0.4	0.3 - 0.4																							
VC14	31/10/2019	VC14 0.5-1.0	0.5 - 1.0																							
VC14	31/10/2019	VC14 0.7-0.8	0.7 - 0.8																					1		
VC14	31/10/2019	VC14 1.0-1.1	1.0 - 1.1														< 0.5		< 0.5	5				<u> </u>		
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4																					+	<u> </u>	1
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																					+	<u> </u>	1
Statistics Number of Results	·		·	4	4	4	4 4	4 4	4	4	4 4	4	4	4	4	4	12		4 12	2 4	4		4 4	4 4		5
Number of Detects				0	0) (0 0) 0	0	0) () () 0	0	0	0	0	0) (0	0	() (<u>) (</u>	<u>л с</u>	0
Minimum Concentra	ation			<0.5	<0.5	5 <0.	5 <5	5 < 0.5	<0.5	<0.5	5 < 0.5	o <0.5	o <0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	5 < 0.5	< 0.5	< 0.5	<0.	5 <{	5> ز	, <0.5	, <0.5
Maximum Concentra	ation			<0.5	< 0.5	5 <0.	5 <5	5 <0.5	<0.5	<0.5	5 < 0.5	< 0.5	i <0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	5 < 0.5	< 0.5	< 0.5	<0.	5 <	5> ز	, <0.6	, <0.6

Statistics Number of Number of Minimum C Maximum C



																			SVOCs						
:PA (2014) Genera	al Solid Waste	e SCC1 (with TCLP)		t by/2-nitroaniline	0 g 3,3-Dichlorobenzidine	L builtroaniline	പ്പള്ള 4-(dimethylamino) നൂട്ട് azobenzene	o a 4-bromophenyl phenyl 여 정 ether	9 월 3 월 4-chloroaniline	o a 4-chlorophenyl phenyl 아중 ether	0. 2/bd gy/dnitroaniline	0 ga 4-Nitroquinoline-N- G x/ oxide	0.5 by/5-nitro-o-toluidine	은 점 T,12- 더 위 dimethylbenz(a)anthra 여 cene	aniline 0.5	ansandenzene B 1	ය යි Bis(2-chloroethoxy) රා යි methane	G Bis(2-chloroethyl)ether	5.0 m 5.0	0.0 M 5.0 Shlorobenzilate	eu eu coronene S mg/kg 0.005	5 년 Hexachlorocyclopenta 당 성 diene	0 M G G G G Hexachloroethane	Exachloropropene 5.0	encophorone Bay/kg 0.5
PA (2014) Genera	al Solid Waste	e TCLP1 etc SCC2 (with TCLP)																							
PA (2014) Restrict PA (2014) Restrict	ted Solid Was	ste SCC2 (with TCLP) ste TCLP2																							
					•			-				•	•												
on Code	Date		Depth		1			1				1		1		I							——————————————————————————————————————		
	7/11/2019	BH05_4.0-4.7 BH06_1_2-1_45	4.0 - 4.7																					<u> </u>	
	7/11/2019	BH07_2.5-2.95	2.5 - 2.95																				—		
	30/10/2019	9 vc01_0.4-0.6	0.4 - 0.6																						
	30/10/2019	9 VC01_0.0-0.2	0.0 - 0.2		-0.5	11.0	-0.5	-0.5	-0.5	-0.5	-0.5		-0.5	-0.5	-0.5		-0.5	-0.5	-0.5	-0.5	10.005	-0.5	-0.5		-0.5
	30/10/2019		0.5 - 1.0	<1.(0 <0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	o <0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5	<0.5
	30/10/2019	VC02_0.0-0.2	0.0 - 0.2																		<0.003				
	30/10/2019	VC02_0.5-0.6	0.5 - 0.6																					<u> </u>	
	30/10/2019	9 VC02_0.5-1.0	0.5 - 1.0																						
	30/10/2019	9 VC02_1.0-1.2	1.0 - 1.2																						
	30/10/2019	V = V = V = 1.0 - 1.5	1.0 - 1.5																		<0.005		_	_	
	31/10/2019	9 VC02_1.3-1.0	0.0 - 0.5																		0.375				
	30/10/2019	VC03_0.0-0.2	0.0 - 0.2																						
	30/10/2019	9 VC03_0.0-0.5	0.0 - 0.5																		<0.005				
	30/10/2019		0.3 - 0.4																		<0.005		—	—	
	30/10/2019	VC03_0.5-1.0	0.5 - 1.0																						
	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																						
	30/10/2019	9 VC03_1.0-1.2	1.0 - 1.2																						
	30/10/2019	9 VC04_0.0-0.1	0.0 - 0.1																		10.005				
	30/10/2019	VC04_0.3-0.4	0.3 - 0.4	<1(<0.6	<10	<0.6	<0.6	<0.6	<0.6	<0.6	s <0.6	<0.6	<0.6	<0.6	<1	<0.6	<0.6	<0.6	<0.6	<0.005	<25	<0.6	<0.6	<0.6
	31/10/2019	9 VC04_0.5-0.6	0.5 - 0.6	51.0	, .0.0	\$1.0	-0.0	-0.0	-0.0	-0.0	-0.0	, .0.0	40.0	-0.0	-0.0		-0.0	-0.0	-0.0	40.0	-0.000	~2.0	-0.0	-0.0	
	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																						
	31/10/2019	9 VC04_0.9-1.0	0.9 - 1.0																						
	30/10/2019		0.0 - 0.1																				—	—	
	30/10/2019	VC05_0.5-0.7	0.5 - 0.9																						
	30/10/2019	VC05_0.8-0.9	0.8 - 0.9																		<0.005				
	31/10/2019	9 VC06_0.0-0.1	0.0 - 0.1																						
	31/10/2019	VC06_0.0-0.5	0.0 - 0.5																						
	31/10/2019		0.3 - 0.4																					<u> </u>	
	31/10/2019	9 VC06 0.5-1.0	0.5 - 1.0																					<u> </u>	
	31/10/2019	VC06_0.7-0.8	0.7 - 0.8																						
	31/10/2019	9 VC06_0.8-0.9	0.8 - 0.9																						
	30/10/2019		0.0 - 0.2	<1 (<0.5	<10	<0 F	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0 F	~1	<0.5	<0 F	<0.5	<0.5	0.256	<25	<0.5	<0.5	<0.5
	30/10/2019	VC07_0.0-0.3	0.0 - 0.3	×1.0	0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	5 <u> </u>	<0.5	<0.5	<0.5	~1	<0.5	<0.5	~ 0.5	<0.5	0.25	~2.0	<0.5	<0.5	<0.5
	30/10/2019	9 VC07_0.5-0.6	0.5 - 0.6																					<u> </u>	
	30/10/2019	9 VC07_0.5-1.0	0.5 - 1.0																						
	30/10/2019	VC07_0.7-0.8	0.7 - 0.7																						
	30/10/2019		1.0 - 1.2																					<u> </u>	
	31/10/2019	9 VC08 0.3-0.4	0.3 - 0.4																					<u> </u>	
	31/10/2019	VC08_0.0-0.5	0.0-0.5																						
	31/10/2019	VC08_0.5-0.6	0.5 - 0.6																						
	31/10/2019		0.5 - 1.0								ļ		├					ļ	\vdash				+	<u> </u>	
	31/10/2019	WC00_0.7-0.0 WC08_1_0-1_1	1.0 - 1.1										++											—	
	31/10/2019	VC08 1.0-1.5	1.0 - 1.5	<1.0	0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	5 < 0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5	<0.5
	31/10/2019	VC08_1.3-1.4	1.3 - 1.4																						
	31/10/2019	VC08_1.5-1.6	1.5 - 1.6										[10.005				
	30/10/2019		0.0 - 0.2															ļ	\vdash		<0.005				
	30/10/2019	VC09 0.4-0.6	0.4 - 0.6								i		+					ļ	\vdash						
	30/10/2019	VC09_0.5-1.0	0.5 - 1.0																						
	30/10/2019	VC09_0.7-0.8	0.7 - 0.8																						

																			SVOCs						
FOI				→ ditroaniline	d a 3,3-Dichlorobenzidine	ud/kg L	dimethylamino) طرق المجالية ما المجالية ما المحالية ما المحالي ما المحالية ما المحالية ما المحالي محالي محالي محالي محالي محالي محالي محالي محالي محالية محالي محالي مح	o a 4-bromophenyl phenyl G a ether	o da 2 dy/ 4-chloroaniline 5 d	a 4-chlorophenyl phenyl Gayether u	ටග් 4-nitroaniline ගත්	a 4-Nitroquinoline-N- الكارية مرابع	o a 2/5-nitro-o-toluidine 6/2/20	a 7,12- a k dimethylbenz(a)anthra a cene	mg/kg	eue Mg/kg	Bis(2-chloroethoxy) ق م ک ش العلیہ العل	고 3 고 3 요즘 Bis(2-chloroethyl)ether	⊂ arbazole	⊃ ∆/6 2 Chlorobenzilate	eueue Coroueue mg/kg	د diene در العدمان محمد المراجع ا مراجع المراجع ال مراجع المراجع ال	d Hexachloroethane	d Hexachloropropene	encone mg/kg
NSW EPA (2014) Genera	I Solid Waste SCC1 (with TCLP)			·	0.0	·	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	•	0.0	0.0	0.0	0.0	0.000	2.0	0.0	0.0	0.0
NSW EPA (2014) Genera	I Solid Waste TCLP1																								
NSW EPA (2014) Restrict	ted Solid Waste SCC2 (with TCLP)																								
NSW EPA (2014) Restrict	ted Solid Waste TCLP2																								
Location Code	Date	Field ID	Depth	· · · ·				1	1	<u> </u>														<u> </u>	
BH06	7/11/2019	BH05_4.0-4.7 BH06_1.2_1.45	4.0 - 4.7 1 2 - 1 <i>1</i> 5																						
BH07	7/11/2019	BH07 2.5-2.95	2.5 - 2.95																						
VC01	30/10/2019	vc01 0.4-0.6	0.4 - 0.6																						
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																						
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5	<0.5
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1																		<0.005				
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2																						
VC02 VC02	30/10/2019	VC02_0.5-0.0	0.5 - 0.0																						
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																						
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5																						
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6																		<0.005				
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5																		0.375				
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2																		<0.005	<u> </u>			
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5																		<0.005				
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6																		×0.003				
VC03	30/10/2019	VC03 0.5-1.0	0.5 - 1.0																						
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																						
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2																						
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1																		-0.005				
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4	<1.0	<0.6	<1.0	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	-1	<0.6	<0.6	<0.6	<0.6	< 0.005	<25	<0.6	<0.6	<0.6
VC04 VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6	<1.0	~0.0	<1.0	~ 0.0	<0.0	<0.0	~ 0.0	\U.U	~ 0.0	\0.0	~ 0.0	\0.0	~1	~ 0.0	\0.0	~ 0.0	~ 0.0	<0.005	~2.5	~0.0	~0.0	<0.0
VC04	31/10/2019	VC04 0.7-0.8	0.7 - 0.8																			<u> </u>			
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0																						
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1																						
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																						
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																		<0.005	<u> </u>			
	30/10/2019	VC05_0.8-0.9	0.8 - 0.9																		<0.005				
VC06	31/10/2019	VC06 0.0-0.5	0.0 - 0.5																						
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4																						
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																						
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																						
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8																			<u> </u>			
VC08 VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2																		0 256				
VC07	30/10/2019	VC07 0.0-0.5	0.0 - 0.5	<1.0	<0.5	<1.0	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	0.25	<2.5	<0.5	<0.5	<0.5
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4													-									
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6																						
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0																						
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7																						
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2																						
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4																						
VC08	31/10/2019	VC08 0.0-0.5	0.0-0.5																						
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6																					†	
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0																						
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																						
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1	1 0	-0 -	-1 0	-0 5	-0.5	-0.5		-0 F	-0 5	-0 5	-0 5	-0.5		-0.5	-0 5	-0 5	-0 5	-0.005			-0 -	-0 5
VC08	31/10/2019	VC08 1 3-1 4	1 3 - 1 4	<1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	[`>	<0.5	<0.5	<0.5	<0.5	<u>~0.005</u>	<2.5	<0.5	<0.5	<0.5
VC08	31/10/2019	VC08 1.5-1.6	1.5 - 1.6	┼──┼			ļ			+				+ +			┝──┤							-+	
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2						1												<0.005			†	
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5																						
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6	\downarrow													T								
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0	├───┤			ļ			+							└───┤							\longrightarrow	
NC08	30/10/2019	0.1-0.8	υ. <i>ι</i> - υ.δ																						



																			SVOCs	,					
				miline	hlorobenzidine	iniline	thylamino) zene	ophenyl phenyl	oaniline	ophenyl phenyl	aniline	quinoline-N-	o-toluidine	/lbenz(a)anthra		Izene	hloroethoxy) Ie	hloroethyl)ether	ole	oenzilate	e	llorocyclopenta	lloroethane	lloropropene	one
				2-nitroa	3,3-Dic	3-nitroe	4-(dime azoben	4-brom ether	4-chlor	4-chlor ether	4-nitroa	4-Nitroo oxide	5-nitro-	7,12- dimethy cene	Aniline	Azober	Bis(2-c methan	Bis(2-c	Carbaz	Chlorot	Corone	Hexach diene	Hexach	Hexach	Isophor
1/000	20/40/2040			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0																	ļ	<0.005		ł	<u> </u>	
	30/10/2019		0.7 - 0.8																	ļ	<0.005		-	<u> </u>	
	31/10/2019	VC10_0.0-0.2	0.0 - 0.2																	ļ	<0.005		-	<u> </u>	
	31/10/2019	VC10_0.0-0.5	0.0 - 0.5																	ļ	<0.005		ł	<u> </u>	
	31/10/2019	VC10_0.0-0.0																		ļ			-		
VC11	30/10/2019	VC11_0.0-0.2	0.0 0.5																	ļ			+		
VC11	30/10/2019	VC11_0.0-0.3	0.0 - 0.3																	ļ	<0.005		·		
VC11	30/10/2019	VC11_0.5-0.7	0.5 1 0																	ļ	~0.005		†		
VC11	30/10/2019	VC11_0.3-1.0	10.12																	ļ			+		
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<10	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<05	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	0.126	<25	<0.5	<0.5	<0.5
VC12	31/10/2019	VC12_0.0-0.3	0.0 - 0.3	<1.0	~0.5	<1.0	~0.3	~0.5	~0. 5	~ 0.5	~0.5	~0. 5	<0.5	~ 0.5	~ 0.5		~ 0.5	~ 0.5	~ 0.5	~0.5	0.120	~z.J	-0.5	-0.5	~0.5
VC12	31/10/2019	VC12_0.5-0.4	0.5 - 0.6																	ļ			ł		
VC12	31/10/2019	VC12_0.5-0.0	0.3 - 0.9																	 			ł		
VC12	31/10/2019	VC12_0.0-0.0	10-11																	 			ł		
VC13	31/10/2019	VC13_0.0-0.1																		ł			ł		
VC13	31/10/2019	VC13_0.0-0.5	0.0-0.5																				ł		
VC13	31/10/2019	VC13_0.3-0.4	0.0 - 0.0																	ļ			ł		
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6																	ļ			ł		
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0																	ļ	 		ł		
VC13	31/10/2019	VC13_0.5-1.0	0.3 - 1.0																	ļ			ł		
VC13	31/10/2019	VC13_1.0.1.1	10 11																	ļ			†		
VC14	31/10/2019	VC13_1.0-1.1																		ļ			†		
VC14	31/10/2019	VC14_0.0-0.1	0.0 0.5																	ļ			†		
VC14	31/10/2019	VC14_0.0-0.3	0.0 - 0.3																	ļ			†		
VC14	31/10/2019	VC14_0.5-0.4	0.5 1 0																	ļ			†		
VC14	31/10/2019	VC14_0.5-1.0	0.3 - 1.0																	ļ			ł		
VC14	31/10/2019	VC14_0.7-0.0	10-11																	ļ			ł		
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1																	ļ			ł		
VC14	31/10/2019	VC14-0 5-0 6	0.5 - 0.6																	ł			ł		
	01/10/2013	101+0.0-0.0	0.0 - 0.0																				L	L	
Statistics																									
Number of Results				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	17	5	5	5	5
Number of Detects				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
Minimum Concentratio	on			<1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.005	<2.5	<0.5	< 0.5	< 0.5
Maximum Concentration	on			<1.0	<0.6	<1.0	<0.6	<0.6	<0.6	<0.6	<0.6	< 0.6	<0.6	<0.6	<0.6	<1	<0.6	<0.6	<0.6	<0.6	0.375	<2.5	<0.6	< 0.6	< 0.6

5	5	5	5	5	5	5	5	5	5	5	5	5	5	17	5	5	5	5
0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.005	<2.5	<0.5	<0.5	<0.5
<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<1	<0.6	<0.6	<0.6	<0.6	0.375	<2.5	<0.6	<0.6	<0.6



Methapyrilene	N-nitrosodiethylamine	N-nitrosodi-n- butylamine	N-nitrosodi-n- propylamine	N- Nitrosomethylethylami ne	N-nitrosomorpholine	N-nitrosopiperidine	N-nitrosopyrrolidine	Pentachlorobenzene	Perylene	Phenacetin	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.004	0.5	0.1	0.1	0.0005	0.0005	0.0005	0.05	0.0005	0.00025	0.00025

0.5	0
	0.5

Location Code	Date	Field ID	Depth																			
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7													<0.0	5 <0.0	5 <0.05	5	< 0.05	< 0.05	0.05> ز
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45													<0.0	5 <0.0	5 < 0.05	5	< 0.05	< 0.05	0.05> ز
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95													<0.0	5 <0.0	5 < 0.05	5	< 0.05	< 0.05	0.05> ز
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6																			
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																			
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.5	<0.5	<0.5	<0.5	<0.5	5 < 0.5	<0.5	<1.0	<0.5	< 0.004	<0.5		< 0.0005	0 <0.0005	0 <0.00050	< 0.5	<0.00050	< 0.00025	0.00025 ز
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1										< 0.004			< 0.0005	0 <0.0005	0 <0.00050)	<0.00050	< 0.00025	0.00025 ز
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2																			
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6																			
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																			
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																			
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5																			
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6										< 0.004	ł		< 0.0005	0 <0.0005	0 <0.00050)	< 0.00050	< 0.00025	0.00025 ز
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5										0.329)		< 0.0005	0 < 0.0005	0 <0.00050)	< 0.00050	< 0.00025	0.00025 ز
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2																			
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5										< 0.004			< 0.0005	0 < 0.0005	0 < 0.00050)	< 0.00050	< 0.00025	0.00025 ز
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4										< 0.004			< 0.0005	0 < 0.0005	0 < 0.00050)	< 0.00050	< 0.00025	0.00025 ز
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6																			
VC03	30/10/2019	VC03 0.5-1.0	0.5 - 1.0																			
VC03	30/10/2019	VC03 0.6-0.7	0.6 - 0.7																			
VC03	30/10/2019	VC03 1.0-1.2	1.0 - 1.2																			
VC04	30/10/2019	VC04 0.0-0.1	0.0 - 0.1							1												
VC04	30/10/2019	VC04 0.3-0.4	0.3 - 0.4							1			< 0.004			< 0.0005	0 < 0.0005	0 < 0.00050)	< 0.00050	< 0.00025	0.00025 ز
VC04	30/10/2019	VC04 0.5-1.0	0.5 - 1.0	<0.6	<0.6	<0.6	<0.6	<0.6	6 < 0.6	<0.6	<1.0	<0.6	< 0.005	i <0.6		< 0.0005	0 < 0.0005	0 < 0.00050	< 0.5	< 0.00050	< 0.00025	0.00025 ز
VC04	31/10/2019	VC04 0.5-0.6	0.5 - 0.6							1												
VC04	31/10/2019	VC04 0.7-0.8	0.7 - 0.8							1												
VC04	31/10/2019	VC04 0.9-1.0	0.9 - 1.0							1												
VC05	30/10/2019	VC05 0.0-0.1	0.0 - 0.1																			-
VC05	30/10/2019	VC05 0.5-0.7	0.5 - 0.7																			-
VC05	30/10/2019	VC05 0.5-0.9	0.5 - 0.9																			-
VC05	30/10/2019	VC05 0.8-0.9	0.8 - 0.9										< 0.004	-		< 0.0005	0 < 0.0005	0 < 0.00050)	< 0.00050	< 0.00025	0.00025 ز
VC06	31/10/2019	VC06 0.0-0.1	0.0 - 0.1													<0.0	5 <0.0	5 < 0.05	5	< 0.05	< 0.05	0.05 ز
VC06	31/10/2019	VC06 0.0-0.5	0.0 - 0.5																			
VC06	31/10/2019	VC06 0.3-0.4	0.3 - 0.4																			
VC06	31/10/2019	VC06 0.5-0.6	0.5 - 0.6																			-
VC06	31/10/2019	VC06 0.5-1.0	0.5 - 1.0																			-
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8																			-
VC06	31/10/2019	VC06 0.8-0.9	0.8 - 0.9																			
VC07	30/10/2019	VC07 0.0-0.2	0.0 - 0.2										0.136	6		< 0.0005	0 < 0.0005	0 < 0.00050)	< 0.00050	< 0.00025	0.00025 ز
VC07	30/10/2019	VC07 0.0-0.5	0.0 - 0.5	< 0.5	<0.5	< 0.5	<0.5	<0.5	5 < 0.5	<0.5	<1.0	<0.5	0.174	< 0.5		< 0.0005	0 < 0.0005	0 < 0.00050	< 0.5	< 0.00050	< 0.00025	0.00025 ز
VC07	30/10/2019	VC07 0.2-0.4	0.2 - 0.4								-		-									
VC07	30/10/2019	VC07 0.5-0.6	0.5 - 0.6																			
VC07	30/10/2019	VC07 0.5-1.0	0.5 - 1.0																			
VC07	30/10/2019	VC07 0.7-0.8	0.7 - 0.7																			
VC07	30/10/2019	VC07 1.0-1.2	1.0 - 1.2																			
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1													<0.0	5 <0.0	5 < 0.05	5	< 0.05	< 0.05	o.05 ان
VC08	31/10/2019	VC08 0.3-0.4	0.3 - 0.4																			
VC08	31/10/2019	VC08 0.0-0.5	0.0-0.5																			
VC08	31/10/2019	VC08 0.5-0.6	0.5 - 0.6																			
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0																		 	-
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																		 	-
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1																		 	-
VC08	31/10/2019	VC08 1.0-1.5	1.0 - 1.5	<0.5	<0.5	<0.5	<0.5	<0.5	5 <0.5	<0.5	<1.0	<0.5	<0.004	<0.5		<0.0005	0 < 0.0005	0 < 0.00050	< 0.5	<0.00050	<0.00025	5 <0.00025
VC08	31/10/2019	VC08 1.3-1.4	1.3 - 1.4	-0.0	5.5	0.0	0.0	-0.0				0.0	0.004			0.0000	0.0000			0.00000	5.00020	5.00020
VC08	31/10/2019	VC08 1 5-1 6	1.5 - 1.6											1	1 1	1	1	1		1	l	1
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2						1				<0.004			<0.0005	0 < 0.0005	0 < 0.00050		<0.00050	<0.00025	5 <0.00025
VC09	30/10/2019	VC09_0.0-0.5	0.0 - 0.5										5.001									0.00020
VC09	30/10/2019	VC09 0.4-0.6	0.4 - 0.6															1			(1 1
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0															1			(1
VC09	30/10/2019	VC09_0.7-0.8	07-08											1			1	1			1	1
	00,10,2010	1.000_0.1 0.0	0.0						1	1 I			1	1	ı — — — —		1	1	1	1	<u>ــــــــــــــــــــــــــــــــــــ</u>	لـــــــــــــــــــــــــــــــــــــ



				Methapyrilene	N-nitrosodiethylamine	N-nitrosodi-n- butylamine	N-nitrosodi-n- propylamine	N- Nitrosomethylethylami ne	N-nitrosomorpholine	N-nitrosopiperidine	N-nitrosopyrrolidine	Pentachlorobenzene	Perylene	Phenacetin	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0															·				/	
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8										<0.004				< 0.00050	<0.00050	< 0.00050	J	<0.00050	<0.00025	< 0.00025
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2															·				/	
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5										<0.004				< 0.00050	<0.00050	< 0.00050	J	<0.00050	<0.00025	< 0.00025
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6																			'	
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2																			'	
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5																			'	
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7										< 0.004				< 0.00050	< 0.00050	< 0.00050	Ĵ	< 0.00050	<0.00025	< 0.00025
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0															1		1		,	
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2															1		1		,	
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.5	5 < 0.5	5 <0.5	5 < 0.5	<0.5	<0.5	5 <0.5	<1.0	<0.5	0.055	<0.5			< 0.00050	< 0.00050	< 0.00050	0.5> ر	< 0.00050	<0.00025	< 0.00025
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4															1		1		,	
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6															· · · · · · · · · · · · · · · · · · ·				,	
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9															· · · · · · · · · · · · · · · · · · ·				,	
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1														< 0.05	< 0.05	< 0.0!	ز	< 0.05	< 0.05	< 0.05
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1														< 0.05	< 0.05	< 0.0!	ز	< 0.05	< 0.05	< 0.05
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5															· · · · · · · · · · · · · · · · · · ·				,	
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4															· · · · · · · · · · · · · · · · · · ·				,	
VC13	31/10/2019	VC13 0.5-0.6	0.5 - 0.6															· · · · · · · · · · · · · · · · · · ·				· · · · · ·	
VC13	31/10/2019	VC13 0.5-1.0	0.5 - 1.0															· · · · · · · · · · · · · · · · · · ·				· · · · · ·	
VC13	31/10/2019	VC13 0.7-0.8	0.7 - 0.8															· · · · · · · · · · · · · · · · · · ·				· · · · · ·	
VC13	31/10/2019	VC13 1.0-1.1	1.0 - 1.1															· · · · · · · · · · · · · · · · · · ·				· · · · · ·	
VC14	31/10/2019	VC14 0.0-0.1	0.0 - 0.1															· · · · · · · · · · · · · · · · · · ·				· · · · · ·	
VC14	31/10/2019	VC14 0.0-0.5	0.0 - 0.5															· · · · · · · · · · · · · · · · · · ·				· · · · · ·	
VC14	31/10/2019	VC14 0.3-0.4	0.3 - 0.4															1			1	,	
VC14	31/10/2019	VC14 0.5-1.0	0.5 - 1.0															1			1	,	
VC14	31/10/2019	VC14 0.7-0.8	0.7 - 0.8															1			1	,	
VC14	31/10/2019	VC14 1.0-1.1	1.0 - 1.1														< 0.05	, <0.05	< 0.0	ز	< 0.05	< 0.05	< 0.05
VC14	31/10/2019	VC14 1.3-1.4	1.3 - 1.4															1			1	,	
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6															· · · · · · · · · · · · · · · · · · ·				· · · · · ·	
	•			•			•		•								•		<u> </u>	-	-		<u> </u>
Statistics																							
Number of Resu	ılts			Ę	5 5	5 5	5 5	5	5	5 5	5	5	17	5	0) 0	25	25	2!	5 ز	, 25	25	25
	1											-			~					<u> </u>	·		

Statistics																				
Number of Results	5	5	5	5	5	5	5	5	5	17	5	0	0	25	25	25	5	25	25	25
Number of Detects	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.004	<0.5			<0.0005	< 0.0005	<0.0005	<0.5	<0.0005	<0.00025	<0.00025
Maximum Concentration	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<1.0	<0.6	0.329	<0.6			<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05



						OC Pestic	cides									
	Chlordane (trans)	d-BHC	4,4 DDD	4,4 DDT	DDT+DDE+DDD - Lab Calc	Dieldrin	Endosulfan	Endosulfan I (alpha)	Endosulfan II (beta)	Endosulfan Sulfate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.00025	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.00025	0.0005	0.0005
NSW EPA (2014) General Solid Waste SCC1 (with TCLP)							108									
NSW EPA (2014) General Solid Waste TCLP1																
NSW EPA (2014) Restricted Solid Waste SCC2 (with TCLP)							432									
NSW EPA (2014) Restricted Solid Waste TCLP2																

Location Code	Date	Field ID	Depth																
BH05	7/11/2019	BH05 4.6-4.7	4.6 - 4.7	<0.05	<0.05	<0.05	<0.2		<0.05		< 0.05	<0.05	<0.05	< 0.05	<0.05		< 0.05	<0.05	< 0.05
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45	<0.05	<0.05	<0.05	<0.2		<0.05		<0.05	< 0.05	<0.05	< 0.05	<0.05		<0.05	<0.05	< 0.05
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95	<0.05	<0.05	<0.05	<0.2		<0.05		< 0.05	<0.05	<0.05	< 0.05	<0.05		<0.05	<0.05	< 0.05
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6																
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2											1					
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6											í					
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0											1					
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2											í					
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5																
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2															,!	
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6															,!	
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0															,!	
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7															,!	
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2															,!	<u> </u>
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1															,!	<u> </u>
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6											(ļļ	ļ'
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8											(,!	ļ'
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0											↓				,!	↓ ′
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1											└──── ┤				!	ļ!
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7											└──── ┤				!	ļ!
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9											<u> </u>					<u> </u>
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	< 0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1	<0.05	<0.05	<0.05	<0.2		<0.05		<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5											↓)	ļ!
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4											↓				J	Į'
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6				-	+ +						۱ ــــــــــــــــــــــــــــــــــــ					┟ ─────┘
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0				-	+ +						۱ ــــــــــــــــــــــــــــــــــــ					┟ ─────┘
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8											⊢−−−− ∔					└──── ┘
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9	-0.0005	10,00050	-0.00050		10,00050	10,00050	-0.00050			40.00050	10,00050	10 00050		10,00005	10,00050	10,00050
	30/10/2019	VC07_0.0-0.2	0.0 - 0.2	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	< 0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
	30/10/2019		0.0 - 0.5	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
	20/10/2019	VC07_0.2-0.4	0.2 - 0.4					<u> </u>						/ł				I	├ ─────┦
	30/10/2019	VC07_0.5-0.0	0.5 - 0.0					+ +						ι−−−− ∔					<u>⊦</u>
VC07	30/10/2019	VC07_0.3-1.0						+ +			} }			/ł				!	<u>├</u> ────┦
VC07	30/10/2019	VC07_0.7-0.0						+ +			} }			/ł				!	<u>├</u> ────┦
	31/10/2019		0.0 0.1	<0.05	<0.05	<0.05	<0.2	+ +	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05
VC08	31/10/2019	VC08_0.3.0.4	0.0-0.1	<0:03	<0.05	<0.05	~0.Z		<0.05		~0.05	<0.05	<0.05	<0.03	<0.05		<0.05	-0.03	<0.03
VC08	31/10/2019	VC08_0.0-0.5	0.0-0.5											rt					<u>├</u> ────┤
VC08	31/10/2019	VC08_0.5-0.6	0.0-0.0											/t					
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 0.0											/t					
VC08	31/10/2019	VC08_0.7-0.8	0.3 - 1.0											/t					
VC08	31/10/2019	VC08_1.0-1.1	10-11											(ł				Į	
VC08	31/10/2019	VC08 1 0-1 5	10-15	<0.00025	<0.00020	<0 00050	<0 00050	<0.00050	<0 00050	<0 00050	<0.00050	<0 00050	<0 00050	<0.00050	<0 00050	<0 00050	<0.00025	<0.00050	<0.00050
VC08	31/10/2019	VC08 1 3-1 4	13-14	-0.00023	-0.00000	-0.00000	-0.00000	-0.00000	-0.00000	-0.00000	-0.00000	-0.00000	-0.00000	-0.00000	-0.00000	-0.00000	-0.00020	-0.00000	-0.00000
VC08	31/10/2019	VC08 1 5-1 6	15-16				1	╂────╂						ł				Į	
VC09	30/10/2019	VC09_0_0_02	0.0-0.2	<0.00025	<0.00020	<0.00020	<0.00020	<0.00050	<0 00050	<0 00050	<0.00050	<0.00050	<0 00050	<0.00050	<0 00050	<0 00050	<0.00025	<0.00050	<0.00050
VC09	30/10/2019	VC09_0.0.05	0.0-0.5	-0.00020		0.00000	0.00000		0.00000	0.00000		0.00000	0.00000		0.00000	0.00000	0.00020		.0.00000
VC09	30/10/2019	VC09_0.4-0.6	04-06				1	 						ł					
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0				1	 						ł				/	· · · · · · · · · · · · · · · · · · ·
VC09	30/10/2019	VC09_07-08	0.7 - 0.8				1	 						ł				/	· · · · · · · · · · · · · · · · · · ·
	00/10/2010	1,000_0.1 0.0	0.1 0.0				1	1						L					<u>ل</u> ــــــــــ



									OC Pestici	des									
				Chlordane (trans)	d-BHC	4,4 DDD	4,4 DDT	B DDT+DDE+DDD - Lab Calc	Dieldrin	Endosulfan	Endosulfan I (alpha)	Endosulfan II (beta)	Endosulfan Sulfate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide
VC.09	30/10/2019	VC09_0.8-1.0	08-10	шу/ку	шу/ку	шу/ку	шу/ку	шу/ку	iiig/kg	шу/ку	iiig/kg	шу/ку	iiig/kg	шу/ку	iiig/kg	iiig/kg	iiig/kg	iiig/kg	піў/ку
VC10	30/10/2019	VC10_07-08	0.7 - 0.8	<0.00025	<0.00050	<0 00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2	0.00020	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00020	0.00000	0.00000
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC10	31/10/2019	VC10 0.5-0.6	0.5 - 0.6																
VC11	30/10/2019	VC11 0.0-0.2	0.0 - 0.2																
VC11	30/10/2019	VC11 0.0-0.5	0.0 - 0.5																
VC11	30/10/2019	VC11 0.5-0.7	0.5 - 0.7	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	< 0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC11	30/10/2019	VC11 0.5-1.0	0.5 - 1.0																
VC11	30/10/2019	VC11 1.0-1.2	1.0 - 1.2																
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.00025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025	<0.00050	<0.00050
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4																
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6																
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1	<0.05	<0.05	<0.05	<0.2		<0.05		<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1	< 0.05	<0.05	<0.05	<0.2		<0.05		<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5																
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4																
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6																
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0																
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8																
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1																
VC14	31/10/2019	VC14_0.0-0.1	0.0 - 0.1																
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5																
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4																
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0																
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8																
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1	<0.05	<0.05	<0.05	<0.2		<0.05		<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4																
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																
Statistics																			
Number of Results	i			25	25	25	25	17	25	17	25	25	25	25	25	17	25	25	25
Number of Detects	3			0	0	0	0	0	0	0	0	00	0	00	0	0	0	0	0
Minimum Concenti	ration			< 0.00025	<0.0005	<0.0005	< 0.0005	< 0.0005	< 0.0005	<0.0005	<0.0005	< 0.0005	< 0.0005	< 0.0005	<0.0005	< 0.0005	<0.00025	<0.0005	< 0.0005
Maximum Concent	tration			< 0.05	< 0.05	< 0.05	<0.2	< 0.0005	< 0.05	< 0.0005	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.0005	< 0.05	< 0.05	< 0.05



	Hexachlorobenzene	Methoxychlor	Oxychlordane	Toxaphene	Tokuthion	Azinphos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorfenvinphos E	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Demeton-S-methyl	Diazinon	cis-Chlorfenvinphos	Dichlorvos	Dimethoate
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.0005	0.0005	0.0005	1	0.2	0.01	0.2	0.01	0.01	0.2	0.01	0.01	0.01	2	0.2	0.2	0.01	0.01	0.01	0.01	0.01
NSW EPA (2014) General Solid Waste SCC1 (with TCLP)												7.5									
NSW EPA (2014) General Solid Waste TCLP1																					
NSW EPA (2014) Restricted Solid Waste SCC2 (with TCLP)												30									
NSW EPA (2014) Restricted Solid Waste TCLP2																					

Location Code	Date	Field ID	Depth																
BH05	7/11/2019	BH05 4.6-4.7	4.6 - 4.7	<0.05									<0.05						
BH06	7/11/2019	BH06 1.2-1.45	1.2 - 1.45	<0.05									<0.05						
BH07	7/11/2019	BH07 2.5-2.95	2.5 - 2.95	<0.05									< 0.05						
VC01	30/10/2019	vc01 0.4-0.6	0.4 - 0.6																
VC01	30/10/2019	VC01 0.0-0.2	0.0 - 0.2																
VC01	30/10/2019	VC01 0.5-1.0	0.5 - 1.0	<0.00050	<0.00050 <0.0005	0		<0.01	<0.01	< 0.01	<0.5	< 0.0100	< 0.01 <	0.01	<0.0	1 < 0.01	< 0.01	< 0.01	<0.01
VC01	30/10/2019	VC01 1.0-1.1	1.0 - 1.1	<0.00050	<0.00050 <0.0005	0		<0.01	<0.01	< 0.01		< 0.0100	< 0.01 <	0.01	<0.0	1 < 0.01	< 0.01	< 0.01	<0.01
VC02	30/10/2019	VC02 0.0-0.2	0.0 - 0.2																
VC02	30/10/2019	VC02 0.5-0.6	0.5 - 0.6																
VC02	30/10/2019	VC02 0.5-1.0	0.5 - 1.0																
VC02	30/10/2019	VC02 1.0-1.2	1.0 - 1.2																
VC02	30/10/2019	VC02 1.0-1.5	1.0 - 1.5																
VC02	30/10/2019	VC02 1.5-1.6	1.5 - 1.6	<0.00050	<0.00050 <0.0005	0		<0.01	<0.01	< 0.01		< 0.0100	< 0.01 <).01	<0.0	1 <0.01	< 0.01	< 0.01	< 0.01
VC02	31/10/2019	VC02 0.0-0.5	0.0 - 0.5	<0.00050	<0.00050 <0.0005	0		<0.01	<0.01	< 0.01		< 0.0100	< 0.01 <).01	<0.0	1 <0.01	< 0.01	< 0.01	< 0.01
VC03	30/10/2019	VC03 0.0-0.2	0.0 - 0.2																
VC03	30/10/2019	VC03 0.0-0.5	0.0 - 0.5	<0.00050	<0.00050 <0.0005	0		<0.01	<0.01	< 0.01		< 0.0100	< 0.01 <).01	<0.0	1 <0.01	< 0.01	< 0.01	< 0.01
VC03	30/10/2019	VC03 0.3-0.4	0.3 - 0.4	<0.00050	<0.00050 <0.0005	0		<0.01	< 0.01	< 0.01		< 0.0100	< 0.01 <).01	< 0.0	1 < 0.01	< 0.01	< 0.01	< 0.01
VC03	30/10/2019	VC03 0.4-0.6	0.4 - 0.6																
VC03	30/10/2019	VC03 0.5-1.0	0.5 - 1.0																
VC03	30/10/2019	VC03 0.6-0.7	0.6 - 0.7																
VC03	30/10/2019	VC03 1.0-1.2	1.0 - 1.2																
VC04	30/10/2019	VC04 0.0-0.1	0.0 - 0.1																
VC04	30/10/2019	VC04 0.3-0.4	0.3 - 0.4	<0.00050	<0.00050 <0.0005	0		<0.01	< 0.01	< 0.01		< 0.0100	< 0.01 <).01	<0.0	1 < 0.01	< 0.01	< 0.01	< 0.01
VC04	30/10/2019	VC04 0.5-1.0	0.5 - 1.0	<0.00050	<0.00050 <0.0005	0		<0.01	< 0.01	< 0.01	<0.6	< 0.0100	< 0.01 <).01	<0.0	1 < 0.01	< 0.01	< 0.01	< 0.01
VC04	31/10/2019	VC04 0.5-0.6	0.5 - 0.6																
VC04	31/10/2019	VC04 0.7-0.8	0.7 - 0.8																
VC04	31/10/2019	VC04 0.9-1.0	0.9 - 1.0																
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1																
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																
VC05	30/10/2019	VC05 0.8-0.9	0.8 - 0.9	<0.00050	<0.00050 <0.0005	0		< 0.01	< 0.01	< 0.01		<0.0100	< 0.01 <).01	<0.0	1 < 0.01	< 0.01	< 0.01	< 0.01
VC06	31/10/2019	VC06 0.0-0.1	0.0 - 0.1	< 0.05		-							< 0.05	-					
VC06	31/10/2019	VC06 0.0-0.5	0.0 - 0.5																
VC06	31/10/2019	VC06 0.3-0.4	0.3 - 0.4																
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																
VC06	31/10/2019	VC06 0.5-1.0	0.5 - 1.0																
VC06	31/10/2019	VC06 0.7-0.8	0.7 - 0.8																
VC06	31/10/2019	VC06 0.8-0.9	0.8 - 0.9																
VC07	30/10/2019	VC07 0.0-0.2	0.0 - 0.2	<0.00050	<0.00050 <0.0005	0		< 0.01	< 0.01	< 0.01		<0.0100	<0.01 <).01	<0.0	1 < 0.01	< 0.01	< 0.01	< 0.01
VC07	30/10/2019	VC07 0.0-0.5	0.0 - 0.5	< 0.00050	<0.00050 <0.0005	0		< 0.01	< 0.01	< 0.01	< 0.5	< 0.0100	< 0.01 <).01	<0.0	1 < 0.01	< 0.01	< 0.01	< 0.01
VC07	30/10/2019	VC07 0.2-0.4	0.2 - 0.4																
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6																
VC07	30/10/2019	VC07 0.5-1.0	0.5 - 1.0																
VC07	30/10/2019	VC07 0.7-0.8	0.7 - 0.7																
VC07	30/10/2019	VC07 1.0-1.2	1.0 - 1.2																
VC08	31/10/2019	VC08 0.0-0.1	0.0 - 0.1	<0.05									< 0.05						
VC08	31/10/2019	VC08 0.3-0.4	0.3 - 0.4																
VC08	31/10/2019	VC08 0.0-0.5	0.0-0.5																
VC08	31/10/2019	VC08 0.5-0.6	0.5 - 0.6																
VC08	31/10/2019	VC08 0.5-1.0	0.5 - 1.0																
VC08	31/10/2019	VC08 0.7-0.8	0.7 - 0.8																
VC08	31/10/2019	VC08 1.0-1.1	1.0 - 1.1																
VC08	31/10/2019	VC08 1.0-1.5	1.0 - 1.5	<0.00050	<0.00050 <0.0005	0		<0.01	< 0.01	< 0.01	<0.5	< 0.0100	< 0.01 <).01	<0.0	1 < 0.01	< 0.01	< 0.01	<0.01
VC08	31/10/2019	VC08 1.3-1.4	1.3 - 1.4	0.00000		-				0.01						0.0	5.01	0.01	
VC08	31/10/2019	VC08 1.5-1.6	1.5 - 1.6	İ		1				1	1	1 1				1	1		
VC09	30/10/2019	VC09 0.0-0.2	0.0 - 0.2	<0.00050	<0.00050 <0.0005	0	1 1	<0.01	< 0.01	< 0.01	1	<0.0100	< 0.01 <	0.01	<0.0	1 < 0.01	< 0.01	<0.01	<0.01
VC09	30/10/2019	VC09 0.0-0.5	0.0 - 0.5			1	1 1			1	1			-					
VC09	30/10/2019	VC09 0.4-0.6	0.4 - 0.6			1	1 1			1	1					1	1	1 1	
VC09	30/10/2019	VC09 0.5-1.0	0.5 - 1.0					İ			1					1			
VC09	30/10/2019	VC09 0.7-0.8	0.7 - 0.8							1	1					1	1	1	
R					• •						1				 - I				



				Hexachlorobenzene	Methoxychlor	Oxychlordane	Toxaphene	Tokuthion	Azinphos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorfenvinphos E	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Demeton-S-methyl	Diazinon	cis-Chlorfenvinphos	Dichlorvos	Dimethoate
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg r	mg/kg i	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0																					-
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8	<0.00050	<0.00050	<0.00050)		<0.01		<0.01	<0.01		<0.0100	<0.01	<0.01				<0.01	<0.01	<0.01	<0.01	<0.01
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2																					-
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5	<0.00050	<0.00050	<0.00050)		<0.01		<0.01	<0.01		<0.0100	<0.01	<0.01				<0.01	<0.01	<0.01	<0.01	<0.01
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6																					
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2																					
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5																					
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7	<0.00050	<0.00050	<0.00050)		<0.01		<0.01	<0.01		<0.0100	<0.01	<0.01				<0.01	<0.01	< 0.01	<0.01	<0.01
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0																					
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2																					
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5	<0.00050	<0.00050	<0.00050)		<0.01		<0.01	<0.01	<0.5	<0.0100	<0.01	<0.01				<0.01	<0.01	<0.01	< 0.01	<0.01
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4																					
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6																					
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																					
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1	<0.05											< 0.05									
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1	<0.05											< 0.05									
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5																					
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4																					
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6																					
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0																					
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8																					
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1																					
VC14	31/10/2019	VC14_0.0-0.1	0.0 - 0.1																					
VC14	31/10/2019	VC14_0.0-0.5	0.0 - 0.5																					
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4																					
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0																					
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8																					
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1	<0.05											<0.05									
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4																					
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																					
• · · · ·																								
Statistics				1 6-1	·	·														/ I	·		·	
Number of Results				25	17	17	0	0	17	0	17	17	5	17	25	17	0	0	0	17	17	17	17	
Number of Detects				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iviinimum Concenti	ration			<0.0005	<0.0005	<0.0005	2		<0.01		< 0.01	< 0.01	< 0.5	<0.0100	< 0.01	< 0.01				<0.01	< 0.01	<0.01	<0.01	<0.01
Maximum Concent	tration			<0.05	<0.0005	<0.0005			<0.01		<0.01	<0.01	<0.5	<0.0100	< 0.05	<0.01				<0.01	<0.01	<0.01	<0.01	<0.01



							OP Pes	sticides																
EQL				Disnitoton Disnitoton D.2	Z с ш mg/kg 0.2	non maj/kg 0.01	douodo Ethoprob Mg/kg	Eenamiphos Ba/g	by/6m 670 700 700	u 620 201 201 201 201 200 200	Eenthion Ba/kg mg 0.0 10.0	0.0 Malathion	mg/kg 0.2	0.0 Darathion	70 B B B B B B B B B B B B B B B B B B B	5.0 Dibrom)	c b b b b b b b b b b b b b b b b b b b	barathion baybarathion baybarathion	Bhorate 0.2	0.0 A) Birimphos-ethyl	brothiofos	Byrrazophos mg/kg 0.2	mg/kg 0.2	mg/kg 0.2
NSW EPA (2014) Ge	eneral Solid Waste SCC1 (with T	CLP)																						
NSW EPA (2014) Ge	eneral Solid Waste TCLP1																							
NSW EPA (2014) Re	estricted Solid Waste SCC2 (with	n TCLP)																				$ \longrightarrow $		
NSVV EPA (2014) Re	estricted Solid Waste ICLP2																							
Location Code	Date	Field ID	Depth																					
BH05	7/11/2019	BH05 4.6-4.7	4.6 - 4.7																				<u> </u>	
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45																					
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95																					
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6													_						+-+		
	30/10/2019	VC01_0.0-0.2	0.0 - 0.2			<0.01		<0.01			<0.01	<0.01		<0.01	<0.0	1		<0.01		<0.01	<0.01	+-+		
VC01	30/10/2019	VC01_0.5-1.0	10-11			<0.01		<0.01			<0.01 <	<0.01		<0.01	<0.0	1		<0.01		<0.01	<0.01	├──┼		
VC02	30/10/2019	VC02 0.0-0.2	0.0 - 0.2			-0.01		30.01			10.01	-0.01		V 0.01	40.0			-0.01		40.01	40.01	<u>├──</u> ┼		
VC02	30/10/2019	VC02 0.5-0.6	0.5 - 0.6																					
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																					
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																					
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5								.0.04	.0.04		.0.04		4		.0.01		10.01		+-+		
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6			< 0.01		< 0.01			<0.01 <	< 0.01		< 0.01	<0.0	1	-	<0.01		<0.01	<0.01	──┼		
VC02	30/10/2019	VC02_0.0-0.3	0.0 - 0.2			<0.01		<0.01			<0.01 <	<u>\0.01</u>		<0.01	<0.0			<0.01		<0.01	<0.01	┠───┼─		
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5			< 0.01		< 0.01			< 0.01 <	<0.01		<0.01	<0.0	1		< 0.01		< 0.01	< 0.01	├ ──┼		
VC03	30/10/2019	VC03 0.3-0.4	0.3 - 0.4			< 0.01		< 0.01			< 0.01 <	< 0.01		< 0.01	<0.0)1		< 0.01		< 0.01	< 0.01			
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6																					
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0																					
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7					_								_	_							
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2					-								_	-					──┼		
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1			<0.01		<0.01			<0.01 <	<0.01		<0.01	<0.0	1		<0.01		<0.01	<0.01	───┼─		
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 0.4			<0.01		<0.01			<0.01 <	<0.01		<0.01	<0.0	1		<0.01		<0.01	<0.01	├──┼		
VC04	31/10/2019	VC04 0.5-0.6	0.5 - 0.6			0.01		0.01			0.01	0.01		0.01	0.0			0.01		0.01	0.01			
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																					
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0																					
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1																					
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																			$ \longrightarrow $		
VC05	30/10/2019		0.5 - 0.9			<0.01		<0.01			<0.01 <	-0.01		<0.01	<0.0	1		<0.01		<0.01	<0.01	\vdash		
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1			<u> </u>		~0.01			<0.01	<0.01		<0.01	<0.0			~0.01		\0.01	~0.01	├──┼		
VC06	31/10/2019	VC06 0.0-0.5	0.0 - 0.5																			├ ──┼		
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4																					
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																					
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																					
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8													_	-					+-+		
	30/10/2019		0.0 - 0.2			<0.01		<0.01			<0.01 <	<0.01		<0.01	<0(1		<0.01		<0.01	<0.01	───┼─		
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.5			<0.01		<0.01			<0.01 <	<0.01		<0.01	<0.0	1		<0.01		<0.01	<0.01	├──┼		
VC07	30/10/2019	VC07 0.2-0.4	0.2 - 0.4			0.01						0.0.		0.01				0.01		0.01				
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6																					
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0																					
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7					_								_								
	30/10/2019	VC07_1.0-1.2	1.0 - 1.2					-								_	-					──┼		
	31/10/2019		0.0 - 0.1																			───┼─		
VC08	31/10/2019	VC08_0.0-0.5	0.0-0.5													_						├ ──┼		
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6		1													1					+	
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0																				<u> </u>	
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																					
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1		<u> </u>														ļ			\downarrow		
	31/10/2019	VC08_1.0-1.5	1.0 - 1.5			<0.01		<0.01		├	<0.01 <	<0.01		<0.01	<0.0	1		<0.01		<0.01	<0.01			
	31/10/2019		1.3 - 1.4							+												+-+	\longrightarrow	
VC09	30/10/2019	VC09_0.0-0.2	0.0-0.2		1	<0.01		<0.01			<0.01 <	<0.01		<0.01	<0.0	1		<0.01		<0.01	<0.01	├──┼	\rightarrow	
VC09	30/10/2019	VC09 0.0-0.5	0.0 - 0.5		1	-0.01		.0.01				0.01		0.01		-			1	-0.01	-0.01	├ ──┼		
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6																					
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0																					
IVC09	30/10/2019	VC09 0.7-0.8	0.7 - 0.8		1	Ī	I		l i			1						Ĩ	I	1		1	I	

						(OP Pes	ticides								-						-			
EQL NSW EPA (2014) Gen NSW EPA (2014) Gen	eral Solid Waste SCC1 (with eral Solid Waste TCLP1	n TCLP)		ng/kg n 0.2	Z L L mg/kg 0.2	mg/kg 0.01	dom Ethoprop 5.0	mg/kg 0.01	B/kg 5'0 5'0	Eensulfothion 5.0	Eenthion Ba//gm 10.0	mg/kg m 0.01 0	sound g/kg 0.2	methyl parathion ba/gm 10.0	0.0 B/kg Mevinphos (Phosdrin)	(Diprom) Maled (Dibrom) Maled (Dibrom)	g mg/kg 2	y mg/kg 0.01	mg/kg 0.2	Pirimphos-ethyl	Birimiphos-methyl	mg/kg 10.0	Byrazophos mg/kg 0.2	au uuo ℃ mg/kg 0.2	Soundary Terbufos Mg/kg
NSW EPA (2014) Rest	tricted Solid Waste SCC2 (w	vith TCLP)																							
NSW EPA (2014) Rest	tricted Solid Waste TCLP2																								
	- .																								
Location Code	Date	Field ID	Depth	I				г г			r								1				r	r	
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7															_							
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45															_							
BHU/	20/10/2019	BHU/_2.5-2.95	2.5 - 2.95																						
	30/10/2019		0.4 - 0.6																						
	30/10/2019		0.0 - 0.2			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01			
	30/10/2019	VC01_0.5-1.0	0.5 - 1.0			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01			
	30/10/2019					\0.01		<u> </u>			\0.01	<0.01		\0.01		<0.01	_	<0.01		<0.01		\0.01			
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2														_	-		+ +					
VC02	30/10/2019	VC02_0.5-0.0	0.5 - 0.0					├ -												╉					
VC02	30/10/2019	V/C02_10_12	10-12																	+ +					
VC02	30/10/2019	VC02_1.0-1.2	10-15																						
VC02	30/10/2019	VC02_1.0-1.0	15-16			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01			
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01			
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2			10.01		30.01			-0.01	10.01		-0.01		10.01	_	-0.01		10.01		-0.01			
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01			·
VC03	30/10/2019	VC03_0_3-0_4	0.3 - 0.4			< 0.01		<0.01			<0.01	<0.01		<0.01		<0.01		<0.01		<0.01		< 0.01			·
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6			10.01		-0.01			10.01	10.01		0.01		10.01		.0.01		10.01		10.01			·
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0																						·
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																						·
VC03	30/10/2019	VC03 1.0-1.2	1.0 - 1.2																						í — — — — — — — — — — — — — — — — — — —
VC04	30/10/2019	VC04 0.0-0.1	0.0 - 0.1																						
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4			< 0.01		< 0.01			<0.01	<0.01		<0.01		<0.01		< 0.01		< 0.01		< 0.01			í — — — — — — — — — — — — — — — — — — —
VC04	30/10/2019	VC04 0.5-1.0	0.5 - 1.0			< 0.01		< 0.01			< 0.01	< 0.01		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01			· · · · · ·
VC04	31/10/2019	VC04 0.5-0.6	0.5 - 0.6																						í — — — — — — — — — — — — — — — — — — —
VC04	31/10/2019	VC04 0.7-0.8	0.7 - 0.8																						í — — — — — — — — — — — — — — — — — — —
VC04	31/10/2019	VC04 0.9-1.0	0.9 - 1.0																						í — — — — — — — — — — — — — — — — — — —
VC05	30/10/2019	VC05 0.0-0.1	0.0 - 0.1																						í — — — — — — — — — — — — — — — — — — —
VC05	30/10/2019	VC05 0.5-0.7	0.5 - 0.7																						
VC05	30/10/2019	VC05 0.5-0.9	0.5 - 0.9																						·
VC05	30/10/2019	VC05 0.8-0.9	0.8 - 0.9			<0.01		< 0.01			<0.01	<0.01		<0.01		<0.01		< 0.01		< 0.01		<0.01			·
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1																						í
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5																						
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4																						1
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																						í T
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																						
VC06	31/10/2019	VC06_0.7-0.8	0.7 - 0.8																						
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9																						
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01			
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01			I
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4															_							
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6															_							ļ
VC07	30/10/2019	VC07_0.5-1.0	0.5 - 1.0																						I
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7															_							
	30/10/2019	VC07_1.0-1.2	1.0 - 1.2															_							
	31/10/2019		0.0 - 0.1																						
VC08	31/10/2019		0.0 - 0.4																	+ +]
VC08	31/10/2019																			┥					
VC08	31/10/2019			 																┥]
VC08	31/10/2019																			╉					
VC08	31/10/2019		10-11					┟──┤												╉					
VC08	31/10/2019		10-15			<0.01		<0.01			<∩ ∩1	<0.01		<u><0 01</u>		<0.01		<0.01		<0.01		<u><0 01</u>]
VC08	31/10/2019	VC08_1.0-1.3	1 3 _ 1 <i>A</i>			-0.01		~0.01			<u>~0.01</u>	-0.01		\ 0.01		-0.01		~0.01		-0.01		~0.01			
VC08	31/10/2019	<u>1,000</u> <u>1,0</u> <u>1,4</u> <u>1,000</u> <u>1,0</u> <u>1,4</u>	15_16																	+ +]
VC09	30/10/2019		0.0-0.2			<0.01		<0.01			<0.01	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01]
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.5			.0.01		-0.01			-0.01	-0.01		-0.01		-0.01		-0.01		-0.01		10.01			
VC09	30/10/2019	VC.09 0 4-0 6	04-06																	+ +					
VC09	30/10/2019	VC09_0.5-1_0	0.5 - 1.0					├ -												┨╴┤					
VC09	30/10/2019	VC09 0.7-0.8	0.7 - 0.8																	1 1					·



						OP P	esticides																		
				Disulfoton	EPN Ethion	Ethoprop	Fenamiphos	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Methyl parathion	, Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Parathion	Phorate	Pirimphos-ethyl	Pirimiphos-methyl	Prothiofos	Pyrazophos	Ronnel	Terbufos
N (000				mg/kg	mg/kg mg/	kg mg/k	tg mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0			0.1				10.04	-0.04		10.01		10.04			-0.04		10.01		-0.04	└────′	 	───
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8		<(.01	<0.01			<0.01	<0.01		<0.01		<0.01			<0.01		<0.01		<0.01	└────′	 	
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2			01	10.01		_	10.01	10.01		10.01		10.01			10.01	ļ	10.01		10.04	⊢−−−−′	 	
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5		<(.01	<0.01			< 0.01	<0.01		<0.01		<0.01			<0.01		<0.01		<0.01	⊢───′	 	
	31/10/2019	VC10_0.5-0.6	0.5 - 0.6																				┢────┘	┣────	
	20/10/2019	VC11_0.0-0.2	0.0 - 0.2																				┢────┘	 	
VC11	30/10/2019	VC11_0.0-0.3	0.0 - 0.3			01	<0.01		-	<0.01	<0.01		<0.01		<0.01			<0.01		<0.01		<0.01	┢────┘	 	
VC11	30/10/2019	VC11_0.5-0.7	0.5 1 0			.01	<u> </u>			<u> </u>	\0.01		~0.01		\0.01			<0.01		<u> </u>		\0.01	└────┘	┝───	+
VC11	30/10/2019	VC11_0.0-1.0	10-12																					<u> </u>	+
VC12	31/10/2019	VC12 0 0-0 5	0.0 - 0.5		<(01	<0.01			<0.01	<0.01		<0.01		<0.01			<0.01		<0.01		<0.01	ب ــــــــــــــــــــــــــــــــــــ	<u> </u>	+
VC12	31/10/2019	VC12_0.0-0.0	0.3 - 0.4			.01	-0.01			30.01	NO.01		-0.01		30.01			-0.01		30.01		10.01	ر ــــــــــــــــــــــــــــــــــــ	<u> </u>	+
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6								1												'	<u> </u>	+
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																				/	<u> </u>	+
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1																				·'		+
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1																				·'		1
VC13	31/10/2019	VC13 0.0-0.5	0.0 - 0.5																				/		-
VC13	31/10/2019	VC13 0.3-0.4	0.3 - 0.4																				/		-
VC13	31/10/2019	VC13 0.5-0.6	0.5 - 0.6																				/		-
VC13	31/10/2019	VC13 0.5-1.0	0.5 - 1.0																				/		1
VC13	31/10/2019	VC13 0.7-0.8	0.7 - 0.8																				′		
VC13	31/10/2019	VC13 1.0-1.1	1.0 - 1.1																				′		
VC14	31/10/2019	VC14 0.0-0.1	0.0 - 0.1																				,		1
VC14	31/10/2019	VC14 0.0-0.5	0.0 - 0.5																				,		
VC14	31/10/2019	VC14_0.3-0.4	0.3 - 0.4																						
VC14	31/10/2019	VC14_0.5-1.0	0.5 - 1.0																						
VC14	31/10/2019	VC14_0.7-0.8	0.7 - 0.8																				[
VC14	31/10/2019	VC14_1.0-1.1	1.0 - 1.1																						
VC14	31/10/2019	VC14_1.3-1.4	1.3 - 1.4																						
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																						
Statistics						47						-				-	1 -		-						
Number of Result	S				0	1/	0 17		<u>10</u>	17	17	0	17	0	17	0		<u>y 17</u>		17	0	17	0		<u>/ 0</u>
Number of Detect	S			0	0	0	0 0	(<u>0 1</u>			0	0	0	0	0	- (0	0	0	0	0	<u> </u>	<u> </u>
Iviinimum Concent	tration				<(.01	<0.01	<u> </u>		<0.01	<0.01		<0.01		<0.01			<0.01	<u> </u>	<0.01		<0.01	└─── ′	 	───
Maximum Concer	ntration				<(.01	<0.01			<0.01	<0.01		<0.01		<0.01			<0.01		<0.01		<0.01	<u>ــــــــــــــــــــــــــــــــــــ</u>	L	<u> </u>



				M	AH		Halog	genated				PC	Bs				Herbicides	<u> </u>		
	Trichloronate	Tetrachlorvinphos	1,2,4-trimethylbenzene	Styrene	1,3,5-trimethylbenzene	lsopropylbenzene	Bromomethane	Dichlorodifluorometha ne	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Total)	Pronamide	1,1,1,2- tetrachloroethane	1,1,1-trichloroethane	1,1,2,2- tetrachloroethane
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.2	0.2	0.5	0.5	0.5	0.5	5	5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.5	0.5	0.5	0.5
NSW EPA (2014) General Solid Waste SCC1 (with TCLP)				108												50		360	1,080	46.8
NSW EPA (2014) General Solid Waste TCLP1																				
NSW EPA (2014) Restricted Solid Waste SCC2 (with TCLP)				432												50		1,440	4,320	187
NSW EPA (2014) Restricted Solid Waste TCLP2																				

Location Code	Date	Field ID	Depth																		
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7		<0.5												<0.1		<0.5	<0.5	<0.5
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45		<0.5												<0.1		<0.5	<0.5	<0.5
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95		<0.5												<0.1		<0.5	<0.5	<0.5
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6																		
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2																		
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0							< 0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.5			
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1							< 0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050				
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2																		
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6																		
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																		·
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																		
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5																		, i
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6							< 0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050				
VC02	31/10/2019	VC02 0.0-0.5	0.0 - 0.5							< 0.0050	<0.0050	<0.0050	<0.0050	<0.0050	< 0.0050	<0.0050	<0.0050				
VC03	30/10/2019	VC03 0.0-0.2	0.0 - 0.2																		
VC03	30/10/2019	VC03 0.0-0.5	0.0 - 0.5							< 0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050				
VC03	30/10/2019	VC03 0.3-0.4	0.3 - 0.4	<0.5	<0.5	<0.5	<0.5	<5	<5	< 0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050		<0.5	<0.5	<0.5
VC03	30/10/2019	VC03 0.4-0.6	0.4 - 0.6																		
VC03	30/10/2019	VC03 0.5-1.0	0.5 - 1.0																		
VC03	30/10/2019	VC03 0.6-0.7	0.6 - 0.7																		
VC03	30/10/2019	VC03 1.0-1.2	1.0 - 1.2																		·
VC04	30/10/2019	VC04 0.0-0.1	0.0 - 0.1																		
VC04	30/10/2019	VC04 0.3-0.4	0.3 - 0.4							<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050				
VC04	30/10/2019	VC04 0.5-1.0	0.5 - 1.0							< 0.0062	< 0.0062	< 0.0062	< 0.0062	< 0.0062	< 0.0062	< 0.0062	< 0.0062	<0.6			
VC04	31/10/2019	VC04 0.5-0.6	0.5 - 0.6																		
VC04	31/10/2019	VC04 0.7-0.8	0.7 - 0.8																		
VC04	31/10/2019	VC04 0.9-1.0	0.9 - 1.0																		
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1														<0.1				
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																		
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9																		
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	< 0.5	< 0.5	<0.5	< 0.5	<5	<5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050		< 0.5	<0.5	< 0.5
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1		< 0.5			-									<0.1		< 0.5	< 0.5	< 0.5
VC06	31/10/2019	VC06 0.0-0.5	0.0 - 0.5																		
VC06	31/10/2019	VC06 0.3-0.4	0.3 - 0.4																		
VC06	31/10/2019	VC06 0.5-0.6	0.5 - 0.6																		
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																		
VC06	31/10/2019	VC06 0.7-0.8	0.7 - 0.8																		
VC06	31/10/2019	VC06 0.8-0.9	0.8 - 0.9																		
VC07	30/10/2019	VC07 0.0-0.2	0.0 - 0.2	< 0.5	< 0.5	<0.5	< 0.5	<5	<5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050		< 0.5	<0.5	< 0.5
VC07	30/10/2019	VC07 0.0-0.5	0.0 - 0.5							< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.0677	< 0.0050	0.0677	<0.5			
VC07	30/10/2019	VC07 0.2-0.4	0.2 - 0.4																		
VC07	30/10/2019	VC07 0.5-0.6	0.5 - 0.6																		
VC07	30/10/2019	VC07 0.5-1.0	0.5 - 1.0														<0.1				
VC07	30/10/2019	VC07 0.7-0.8	0.7 - 0.7																		
VC07	30/10/2019	VC07 1.0-1.2	1.0 - 1.2																		
VC08	31/10/2019	VC08 0.0-0.1	0.0 - 0.1		<0.5												<0.1	l	<0.5	<0.5	<0.5
VC08	31/10/2019	VC08 0.3-0.4	0.3 - 0.4														<0.1				
VC08	31/10/2019	VC08 0.0-0.5	0.0-0.5																		
VC08	31/10/2019	VC08 0.5-0.6	0.5 - 0.6																		·
VC08	31/10/2019	VC08 0.5-1.0	0.5 - 1.0																		
VC08	31/10/2019	VC08 0.7-0.8	0.7 - 0.8															l	1		
VC08	31/10/2019	VC08 1.0-1.1	1.0 - 1.1															l	1		
VC08	31/10/2019	VC08 1.0-1.5	1.0 - 1.5							<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.5	1		
VC08	31/10/2019	VC08 1.3-1.4	1.3 - 1.4																1		
VC08	31/10/2019	VC08 1.5-1.6	1.5 - 1.6																		
VC09	30/10/2019	VC09 0.0-0.2	0.0 - 0.2							<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	l	1		
VC09	30/10/2019	VC09 0.0-0.5	0.0 - 0.5															l	1		
VC09	30/10/2019	VC09 0.4-0.6	0.4 - 0.6														<0.1	l	1		
VC09	30/10/2019	VC09 0.5-1.0	0.5 - 1.0															l	1		
VC09	30/10/2019	VC09 0.7-0.8	0.7 - 0.8															l	1		
			<u> </u>	1													i				



			M	AH		Halog	enated				PC	Bs				Herbicides		
Trichloronate	Tetrachlorvinphos	1,2,4-trimethylbenzene	Styrene	1,3,5-trimethylbenzene	lsopropylbenzene	Bromomethane	Dichlorodifluorometha ne	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Total)	Pronamide	1,1,1,2- tetrachloroethane	1,1,1-trichloroethane 1,1,2,2- tetrachloroethane
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg mg/kg
								<0.0050	<0.0050		<0.0050	<0.0050		<0.0050	<0.0050			'
								<0.0030	<0.0030	<0.0030	<0.0030	<0.0050	<0.0050	~0.0050	<0.0030			'
								<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050			'
								-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000			
		<0.5	< 0.5	< 0.5	<0.5	<5	<5	<0.0050	<0.0050	<0.0050	<0.0050	<0 0050	<0.0050	<0.0050	<0.0050		<0.5	<0.5 <0.5
		0.0	0.0	0.0	0.0			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0	
								<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0346	<0.0050	0.0346	<0.5		
															< 0.1			
			<0.5												<0.1		<0.5	<0.5 <0.5
			<0.5												<0.1		<0.5	<0.5 <0.5
																		'
																		'
			<0.5												<0.1		<0.5	<0.5 <0.5
																		'
0	0	4	12	4	Δ	4	Δ	17	17	17	17	17	17	17	30	5	12	12 12
0	0		0	0		0	0	.,	0	0		0	2	0	2	0	0	
		<0.5	<0.5	<0.5	<0.5	<5	<5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.5	<0.5	<0.5 <0.5
		< 0.5	<0.5	<0.5	<0.5	<5	<5	< 0.0062	<0.0062	< 0.0062	< 0.0062	<0.0062	0.0677	< 0.0062	0.0677	<0.6	< 0.5	<0.5 <0.5
	mg/kg	Imagina Imagina Imagina Imagina	Image: second constraints Image: second constraints mg/kg mg/kg mg/kg mg/kg <td>M Image: market of the second se</td> <td>MAH Make Make Image: Solution of the second</td> <td>MAH Image: state st</td> <td>MAH Halog Image: second</td> <td>MAH Halogenated a <</td> <td>MAH Halogenated so e</td> <td>MAH Halogenated are a</td> <td>MAH Halogenated s <</td> <td>MAH Halogenated PC s</td> <td>MAH Halogenated PCBs age age</td> <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td> <td>MAH Halogenated PCBs gg gg</td> <td>MAH Halogenated PCBs a b</td> <td>MAH Halogeneted PCBs Herbicides g<!--</td--><td>MAH Helogenated PCBs Hetbickles g</td></td>	M Image: market of the second se	MAH Make Make Image: Solution of the second	MAH Image: state st	MAH Halog Image: second	MAH Halogenated a <	MAH Halogenated so e	MAH Halogenated are a	MAH Halogenated s <	MAH Halogenated PC s	MAH Halogenated PCBs age age	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	MAH Halogenated PCBs gg gg	MAH Halogenated PCBs a b	MAH Halogeneted PCBs Herbicides g </td <td>MAH Helogenated PCBs Hetbickles g</td>	MAH Helogenated PCBs Hetbickles g

4	4	4	4	17	17	17	17	17	17	17	30	5	12	12	12
0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0
0.5	<0.5	<5	<5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.5	<0.5	<0.5	<0.5
0.5	< 0.5	<5	<5	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	0.0677	< 0.0062	0.0677	<0.6	<0.5	<0.5	<0.5



								Chl	orinated I	Iydrocarl	bons				1							
6.0 m 2.0 m 2.0 m 2.0 m 2.0 m 2.0 m 2.1,1,2-trichloroethane	25 63/ 63/ 1,1-dichloroethene	는 여성 (1,1-dichloropropene 여성	으 a 1,2,4-trichlorobenzene	o 3 1,2-dibromo-3- 여 중 chloropropane	0. 12-dichlorobenzene 12-dichlorobenzene	1,2-dichloroethane	O a 1,2-dichloropropane	0 g 5 k/ 6 dichloropropane	0.0 g 5.0 g 3/ 0,1,4-dichlorobenzene	으 a 2,2-dichloropropane	으 a 3 3 2-chloronaphthalene	O a G a G 2-chlorotoluene G	.0 a 3 4-chlorotoluene 6 a	mg/kg 0.5	81 6 6 6 7 6 8 8 8 8 8 9 8 9 8 8 9 8 8 9 8 8 9 8	Chlorobenzene mg/kg 0.5 3,600	mg/kg 0.5 216	ය (g by/chloromethane	o a c) 여 cis-1,2-dichloroethene 여	mg/kg 0.5 310	By/60 5.0 5.0	epiuoli mg/kg 4 7.2
173	100				620	72			1.080						72	14 400	864			1 240		28.8
175	100				020	12			1,000						12	14,400	004			1,240		20.0
<0.5 <0.5 <0.5	<0.5 <0.5 <0.5		<0.5		<0.5	<0.5 <0.5 <0.5									<0.5 <0.5 <0.5	<0.5 <0.5 <0.5	<0.5 <0.5 <0.5			<0.5 <0.5 <0.5	<0.5	<4 <4 <4
			~0.5		~ 0.5				~0.5		~0.5										~0. 5	
<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5		<0.5	<5
			<0.6		<0.6				<0.6		<0.6										<0.6	
<0.5 <0.5	<0.5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5 <0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5 <0.5	<0.5 <0.5	<0.5 <0.5	<5	<0.5	<0.5	<0.5	<5 <4
<0.5	<0.5	<0.5	<0.5 <0.5	<0.5	<0.5 <0.5	<0.5	<0.5	<0.5	<0.5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5		<0.5 <0.5	<5
<0.5	<0.5					<0.5									<0.5	<0.5	<0.5			<0.5		<4
			<0.5		<0.5				<0.5		<0.5										<0.5	

	onoral Solid Wasta SCC1 (wi			c.0 6.0 7.1,2-trichloroethane	0.0 m 2.0 g 2.0 g 2.0 g	mg/kg by 2.0 mg/gm by 2.0 mg by 2.0		G m 1,2-dibromo-3- G sy/chloropropane	0.5 0.5		0 년 5.0kg 1,2-dichloropropane	.0 표 3.4/ bay 1,3-dichloropropane	0.5 2.0 2.0	gy/gm 5.2-dichloropropane 5.0	G B G B G 2-chloronaphthalene	mg/kg 0.5	5.0 mg/kg	euezeue Bromopeuzeue mg/kg 0.5	6.0 Carbon tetrachloride	Chlorobenzene Morobenzene Morobenzene Morobenzene Chlorobenzene Chlorobenzene	E Logo Logo HO mg/kg 0.5	5 chloromethane 2	0.0 g d// cis-1,2-dichloroethene	mg/kg	6.0 m 2.0 m 2.0 c 2.0 c	mg/kg 4
NSW EPA (2014) Ge NSW EPA (2014) Ge	eneral Solid Waste SCCT (wi			43.2	23				155	10			270						10	3,000	210			510		1.2
NSW EPA (2014) Re NSW EPA (2014) Re	estricted Solid Waste SCC2 (estricted Solid Waste TCLP2	(with TCLP)		173	100				620	72			1,080						72	14,400	864			1,240		28.8
	Ditte	51.111D	D																	•						
Location Code	Date 7/11/2019	BH05_4_6-4_7	Depth 4 6 - 4 7	<0.5	<0.5					<0.5									<0.5	<0.5	<0.5			<0.5		<4
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45	<0.5	<0.5					<0.5									<0.5	<0.5	5 <0.5			<0.5	,	<4
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95	<0.5	<0.5					<0.5									<0.5	<0.5	5 <0.5			<0.5		<4
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6																					<u> </u>	 '	
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2				<05		<0.5				<0.5		<0.5										<0.5	<u> </u>
VC01	30/10/2019	VC01_0.0-1.0	1.0 - 1.1				<0.5		<0.5				<0.5		<0.5									<u> </u>	<0.5	<u> </u>
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2																							
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6																							
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																	ļ					 '	
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																					──	{ '	───
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5																					<u> </u>	├ ────′	
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5																					<u> </u>	'	
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2																							
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5																						<u> </u>	<u> </u>
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	5 <0.5	<0.5	5 <0.5	<5	<0.5	<u> </u>	< 0.5	<5
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6																						 '	
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																					<u> </u>	├ ────′	
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2																							
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1																						<u> </u>	<u> </u>
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4				-0.0		10.0				-0.0		10.0									<u> </u>		<u> </u>
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0			· · ·	<0.6		<0.6				<0.6		<0.6										<0.6	
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8																					<u> </u>	'	1
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0																							
VC05	30/10/2019	VC05_0.0-0.1	0.0 - 0.1																							
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																					<u> </u>	 '	
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9	<0.5	<0.5	<0.5	<05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	< 0.5	<0 F	< 0.5	~5	<0.5	<u></u>	<0.5	<5
VC06	31/10/2019	VC06_0.0-0.1	0.0 - 0.1	<0.5	<0.5	NO.0	×0.5	<0.5	×0.5	< 0.5	×0.5	-0.5	-0.0	-0.5		×0.0	-0.5	-0.0	<0.5	<0.5	, <0.5 5 <0.5	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	-0.5	< 0.5	, -0.5	<0
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5																							
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4																						'	
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																					<u> </u>	 '	
VC06	31/10/2019		0.5 - 1.0																						├────′	
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9										ļ					1					ļ	<u> </u>	<u>├</u> ───′	t
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	< 0.5		<0.5	<0.5	<0.5	<u> </u>	<0.5	<u><</u> 0.5	<5	<0.5	,	<0.5	<5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5				<0.5		<0.5				<0.5		<0.5										<0.5	1
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4																					<u> </u>	 '	
	30/10/2019	VC07_0.5-0.6	0.5 - 0.6																						├────′	
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7																					<u> </u>	├ ────′	
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2																							
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1	<0.5	<0.5					<0.5									<0.5	<0.5	5 <0.5			<0.5	<u> </u>	<4
VC08	31/10/2019	VC08_0.3-0.4	0.3 - 0.4																					<u> </u>	 '	
VC08	31/10/2019	VC08_0.0-0.5	0.0-0.5																					<u> </u>	├ ───′	1
VC08	31/10/2019	VC08 0.5-1.0	0.5 - 1.0																						<u>├</u> ──′	<u> </u>
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																						ļ/	
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1																						↓ <u> </u>	L
VC08	31/10/2019	VC08_1.0-1.5	1.0 - 1.5			·	<0.5		<0.5				<0.5		<0.5										< 0.5	
	31/10/2019		1.3 - 1.4	<u> </u>																				╂────	 '	
VC09	30/10/2019	VC.09 0 0-0 2	0.0.2																					┼───	├ ───′	<u> </u>
VC09	30/10/2019	VC09 0.0-0.5	0.0 - 0.5																					<u> </u>		[
VC09	30/10/2019	VC09_0.4-0.6	0.4 - 0.6																							
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0																						<u> </u>	<u> </u>
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8																					<u> </u>	<u> </u>	1

				1,1,2-trichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,4-trichlorobenzene	1,2-dibromo-3- chloropropane	1,2-dichlorobenzene	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane	2-chloronaphthalene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Carbon tetrachloride	Chlorobenzene	Chloroform	Chloromethane	cis-1,2-dichloroethene	Methylene chloride	-lexachlorobutadiene	Vinyl chloride
				mg/kg	mg/kg	mg/kg i	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL NSW EPA (2014) Ge	eneral Solid Waste SCC1 (wi	ith TCLP)		0.5	0.5	0.5	0.5	0.5	0.5 155	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	0.5	0.5	0.5	4
NSW EPA (2014) Ge	eneral Solid Waste TCLP1	·····																								
NSW EPA (2014) Re	estricted Solid Waste SCC2 ((with TCLP)		173	100				620	72			1,080						72	14,400	864			1,240	┝───╯	28.8
Location Code	Date	Field ID	Depth									1			1		1	1								
BH05 BH06	7/11/2019	BH05_4.6-4.7 BH06_1 2-1 45	4.6 - 4.7	<0.5	5 <0.5					<0.5 <0.5									<0.5	<0.5	<0.5			<0.5	.[]	<4
BH07	7/11/2019	BH07_2.5-2.95	2.5 - 2.95	<0.5	5 < 0.5					< 0.5									< 0.5	< 0.5	< 0.5			< 0.5		<4
VC01	30/10/2019	vc01_0.4-0.6	0.4 - 0.6																						<u> </u>	\square
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2				<0.5		<0.5				<0.5		<0.5										<0.5	<u> </u>
VC01	30/10/2019	VC01_0.3-1.0	1.0 - 1.1				~0. 5		<0.5				~0.5		<0.5										~0.5	
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2																							
VC02	30/10/2019	VC02_0.5-0.6	0.5 - 0.6																						<u> </u>	
VC02	30/10/2019	VC02_0.5-1.0	0.5 - 1.0																						───′	
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2																						├ ───┦	
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6																							[
VC02	31/10/2019	VC02_0.0-0.5	0.0 - 0.5																						<u> </u>	
VC03	30/10/2019	VC03_0.0-0.2	0.0 - 0.2		-																				 '	───
VC03	30/10/2019	VC03_0.0-0.3	0.0 - 0.5	<0.5	5 < 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<5	<0.5		<0.5	<5
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	
VC03	30/10/2019	VC03_0.5-1.0	0.5 - 1.0																							
VC03	30/10/2019	VC03_0.6-0.7	0.6 - 0.7																						└─── ′	
VC03	30/10/2019	VC03_1.0-1.2	0.0 - 0.1																						───′	<u> </u>
VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4																							
VC04	30/10/2019	VC04_0.5-1.0	0.5 - 1.0				<0.6		<0.6				<0.6		<0.6										<0.6	
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6																						 '	
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8		-																				├ ───┘	
VC05	30/10/2019	VC05 0.0-0.1	0.0 - 0.1																						├ ───┦	
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7																							
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9			.0.5	.0.5	.0.5			.0.5												.0.5			<u> </u>
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9	<0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<5
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5		-0.0					-0.5									×0.5	-0.0	-0.0			-0.5	├ ───┦	~+
VC06	31/10/2019	VC06_0.3-0.4	0.3 - 0.4																							
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6																						<u> '</u>	
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0																						↓ ′	
VC06	31/10/2019	VC06_0.8-0.9	0.8 - 0.9																						├ ───┦	
VC07	30/10/2019	VC07_0.0-0.2	0.0 - 0.2	<0.5	5 <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<5	<0.5		<0.5	<5
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5				<0.5		<0.5				<0.5		<0.5										<0.5	
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4																						↓ ′	
VC07	30/10/2019	VC07_0.5-0.8	0.5 - 0.0																						├'	<u> </u>
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7																						<i> </i>	[
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2																						'	<u> </u>
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1	<0.5	5 <0.5					<0.5									<0.5	<0.5	< 0.5			<0.5	 '	<4
VC08	31/10/2019	VC08_0.0-0.5	0.3 - 0.4																						───′	<u> </u>
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6																						<i> </i>	
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0																						['	<u> </u>
	31/10/2019	VC08_0.7-0.8	0.7 - 0.8																						 '	
VC08	31/10/2019	VC08_1.0-1.1 VC08_1.0-1.5	1.0 - 1.1		+	+	<0.2		<0 5				<0.5	}	<0.2			<u> </u>			<u> </u>				<0.5	<u> </u>
VC08	31/10/2019	VC08 1.3-1.4	1.3 - 1.4		1		.0.0		-0.0				-0.0	1	-0.0			1							-0.0	<u> </u>
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6																						<u> </u>	\square
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2			├							 	 											└── ′	───
VC09	30/10/2019		0.0 - 0.5		+	+																			───′	<u> </u>
VC09	30/10/2019	VC09 0.5-1.0	0.5 - 1.0		1																				├ ──┤	<u> </u>
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8																						<u> </u>	



												Ch	lorinated	Hydrocar	bons											
				1,1,2-trichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,4-trichlorobenzene	1,2-dibromo-3- chloropropane	1,2-dichlorobenzene	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane	2-chloronaphthalene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Carbon tetrachloride	Chlorobenzene	Chloroform	Chloromethane	cis-1,2-dichloroethene	Methylene chloride	Hexachlorobutadiene	Vinyl chloride
L (000				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VC09	30/10/2019	VC09_0.8-1.0	0.8 - 1.0																					───		
VC10	30/10/2019	VC10_0.7-0.8	0.7 - 0.8																					───		
VC10	31/10/2019	VC10_0.0-0.2	0.0 - 0.2																					───		
VC10	31/10/2019	VC10_0.0-0.5	0.0 - 0.5								_													───		
VC10	31/10/2019	VC10_0.5-0.6	0.5 - 0.6																					───		
VC11	30/10/2019	VC11_0.0-0.2	0.0 - 0.2																					──┤		
VC11	30/10/2019	VC11_0.0-0.5	0.0 - 0.5								-					.0.5						<u> </u>		<u> </u>		
VC11	30/10/2019	VC11_0.5-0.7	0.5 - 0.7	<0.5	o <0.5	< < 0.5	o <0.5	o <0.5	< 0.5	o <0.5	o <0.8	o <0.5	o <0.5	o <0.5		<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<5	<0.5	──┤	<0.5	<5
VC11	30/10/2019	VC11_0.5-1.0	0.5 - 1.0																		<u> </u>	───		──┤		
VC11	30/10/2019	VC11_1.0-1.2	1.0 - 1.2							_					.0.5						<u> </u>	───	<u> </u>	$ \longrightarrow $		
VC12	31/10/2019	VC12_0.0-0.5	0.0 - 0.5				<0.5)	<0.5)			<0.5)	<0.5									──┤	<0.5	
VC12	31/10/2019	VC12_0.3-0.4	0.3 - 0.4																					───		
VC12	31/10/2019	VC12_0.5-0.6	0.5 - 0.6																				'			
VC12	31/10/2019	VC12_0.8-0.9	0.8 - 0.9																							
VC12	31/10/2019	VC12_1.0-1.1	1.0 - 1.1	<0.5	5 <0.5	, ,				<0.5	5								<0.5	<0.5	, <0.5			<0.5		<4
VC13	31/10/2019	VC13_0.0-0.1	0.0 - 0.1	<0.5	5 < 0.5	5				<0.5	5								<0.5	<0.5	, <0.5			<0.5		<4
VC13	31/10/2019	VC13_0.0-0.5	0.0 - 0.5																							
VC13	31/10/2019	VC13_0.3-0.4	0.3 - 0.4																							
VC13	31/10/2019	VC13_0.5-0.6	0.5 - 0.6																							
VC13	31/10/2019	VC13_0.5-1.0	0.5 - 1.0																							
VC13	31/10/2019	VC13_0.7-0.8	0.7 - 0.8																		1					
VC13	31/10/2019	VC13_1.0-1.1	1.0 - 1.1																		1					
VC14	31/10/2019	VC14 0.0-0.1	0.0 - 0.1																							
VC14	31/10/2019	VC14 0.0-0.5	0.0 - 0.5																							
VC14	31/10/2019	VC14 0.3-0.4	0.3 - 0.4																							
VC14	31/10/2019	VC14 0.5-1.0	0.5 - 1.0																							
VC14	31/10/2019	VC14 0.7-0.8	0.7 - 0.8																							
VC14	31/10/2019	VC14 1.0-1.1	1.0 - 1.1	<0.5	5 < 0.5	5				< 0.5	5								< 0.5	<0.5	<0.5 ز	,		< 0.5		</td
VC14	31/10/2019	VC14 1.3-1.4	1.3 - 1.4																							
VC14	31/10/2019	VC14-0.5-0.6	0.5 - 0.6																							
Statistics Number of Result	ts			 	2 12	2 4	<u>م</u>) 4			2	4	t c) 4	5	4		. 4	12		2 12	2 4	4	. 8		
Number of Detect	ts			() ()) 0) 0	0) () () 0	0	0	0	0	0	(0	0	0	0	(
Minimum Concen	ntration			<0.5	5 < 0.5	< 0.5	5 < 0.5	5 < 0.5	<0.5	5 < 0 5	5 <0 !	5 < 0 5	5 < 0.5	5 < 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ر <0 5	<5	<0.5	<0.5	<0.5	</td
Maximum Concer	ntration			<0.0	5 <0.5	<0.5	<0.0	<0.5	<0.6		5 <0.4	5 <0.6	-0.0 5 <0.6	<0.5	<0.6	<0.5	<0.5	<0.5	<0.5	<0.6	5 <0 F	<	<0.5	<0.5	<0.0	<
	nadaon			-0.0		-0.0	.0.0	.0.0	1.0-	-0.0	-0.0	-0.0		.0.0	0.0	.0.	-0.0	0.0	-0.0	-0.0	-0.0		-0.0	.0.0	-0.0	-0

Statistics Number of Number of Minimum C Maximum C

Circular Quay Investigation Port Authority of NSW



	Explo	sives		Nit	roaromat	ics	Nitrosoamines			Phtha	alates		
,3,5-Trinitrobenzene	2,4-Dinitrotoluene	2,6-dinitrotoluene	Nitrobenzene	2-Picoline	-aminobiphenyl	² entachloronitrobenze ie	N-Nitrosodiphenyl & Diphenylamine	3is(2-ethylhexyl) ohthalate	3utyl benzyl phthalate	Diethylphthalate	Dimethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate
ma/ka	ma/ka	ma/ka	 ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka	ma/ka
0.5	1	1	0.5	0.5	0.5	0.5	1	5	0.5	0.5	0.5	0.5	0.5
	4.68	-	72				-						
	18.7		288										
								5.0					
<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
-0.0	11.0	11.0	-0.0	-0.0	10.0	-0.0	11.0	-5.0	-0.0	-0.0	-0.0	-0.0	10.0
<0.6	<1.0	<1.0	<0.6	<0.6	<0.6	<0.6	<1.2	<5.0	<0.6	<0.6	<0.6	<0.6	<0.6
<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
0.0			0.0			0.0				0.0	0.0	0.0	0.0
<0.5	<1 0	<1 0	<0.5	<0.5	<0.5	<0.5	<1 0	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
5.5			5.0	5.5	5.5	5.5		5.5	2.0	2.0	5.0	2.0	5.0

	тд/кд	mg/kg	mg/kg	mg/
EQL 0.5	1	1	0.5	0.
NSW EPA (2014) General Solid Waste SCC1 (with TCLP)	4.68		72	
NSW EPA (2014) General Solid Waste TCLP1				
NSW EPA (2014) Restricted Solid Waste SCC2 (with TCLP)	18.7		288	
NSW EPA (2014) Restricted Solid Waste TCLP2				

					Explo	sives		Ni	troaroma	tics	Nitrosoamines	1		Phtha	lates		
				۵.	<u></u>					e N	Threedininee		fe				
				zen	Ð	0				pen	/I &		lala		te	ate	ate
				oen:	nen	lene			Iyn	itrol	len)	(ly	ohth	ate	ıala	hala	hala
				itrol	otolu	tolu	ene		phe	ron	dipt mir	lhe	zyl p	thal	phth	pht	pht
				Trin	nitro	nitro	enz	line	idor	chlo	oso Jyla	ethy ate	Sen:	lpht	l lyr	utyl	ctyl
				- - -	-Dii	dir	robe	Dico	mir	ntao	Nitro	s(2-6 thai	tyl k	ethy	netł	īq u	ō L
				1,3	2,4	2,6	Nit	2-F	4-8	Pe ne		Bis pht	Bu	Die	Dir	Di-	-i D
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL NSW FPA (2014) G	General Solid Waste SCC1 (with	TCLP)		0.5	4 68	I	0.5	0.5	0.5	0.5	I	5	0.5	0.5	0.5	0.5	0.5
NSW EPA (2014) G	General Solid Waste TCLP1				1.00		12										
NSW EPA (2014) R	Restricted Solid Waste SCC2 (wi	ith TCLP)			18.7		288										
NSW EPA (2014) R	Restricted Solid Waste TCLP2																
Location Code	Date	Field ID	Depth														
BH05	7/11/2019	BH05_4.6-4.7	4.6 - 4.7														
BH06	7/11/2019	BH06_1.2-1.45	1.2 - 1.45													 '	
VC01	30/10/2019	BH07_2.5-2.95	2.5 - 2.95														
VC01	30/10/2019	VC01_0.0-0.2	0.0 - 0.2														
VC01	30/10/2019	VC01_0.5-1.0	0.5 - 1.0	<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
VC01	30/10/2019	VC01_1.0-1.1	1.0 - 1.1													└─── ′	
VC02	30/10/2019	VC02_0.0-0.2	0.0 - 0.2													¦'	
VC02	30/10/2019	VC02 0.5-1.0	0.5 - 1.0														
VC02	30/10/2019	VC02_1.0-1.2	1.0 - 1.2														
VC02	30/10/2019	VC02_1.0-1.5	1.0 - 1.5													└─── ′	<u> </u>
VC02	30/10/2019	VC02_1.5-1.6	1.5 - 1.6													¦'	
VC03	30/10/2019	VC03 0.0-0.2	0.0 - 0.2														
VC03	30/10/2019	VC03_0.0-0.5	0.0 - 0.5														
VC03	30/10/2019	VC03_0.3-0.4	0.3 - 0.4													 '	<u> </u>
VC03	30/10/2019	VC03_0.4-0.6	0.4 - 0.6				 	1	1			 				¦'	
VC03	30/10/2019	VC03 0.6-0.7	0.6 - 0.7														
VC03	30/10/2019	VC03_1.0-1.2	1.0 - 1.2														
VC04	30/10/2019	VC04_0.0-0.1	0.0 - 0.1													└─── ′	
VC04 VC04	30/10/2019	VC04_0.3-0.4	0.3 - 0.4	<0.6	<1.0	<1.0	<0.6	<0.6	<0.6	<0.6	<12	<5.0	<0.6	<0.6	<0.6	<0.6	<0.6
VC04	31/10/2019	VC04_0.5-0.6	0.5 - 0.6	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
VC04	31/10/2019	VC04_0.7-0.8	0.7 - 0.8													 '	
VC04	31/10/2019	VC04_0.9-1.0	0.9 - 1.0													 '	<u> </u>
VC05	30/10/2019	VC05_0.5-0.7	0.5 - 0.7														
VC05	30/10/2019	VC05_0.5-0.9	0.5 - 0.9														
VC05	30/10/2019	VC05_0.8-0.9	0.8 - 0.9													'	
VC06	31/10/2019	VC06_0.0-0.5	0.0 - 0.5													'	<u> </u>
VC06	31/10/2019	VC06 0.3-0.4	0.3 - 0.4														
VC06	31/10/2019	VC06_0.5-0.6	0.5 - 0.6														
VC06	31/10/2019	VC06_0.5-1.0	0.5 - 1.0													 '	Ļ
VC06	31/10/2019		0.7 - 0.8														
VC07	30/10/2019	VC07 0.0-0.2	0.0 - 0.2													[]	
VC07	30/10/2019	VC07_0.0-0.5	0.0 - 0.5	<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
VC07	30/10/2019	VC07_0.2-0.4	0.2 - 0.4													└─── ′	
VC07	30/10/2019	VC07_0.5-0.6	0.5 - 0.6														
VC07	30/10/2019	VC07_0.7-0.8	0.7 - 0.7													[]	
VC07	30/10/2019	VC07_1.0-1.2	1.0 - 1.2														
VC08	31/10/2019	VC08_0.0-0.1	0.0 - 0.1													 '	
VC08	31/10/2019	VC08_0.3-0.4	0.0-0.5													'	<u> </u>
VC08	31/10/2019	VC08_0.5-0.6	0.5 - 0.6														
VC08	31/10/2019	VC08_0.5-1.0	0.5 - 1.0														
VC08	31/10/2019	VC08_0.7-0.8	0.7 - 0.8				 					 				 '	<u> </u>
VC08	31/10/2019	VC08_1.0-1.1	1.0 - 1.1	<0.5	<1 0	<10	<0 5	<0 5	<0.5	<0.2	<1 0	<50	<0 5	<0 5	<0.5	<0.5	<05
VC08	31/10/2019	VC08_1.3-1.4	1.3 - 1.4		-1.0		-0.0	-0.0	-0.0	-0.0	\$1.0	-0.0	-0.0	-0.0	-0.0	-0.0	
VC08	31/10/2019	VC08_1.5-1.6	1.5 - 1.6														
VC09	30/10/2019	VC09_0.0-0.2	0.0 - 0.2				 					 				 '	<u> </u>
VC09	30/10/2019		0.0 - 0.5													i'	
VC09	30/10/2019	VC09_0.5-1.0	0.5 - 1.0				1					1					<u> </u>
VC09	30/10/2019	VC09_0.7-0.8	0.7 - 0.8														

Circular Quay Investigation Port Authority of NSW



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Appendix C Table C4 Analytical results - Waste classification TCLP

				Explo	sives	_	Nit	roaroma	tics	Nitrosoamines		-	Phtha	alates		
			1,3,5-Trinitrobenzene	2,4-Dinitrotoluene	2,6-dinitrotoluene	Nitrobenzene	2-Picoline	4-aminobiphenyl	Pentachloronitrobenze ne	N-Nitrosodiphenyl & Diphenylamine	Bis(2-ethylhexyl) phthalate	Butyl benzyl phthalate	Diethylphthalate	Dimethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
30/10/2019	VC09_0.8-1.0	0.8 - 1.0													ا	 '
30/10/2019	VC10_0.7-0.8	0.7 - 0.8													·'	Ļ'
31/10/2019	VC10_0.0-0.2	0.0 - 0.2													·'	Ļ'
31/10/2019	VC10_0.0-0.5	0.0 - 0.5													ا ا	ļ/
31/10/2019		0.5 - 0.6													!	───′
30/10/2019	VC11_0.0-0.2	0.0 - 0.2													!	└────′
30/10/2019	VC11_0.0-0.5	0.0 - 0.5													!	───′
30/10/2019	VC11_0.5-0.7	0.5 - 0.7													!	└────′
20/10/2019	VC11_0.5-1.0	0.5 - 1.0														───′
31/10/2019	VC12 0.0.05	0.0 0.5	<0.5	<1.0	<10	<0.5	<05	<0 5	<0.5	<10	~5.0	<0.5	<0.5	<0.5	<0.5	<0.5
31/10/2019	VC12_0.0-0.5	0.0 - 0.3	<0.5	<1.0	<1.0	~ 0.5	NO.5	NU.5	NO.5	<1.0	~ 5.0	NU.5	~0.5	~ 0.5	<u> </u>	<0.5
31/10/2019	VC12_0.5-0.4	0.5-0.4														┣────┘
31/10/2019	VC12_0.3-0.0															├ ────′
31/10/2019	VC12_0.0-0.3	10-11													ļ	├ ───┘
31/10/2019	VC13_0.0-0.1	0.0 - 0.1													ļ	<u>├</u> ───
31/10/2019	VC13_0.0-0.5	0.0-0.5													/	
31/10/2019	VC13_0.3-0.4	0.3 - 0.4													/	
31/10/2019	VC13_0.5-0.6	0.5 - 0.6													Į	
31/10/2019	VC13_0.5-1.0	0.5 - 1.0													/	
31/10/2019	VC13 0.7-0.8	0.7 - 0.8													/	
31/10/2019	VC13 1.0-1.1	1.0 - 1.1						-								
31/10/2019	VC14 0.0-0.1	0.0 - 0.1														
31/10/2019	VC14 0.0-0.5	0.0 - 0.5													[†]	
31/10/2019	VC14 0.3-0.4	0.3 - 0.4														
31/10/2019	VC14_0.5-1.0	0.5 - 1.0														
31/10/2019	VC14_0.7-0.8	0.7 - 0.8														
31/10/2019	VC14_1.0-1.1	1.0 - 1.1														
31/10/2019	VC14_1.3-1.4	1.3 - 1.4													, į	
31/10/2019	VC14-0.5-0.6	0.5 - 0.6													1	
			5	5	5	5	5	5	5	5	5	5	5	5	5	5
			0	0	0	0	0	0	0	0	0	0	0	0	0	0
1			<0.5	<1	<1	< 0.5	< 0.5	< 0.5	< 0.5	<1.0	<5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
n			<0.6	<1	<1	<0.6	<0.6	<0.6	<0.6	<1.0	<5.0	<0.6	<0.6	<0.6	<0.6	<0.6

Number of Detects 0 0 0 0 0 Minimum Concentration <0.5 <1 <1 <0.5 <1 <0.5 <1 <0.6 <0 <0 Maximum Concentration <0.6 <1 <1 <0.6 <0 <0 <0 <0	Number of Results	5	5	5	5	
Minimum Concentration <0.5 <1 <1 <0.5 <1 <0.5 <0 Maximum Concentration <0.6	Number of Detects	0	0	0	0	
Maximum Concentration <0.6 <1 <1 <0.6 <0	Minimum Concentration	<0.5	<1	<1	<0.5	<0
	Maximum Concentration	<0.6	<1	<1	<0.6	<0

Appendix D - Pro UCL outputs

	A	В	С	D	E	Ξ	F	G	Н		J	K		L
1					UCL	Statis	tics for Data	Sets with N	on-Detects					
2														
3		User Sele	cted Options											
4	Da	e/Time of Co	omputation	ProUCL 5.1	18/12/	2019 5	5:43:05 PM							
5			From File	waste class	_rev c	_b.xls								
6		Fu	II Precision	OFF										
7		Confidence	Coefficient	95%										
/	Number o	of Bootstrap	Operations	2000										
8														
9	Benzo(a) p	/rene												
10														
11							General	Statistics						
12			Total	Number of C	bserv	ations	95			Numbe	r of Distinct	Observation	5 2	20
13				Numbe		etects	20				Number of	Non-Detect	. 7	75
14			N		tinct D		18			Numb	er of Distinct			3
15				Mini			0.004			Numbe	Minimur	m Non Dotor	+ 0	004
16				Movi			0.004				Movimur		. 0	0.5
17				IVIAXI			4				Davaant	Non-Delec		0.5
18				Varia	Ince D	elecis	0.980				Percent	OD Data at	5 /	/8.95%
19				IV	iean D	etects	1.113					SD Detects	S	0.993
20				Me	dian D	etects	0.886					CV Detect	5	0.893
21				Skewr	iess D	etects	1.59				Ku	rtosis Detect	S	3
22				Mean of Log	iged D	etects	-0.67				SD of Lo	gged Detect	5	1.898
23														
24						Norm	nal GOF Tes	t on Detects	Only					
25			S	hapiro Wilk	Fest St	atistic	0.852			Shapiro W	ilk GOF Tes	ŧ		
26			5% SI	hapiro Wilk C	Critical	Value	0.905	[Detected Data	a Not Norm	al at 5% Sig	nificance Lev	/el	
27				Lilliefors	Fest St	atistic	0.205			Lilliefors	GOF Test			
28			5	% Lilliefors C	Critical	Value	0.192	[Detected Data	a Not Norm	al at 5% Sig	nificance Lev	/el	
29				C	etecte	d Dat	a Not Norma	al at 5% Sign	ificance Leve	el				
30														
31			Kaplan-	Meier (KM) S	Statisti	cs usi	ng Normal C	ritical Value	s and other N	Nonparame	tric UCLs			
32					KM	Mean	0.25			KI	M Standard I	Error of Mea	n ().0678
33					K	MSD	0.631				95% KI	M (BCA) UCI	_	0.367
34				95%	KM (t) UCL	0.363			95% KM (F	Percentile Bo	ootstrap) UC		0.362
35				95%	KM (z) UCL	0.362				95% KM Bo	otstrap t UCI	_	0.402
26			ę	90% KM Che	byshev	/ UCL	0.454				95% KM Ch	ebyshev UCI	_	0.546
27			97	.5% KM Che	byshev	/ UCL	0.674				99% KM Ch	ebyshev UCI	_	0.925
37					-							-		
30				G	amma	GOF	Tests on De	etected Obse	ervations Onl	ly				
39				A-D	Fest St	atistic	1.144		Ar	- nderson-Da	rling GOF T	est		
40				5% A-D C	Critical	Value	0.779	Detect	ed Data Not (Gamma Dis	tributed at 5	% Significan	ce Le	vel
41				K-S	Fest St	atistic	0.263		K	olmoaorov-	-Smirnov G	OF		
42				5% K-S C	ritical	Value	0.201	Detect	ed Data Not	Gamma Dis	tributed at 5	% Significan	cele	vel
43				Detecte	nd Date	a Not (Gamma Diet	ributed at 5%	6 Significanc					
44				Derecte	Jau			aitu di U7	- Cigninicant					
45					<u> </u>	amme	Statistics or		ata Only					
46					k hot		0 760			Ŀ	star (bias s-			0 697
47				Τμ-			1 1 1 1			K Thata	star (bics co		/ \	1.62
48				ine			20.74			ineta				1.02
49				r • • •			30.74				nu star (Di	as conected	/ 4	1.40
50				Me	an (de	uects)	1.113							
51)		Obertait	alma las s						
52				C	amma		Statistics u	sing Imputed	I NON-Detect					
53			GROS may	not he used	whon	data s	et has > 50%	6 NI)s with m	any tiad aher	envetions at	multiple DL	•		
55					when							s		
54		GROS may	y not be used	when kstar	of dete	cts is	small such a	s <1.0, espec	cially when th	ne sample s	ize is small ((e.g., <15-20)	

	A B C D E	F	G H I J K	L
56	This is espec	ally true whe	en the sample size is small.	
57	For gamma distributed detected data, BTVs a		iy be computed using gamma distribution on KM estimates	0.255
58	Minimum	0.004	Mean	0.255
59	Maximum ag	4	Median CV	2.492
60	SD k bot (MLE)	0.000	k star (bias corrected MLE)	2.402
61	Thata (MLE)	0.309	Thota star (bias corrected MLE)	0.300
62	nu bot (MLE)	58 71	nu star (bias corrected)	58 10
63	Adjusted Level of Significance (B)	0.0475		56.19
64	Approximate Chi Square Value (58.19. d)	41.65	Adjusted Chi Square Value (58 19 ß)	41 44
65	95% Gamma Approximate UCL (use when n>=50)	0.356	95% Gamma Adjusted UCL (use when n<50)	0.358
66		0.000		
67	Estimates of G	iamma Para	meters using KM Estimates	
00 60	Mean (KM)	0.25	SD (KM)	0.631
70	Variance (KM)	0.398	SE of Mean (KM)	0.0678
70	k hat (KM)	0.157	k star (KM)	0.159
72	nu hat (KM)	29.9	nu star (KM)	30.29
72	theta hat (KM)	1.591	theta star (KM)	1.571
74	80% gamma percentile (KM)	0.286	90% gamma percentile (KM)	0.748
75	95% gamma percentile (KM)	1.361	99% gamma percentile (KM)	3.119
76		1		
77	Gamn	na Kaplan-M	eier (KM) Statistics	
78	Approximate Chi Square Value (30.29, α)	18.72	Adjusted Chi Square Value (30.29, β)	18.58
79	95% Gamma Approximate KM-UCL (use when n>=50)	0.405	95% Gamma Adjusted KM-UCL (use when n<50)	0.408
80				
81	Lognormal GC	OF Test on D	etected Observations Only	
82	Shapiro Wilk Test Statistic	0.744	Shapiro Wilk GOF Test	
83	5% Shapiro Wilk Critical Value	0.905	Detected Data Not Lognormal at 5% Significance Lev	el
84		0.333	Lilletors GOF Test	
85	5% Lillerors Critical Value	U. 192	Detected Data Not Lognormal at 5% Significance Lev	ei
86				
8/	Lognormal RO	S Statistics	Using Imputed Non-Detects	
88	Mean in Original Scale	0.248	Mean in Log Scale	-4.813
89	SD in Original Scale	0.634	SD in Log Scale	3.132
90	95% t UCL (assumes normality of ROS data)	0.356	95% Percentile Bootstrap UCL	0.362
92	95% BCA Bootstrap UCL	0.39	95% Bootstrap t UCL	0.4
93	95% H-UCL (Log ROS)	5.379		
94		I		
95	Statistics using KM estimates	on Logged I	Data and Assuming Lognormal Distribution	
96	KM Mean (logged)	-4.195	KM Geo Mean	0.0151
97	KM SD (logged)	2.206	95% Critical H Value (KM-Log)	3.67
98	KM Standard Error of Mean (logged)	0.324	95% H-UCL (KM -Log)	0.396
99	KM SD (logged)	2.206	95% Critical H Value (KM-Log)	3.67
100	KM Standard Error of Mean (logged)	0.324		
101		DI /0.0		
102		DL/2 S		
103	UL/2 Normal	0.405		1 7/1
104	SD in Original Scale	0.400 0 582		1 78
105	95% t LICL (Assumes normality)	0.505		1.70
106	DL/2 is not a recommended m	ethod. provid	ded for comparisons and historical reasons	
107				
108	Nonparame	etric Distribu	tion Free UCL Statistics	
110	Data do not follow a D	iscernible D	istribution at 5% Significance Level	
110				

	A	В	С	D	E	F	G	Н	I	J	K	L
111												
112						Suggested	UCL to Use					
113			95	5% KM (Cheb	yshev) UCL	0.546						
114												
115		Note: Sugges	stions regard	ling the selec	tion of a 95%	6 UCL are pr	ovided to hel	p the user to	select the m	ost appropria	ate 95% UCI	
116			F	Recommenda	tions are bas	sed upon dat	a size, data o	distribution, a	and skewnes	S.		
117		These recor	mmendation	s are based u	pon the resu	Ilts of the sim	nulation studie	es summariz	ed in Singh,	Maichle, and	d Lee (2006).	-
118	Н	owever, simu	lations result	ts will not cov	er all Real W	Vorld data se	ts; for additio	nal insight th	ie user may	want to cons	ult a statistic	ian.

	A	В	С	D	E	F	G	Н	I	J	K	L
119	ا مد ط											
120	read											
121												
122					N	General	Statistics		<u></u> .		N	
123			Total	Number of C	Observations	91			Numbe	r of Distinct C	bservations	52
124				Numbe	er of Detects	78				Number of I	Non-Detects	13
125			N	umber of Dis	tinct Detects	52			Numbe	er of Distinct I	Non-Detects	1
126				Mini	imum Detect	1.1				Minimum	Non-Detect	5
127				Max	imum Detect	318				Maximum	Non-Detect	5
128				Varia	ance Detects	3981				Percent	Non-Detects	14.29%
129				N	lean Detects	41.67					SD Detects	63.1
130				Me	dian Detects	13.75					CV Detects	1.514
131				Skewr		2.403						5.8
132				Mean of Log	ged Detects	2.878				SD of Log	ged Detects	1.283
133					NI		t on Datast	o Only				
134				hanira Wills			L ON DETECTS		Tost on De	tooted Ohan	nationa Ork	,
135			5			0.042						y
136				5% Snapiro		0.000		Delected Dat			meance Leve	;1
137			F			0.282		Data ata d Dat		GOF Test	ifiannan Laura	.1
138			5	% Lillietors C	ritical value	U.I	Lat EV Cia			ai at 5% Sign	Ificance Leve)
139				L		a not norma	li at 5% Sigi	incance Lev				
140			Kanlan		Ptotiotico uni			o and other	Nonnoromo			
141			Kapian-					es and other	Nonparame		were of Maan	6 201
142						50.62						0.291
143				0.5%		09.02 46.57				95% Kivi		47.04
144				95%		40.37			95% KIVI (P			47.33
145				95%		40.40				95% KIVI BOO		48.94
146				5% KM Che	bysnev UCL	54.98					bysnev UCL	03.53
147			97	.5% KIVI Che	bysnev UCL	75.4			:		bysnev UCL	90.7
148					amma GOF	Tests on De	tected Obs	envetions On	dv.			
149				<u>م_0</u>	Test Statistic	3 879			nderson-Da	rling GOF Te	set	
150				5% A-D (Critical Value	0.797	Detec	ted Data Not	Gamma Dis	tributed at 5%		e l evel
151				<u>к-s</u>	Test Statistic	0.737	Delee			Smirnov GO	F	
152				5% K-S (Critical Value	0.105	Detec	ted Data Not	Gamma Dis	tributed at 5%		e l evel
153				Detecte	ed Data Not	Gamma Dist	ributed at 5	% Significan	ce i evel			
154				Dottoon								
155					Gamma	Statistics or	Detected [Data Only				
156					k hat (MLF)	0.708			k	star (bias cor	rected MLE)	0.689
157				The	ta hat (MLE)	58.83			Theta	star (bias cor	rected MLE)	60.43
158				r	nu hat (MLE)	110.5				nu star (bia	s corrected)	107.6
159				Me	ean (detects)	41.67						
160												
161				(Gamma ROS	Statistics us	sing Impute	d Non-Detec	ts			
162			GROS may	not be used	when data s	et has $> 50\%$	NDs with n	nany tied obs	ervations at	multiple DI s		
163		GROS may	y not be used	when kstar	of detects is	small such a	s <1.0. espe	cially when t	he sample si	ize is small (e	e.g., <15-20)	
164			, 100000	or such situat	ions. GROS	method may	vield incorre	ect values of	UCLs and R	TVs	3, 220)	
165				7	This is especi	ally true whe	n the sampl	e size is sma	II.			
166		For dar	nma distribut	ted detected	data, BTVs a	and UCLs ma	y be compu	ted using gar	nma distribu	tion on KM es	stimates	
167					Minimum	0.01	, <u> </u>				Mean	35.71
168					Maximum	318					Median	10.6
169					SD	60.17					CV	1.685
1/0					k hat (MI F)	0.376			k	star (bias cor	rected MI F)	0.371
1/1				The	ta hat (MLF)	94.95			Theta	star (bias cor	rected MLE)	96.25
1/2				r	nu hat (MI F)	68.46				nu star (bia	s corrected)	67.54
1/3							<u> </u>					

	A B C D E	F	G	Н			J	K	L
174	Adjusted Level of Significance (β)	0.0474						(07.54.0)	40.00
175	Approximate Chi Square Value (67.54, α)	49.62		050/	Adjust	ed Chi S	Square Va	alue (67.54, β)	49.38
176		40.01		90%	Gamma	Aujustet		e when h<50)	40.00
177	Estimates of (amma Para	meters using	ı KM Estir	nates				
1/8	Mean (KM)	36.11		,	hatoo			SD (KM)	59.62
179	Variance (KM)	3554					SE	of Mean (KM)	6.291
180	k hat (KM)	0.367						k star (KM)	0.362
182	nu hat (KM)	66.77						nu star (KM)	65.91
183	theta hat (KM)	98.42					tł	neta star (KM)	99.72
184	80% gamma percentile (KM)	57.5				90% (gamma pe	ercentile (KM)	103.7
185	95% gamma percentile (KM)	155.2				99% (gamma pe	ercentile (KM)	286.2
186									
187	Gamn	na Kaplan-M	eier (KM) St	atistics					
188	Approximate Chi Square Value (65.91, α)	48.23			Adjust	ed Chi S	Square Va	lue (65.91, β)	47.98
189	95% Gamma Approximate KM-UCL (use when n>=50)	49.35		95% Gan	nma Adju	isted KN	I-UCL (us	e when n<50)	49.6
190									
191		DF Test on D	etected Obs	ervations	Only		00F T		
192	Shapiro Wilk Approximate Test Statistic	0.944			Shap			st innificance la	. al
193	5% Snapiro Wilk P Value	0.00401	D	elected Da		ioforo G	$\frac{11 \text{ at 5\% 5}}{\text{OE Test}}$	Ignificance Le	vei
194	5% Lilliefors Critical Value	0.12	D	atected Da	ta Not L			ignificance Le	vol
195		Not Lognorm	nal at 5% Sid			Synomia	ii at 5 /0 5		
196		Hot Loghom		grinioarioo					
19/	Lognormal RC	S Statistics	Usina Imput	ed Non-De	etects				
198	Mean in Original Scale	35.99					Mear	n in Log Scale	2.54
200	SD in Original Scale	60.01					SE) in Log Scale	1.466
200	95% t UCL (assumes normality of ROS data)	46.44				95% Pe	ercentile B	ootstrap UCL	46.75
202	95% BCA Bootstrap UCL	48.16					95% Bo	otstrap t UCL	48.89
203	95% H-UCL (Log ROS)	56.71							
204									
205	Statistics using KM estimates	on Logged [Data and As	suming Lo	ognormal	Distribu	ution		
206	KM Mean (logged)	2.589					ł	KM Geo Mean	13.32
207	KM SD (logged)	1.393				95% Cr	itical H Va	alue (KM-Log)	2.658
208	KM Standard Error of Mean (logged)	0.153				050/ 0	95% H-U	CL (KM -Log)	51.96
209	KM SD (logged)	1.393				95% Cr	itical H Va	alue (KM-Log)	2.658
210	KM Standard Error of Mean (logged)	0.153							
211			tatistics						
212	DL/2 Normal				DL/2	Log-Tra	ansforme	4	
213	Mean in Original Scale	36.07					Mear	- n in Log Scale	2.597
214	SD in Original Scale	59.97					SE) in Log Scale	1.373
215	95% t UCL (Assumes normality)	46.52					959	% H-Stat UCL	50.47
210	DL/2 is not a recommended m	ethod, provid	ded for com	oarisons a	nd histo	rical rea	sons		
217									
219	Nonparam	etric Distribu	tion Free UC	L Statisti	cs				
220	Data do not follow a D	iscernible Di	istribution at	5% Signi	ficance L	.evel			
221									
222		Suggested	UCL to Use						
223	95% KM (Chebyshev) UCL	63.53							
224									
225	Note: Suggestions regarding the selection of a 95%	% UCL are pro	ovided to he	p the user	r to selec	t the mo	st approp	riate 95% UCL	
226	Recommendations are ba	sed upon dat	ta size, data	distribution	n, and sk	ewness.		11 (0000)	
227	I hese recommendations are based upon the resu	uits of the sim	nulation studi	es summa	arized in S	Singh, N	laichle, ar	nd Lee (2006).	
228	However, simulations results will not cover all Real V	Vorld data se	ts; for addition	onal insigh	t the use	r may wa	ant to con	sult a statistic	an.

	A	В		С		D	E		F	G	H				J			K		L
229	Mercury																			
230																				
231									General	Statistics										
232				Tota	l Nun	hber of (Observa	tions	38				Nur	mber	of Distin	nct O	bser	vations		21
233					-								Nur	nber o	of Missir	ng O	bser	vations	3	2
234						Numb	er of De	etects	22						Numbei	r of N	lon-[Detects	3	16
235				N	lumbe	er of Dis	tinct De	etects	21				Nu	Imber	of Disti	nct N	lon-[Detects	3	2
230						Min	imum D	etect	0.01						Minin	num	Non-	-Detec	t (0.01
237						Max	imum D	etect	4.25						Maxin	num	Non-	-Detec	t	0.1
230						Varia	ance De	etects	1.418						Perce	ent N	lon-[Detects	; ,	42.11%
239						Ν	lean De	etects	1.055								SD D	Detects	3	1.191
240						Ме	dian De	etects	0.75								CVE	Detects	3	1.128
241						Skewr	ness De	etects	1.318							Kurto	sis [Detects	3	1.246
242					Меа	in of Log	ged De	etects	-1.007						SD of	Logo	jed [Detects	3	1.859
243																				
245								Norma	al GOF Tes	t on Detect	s Only									
246				Ś	Shapi	ro Wilk	Test Sta	atistic	0.835				Shapiro	o Wilk	GOF T	Fest				
247				5% 5	Shapir	o Wilk (Critical V	/alue	0.911		Detecte	d Data	a Not No	ormal	at 5% S	Signif	ican	ce Lev	el	
248					Li	Iliefors	Test Sta	atistic	0.2				Lillie	fors G	OF Tes	st				
249				Į	5% Li	lliefors (Critical V	/alue	0.184		Detecte	d Data	a Not No	ormal	at 5% S	Signif	ican	ce Lev	el	
250						0	Detecte	d Data	Not Norma	l at 5% Sig	nificance	e Leve	əl							
251																				
252				Kaplan	-Meie	er (KM) S	Statistic	s usin	g Normal C	ritical Value	es and o	ther N	lonpara	ametri	c UCLs	\$				
253							KMI	Mean	0.618					KM	Standa	rd Er	ror o	of Mear	1	0.17
254							K	M SD	1.023						95%	KM	(BC/	A) UCL	-	0.909
255						95%	6 KM (t)	UCL	0.904				95% K	M (Pe	rcentile	Boo	tstra	p) UCL	-	0.903
256						95%	5 KM (z)	UCL	0.897					9	5% KM	Boot	strap	o t UCL	-	1.022
257					90%	KM Che	ebyshev	UCL	1.128					95	5% KM (Cheb	yshe	ev UCL	-	1.358
258				9	7.5%	KM Che	ebyshev	UCL	1.679					99	9% KM (Cheb	yshe	ev UCL	-	2.308
259																				
260						C	Gamma	GOF	Tests on De	etected Obs	ervation	is Onl	у							
261						A-D	Test Sta	atistic	0.488			Ar	derson	-Darli	ing GOI	FTe	st	-		
262					5	% A-D (/alue	0.797	Detecte	ed data a	ppear	Gamm	na Dis	tributed	at 5°	% Si	gnifica	nce l	_evel
263						K-S	lest Sta	atistic	0.139			K	olmogo	prov-S	mirnov	GOF	-			
264					5	% K-S (/alue	0.195	Detecte	ed data a	ippear	Gamm	na Dis	tributed	at 5	% Si	gnifica	nce I	_evel
265					L	Detected		ppear	Gamma Di	stributed at	5% Sigr	nificar		ei						
266									Ptotiotico or	Detected	Data On	h.,								
267							Ga				Jala On	iy		li ot	or (hioo	r	ooto			0 5 2 5
268						The	ta hat (1 805				Th			corr			, 	0.555
269						1110	nu hat (25.73							(hiad			<u>,</u>	23 55
270						Ma			1 055						nu stai	(Dias		rected	, ·	20.00
271						IVIC	san (ue	10013)	1.000											
272							Gamma	ROS	Statistics u	sina Impute	d Non-D)etect	•							
273			G	ROS ma	v not	he used	l when (lata se	$\frac{1}{10000000000000000000000000000000000$	NDs with r	nany tier	d obse	rvation	satm	ultinle (DIs				
274		GROS m	av nr	t be use	d whe	en kstar	of deter	cts is s	mall such a	s <1.0. esne	ecially wi	hen th	e samn		e is sma		a. <	15-20		
275			,	Fi	or suc	ch situat	ions. G	ROS n	nethod mav	vield incorr	ect value	es of I	JCLs an		vs	(0.	J., `			
276					J. Jul		This is e	specia	ally true whe	n the same	e size is	smal	l.							
277		For a	amm	a distribi	Ited d	etected	data R	TVs ar		v be comp	Ited usin	g gam	ma dist	tributi	on on K	Mes	tima	tes		
2/8		9				5.50.00	Mini	imum	0.01			a gan			0111	00		Mear	1	0.617
2/9							Maxi	mum	4.25								-	Mediar		0.045
280								SD	1.037									C\	, —	1.68
281							k hat (MLE)	0.341					k st	ar (bias	corr	ecte)	0.331
282						The	ta hat (MLE)	1.811				Th	ieta st	ar (bias	corr	ecter)	1.863
283															(2140			····	1	

	A B C D E		F	G	н		JK	L						
284	nu hat (M	MLE)	25.9				nu star (bias corrected)	25.19						
285	Adjusted Level of Significanc	e (β)	0.0434											
286	Approximate Chi Square Value (25.1	9, α)	14.76			Adjuste	d Chi Square Value (25.19, β)	14.43						
287	95% Gamma Approximate UCL (use when n>	=50)	1.054		95% Ga	mma Ao	djusted UCL (use when n<50)	1.078						
288				mma Parameters using KM Estimates										
289	Esuinates													
290	Variance	(KM)	1 047		0.17									
291	k hat	(KM)	0.365		0.353									
292	nu hat	(KM)	27.71				nu star (KM)	26.85						
293	theta hat	(KM)	1.695				theta star (KM)	1.749						
294	80% gamma percentile	(KM)	0.98				90% gamma percentile (KM)	1.781						
295	95% gamma percentile	(KM)	2.678				99% gamma percentile (KM)	4.963						
297														
298	G	amm	a Kaplan-Me	eier (KM) St	atistics									
299	Approximate Chi Square Value (26.8	5, α)	16.04			Adjuste	d Chi Square Value (26.85, β)	15.69						
300	95% Gamma Approximate KM-UCL (use when n>	=50)	1.034		95% Gamma	a Adjust	ted KM-UCL (use when n<50)	1.057						
301														
302	Lognorma	al GO	F Test on D	etected Obs	ervations Or	nly								
303	Shapiro Wilk Test Sta	tistic	0.912			Shapir	o Wilk GOF Test							
304	5% Shapiro Wilk Critical V	/alue	0.911	Dete	ected Data a	ppear Lo	ognormal at 5% Significance L	evel						
305	Lilliefors Test Sta	tistic	0.196			Lillie	fors GOF Test							
306	5% Lilliefors Critical V	/alue	0.184	De	etected Data	Not Log	Inormal at 5% Significance Lev	vel						
307	Detected Data app	ear A	pproximate	proximate Lognormal at 5% Significance Level										
308	Lognormo													
309	Lognorma Maan in Original S													
310			1.037											
311	95% t UCL (assumes normality of BOS)	data)	0.902		95% Percentile Rootstran LICI									
312	95% BCA Bootstrap	UCL	0.974		95% Bootstrap t UCI									
313	95% H-UCL (Log F	ROS)	14.7											
314		,												
315	Statistics using KM estim	ates	on Logged D											
317	KM Mean (log	ged)	-2.405		0.0902									
318	KM SD (log	ged)	2.174		95% Critical H Value (KM-Lo									
319	KM Standard Error of Mean (log	ged)	0.368		95% H-UCL (KM -Log)									
320	KM SD (log	ged)	2.174		4.005									
321	KM Standard Error of Mean (log	ged)	0.368											
322														
323			DL/2 St	atistics										
324	DL/2 Normal	<u> </u>	0.001	DL/2 Log-Transformed										
325	Mean in Original S	cale	0.624		-2.268									
326	SD in Original S	cale	1.033				SD in Log Scale	2.185						
327	95% t UCL (Assumes norm	ality)	0.907	95% H-Stat UCL 4.//										
328		o u M	anou, provic	ieu ior comp	ansons and	mstorio	ai 10a30113							
329	Nonns	Irame	tric Distribut	ion Free LIC	L Statistics									
330	Detected Data a	ppea	r Gamma Die	stributed at !	5% Significa	nce Lev	rel							
331														
332 222			Suggested	Suagested UCL to Use										
333	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k	<=1)	1.057	-										
335														
336	Note: Suggestions regarding the selection of a	a 95%	6 UCL are provided to help the user to select the most appropriate 95% UCL.											
337	Recommendations ar	e bas	ed upon data	a size, data o	distribution, a	and skev	wness.							
338	These recommendations are based upon the	resu	Its of the sim	ulation studi	es summariz	ed in Si	ngh, Maichle, and Lee (2006).							
-														

	A	В	С	D	E	F	G	Н	_	J	K	L		
339	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.													
340														

	A	В	С	D	E	F	G	Н		J	K	L						
1					UCL Statis	tics for Data	Sets with No	n-Detects										
2				1														
3		User Sele	cted Options		10/10/2011													
4	Da	te/ I ime of C	omputation	ProUCL 5.1	18/12/2019 5	o:1/:54 AM												
5			From File	NAGD_revO	_g.xls													
6		Fu																
7		Confidence	Coefficient	95%														
8	Number	of Bootstrap	Operations	2000														
9	Connor																	
10	Copper																	
11						General	Statistics											
12			Total	Number of C	Observations	8 Number of Distinct Observations												
13			10101	Number	er of Detects	3				Number of No	on-Detects	5						
14			N		tinct Detects	3			Numbe	er of Distinct No	n-Detects	1						
15				Mini	mum Detect	45			Numbe	Minimum N	Ion-Detect	1						
16				Mavi	mum Detect	180				Maximum N	Ion-Detect	1						
17				Varia	nco Dotocto	8600				Porcont No	n Dotocto	62.5%						
18				vaila	ean Detecto	104 5						02.0 %						
19				IVI Mo	dian Detects	104.5						93.22						
20				Skour		0 729				Kurtos		0.092						
21				Moon of Log	and Detects	-0.720				SD of Logg	ad Detects	N/A						
22	Mean of Logged Detects 3.844 SD of Logged Detects 2.0																	
23					Warning: D	ata sat has r	nly 3 Detect	ed Values										
24			т	his is not end	wah to comp	ute meaning	ful or reliable	statistics ar	d estimates	<u> </u>								
25						die meaning			ia estimates	•								
26																		
27			Note: Sam	ole size is sm	nall (e.a. <10) if data are	collected us	ing ISM appr	oach vou s	hould use								
28			quidance pr	ovided in ITR	C Tech Rea	Guide on IS	M (ITRC 20)	12) to compu	te statistics	of interest								
29			For	example, vou	may want to	use Chebys	shev UCL to	estimate EP	C (ITRC, 20	12).								
30			Chebyshev	UCL can be	computed u	sing the Non	parametric a		Dotions of P	roUCL 5.1								
31			,			g	<u></u>		- F									
32					Norm	al GOF Test	t on Detects	Only										
30 34			S	hapiro Wilk 1	est Statistic	0.979	0.979 Shapiro Wilk GOF Test											
34			5% S	hapiro Wilk C	Critical Value	0.767	Detected Data appear Normal at 5% Significance Le											
30				Lilliefors 1	est Statistic	0.233	Lilliefors GOF Test											
30			5	% Lilliefors C	Critical Value	0.425	Detected Data appear Normal at 5% Significance Level											
32				De	tected Data a	appear Norm	al at 5% Sigi	nificance Lev	rel									
39																		
40			Kaplan-	Meier (KM) S	tatistics usin	g Normal Cri	itical Values	and other No	onparametrio	UCLs								
41					KM Mean	39.81			K	A Standard Err	or of Mean	29.63						
42					KM SD	68.43				95% KM (BCA) UCL	N/A						
43				95%	KM (t) UCL	95.95			95% KM (F	Percentile Boots	strap) UCL	N/A						
44				95%	KM (z) UCL	88.55				95% KM Boots	trap t UCL	N/A						
45			(0% KM Che	byshev UCL	128.7			!	95% KM Cheby	shev UCL	169						
46			97	.5% KM Che	byshev UCL	224.9			!	99% KM Cheby	shev UCL	334.7						
47							1											
48				G	iamma GOF	Tests on De	tected Obser	vations Only	1									
49					Not End	ough Data to	Perform GO	F Test										
50																		
51					Gamma	Statistics on	Detected Da	ata Only										
52					k hat (MLE)	0.745			k	star (bias corre	cted MLE)	N/A						
53				The	ta hat (MLE)	140.3			Theta	star (bias corre	cted MLE)	N/A						
54				r	u hat (MLE)	4.468				nu star (bias	corrected)	N/A						
55				Me	an (detects)	104.5												
1111						1	1											

	A B C D E	F	G H I J K	L											
56	Gamma ROS	Statistics us	ing Imputed Non-Detects												
57	GROS may not be used when data s	set has > 50%	6 NDs with many tied observations at multiple DLs												
58	GROS may not be used when kstar of detects is	small such a	s <1.0, especially when the sample size is small (e.g., <15-20)												
59	For such situations, GROS	method may	vield incorrect values of UCLs and BTVs												
61	This is espec	ially true whe	n the sample size is small.												
62	For gamma distributed detected data, BTVs	and UCLs ma	ay be computed using gamma distribution on KM estimates												
62	Minimum	0.01	Mean	39.19											
64	Maximum	189	Median	0.01											
65	SD	73.54	CV	1.876											
66	k hat (MLE)	0.15	k star (bias corrected MLE)	0.177											
67	Theta hat (MLE)	260.5	Theta star (bias corrected MLE)	221											
68	nu hat (MLE)	2.408	nu star (bias corrected)	2.838											
69	Adjusted Level of Significance (β)	0.0195													
70	Approximate Chi Square Value (2.84, α)	0.326	Adjusted Chi Square Value (2.84, β)	0.187											
71	95% Gamma Approximate UCL (use when n>=50)	341.1	95% Gamma Adjusted UCL (use when n<50)	N/A											
72	2														
73	23 Estimates of Gamma Parameters using KM Estimates														
74	Mean (KM)	39.81	SD (KM)	68.43											
75	Variance (KM)	4683	SE of Mean (KM)	29.63											
76	k hat (KM)	0.338	k star (KM)	0.295											
77	nu hat (KM)	5.415	nu star (KM)	4.718											
78	theta hat (KM)	117.6	theta star (KM)	135											
79	80% gamma percentile (KM)	60.79	90% gamma percentile (KM)	117.7											
80	95% gamma percentile (KM) 183.1 99% gamma percentile (KM)														
81	Gamp	na Kanlan-Me	sior (KM) Statistics												
82	Gamma Kapian-Meier (KM) Statistics														
83	95% Gamma Approximate KM-UCL (use when n>=50)	183.4	95% Gamma Adjusted KM-UCL (use when n<50)	284.8											
84	······································														
60 86	Lognormal GC	OF Test on De	etected Observations Only												
87	Shapiro Wilk Test Statistic	0.84	Shapiro Wilk GOF Test												
88	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Lo	ce Level											
89	Lilliefors Test Statistic	0.345	Lilliefors GOF Test												
90	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Le	Level											
91	Detected Data ap	opear Lognor	mal at 5% Significance Level												
92															
93	Lognormal RO	S Statistics U	Ising Imputed Non-Detects												
94	Mean in Original Scale	39.31	Mean in Log Scale	-0.572											
95	SD in Original Scale	73.47	SD in Log Scale	4.246											
96	95% t UCL (assumes normality of ROS data)	88.52	95% Percentile Bootstrap UCL	/8.4/											
97		94.0Z	95% Bootstrap t UCL	1807											
98	95% H-UCL (LOU RUS)	2.909E+12													
99	Statietice using KM astimatos	on Loaged D	ata and Assuming Lognormal Distribution												
100	KM Mean (logged)	1 442	KM Geo Mean	4 228											
101	KM SD (logged)	2.122	95% Critical H Value (KM-I on)	6.481											
102	KM Standard Error of Mean (logged)	0.919	95% H-UCL (KM -Loa)	7277											
103	KM SD (logged)	2.122	95% Critical H Value (KM-Log)	6.481											
104	KM Standard Error of Mean (logged)	0.919													
106															
107		DL/2 St	atistics												
108	DL/2 Normal		DL/2 Log-Transformed												
109	Mean in Original Scale	39.5	Mean in Log Scale	1.008											
-	SD in Original Scale	73.35	SD in Log Scale	2.589											

	А	В	С	D	E	F	G	Н		J	K	L				
111			95% t l	JCL (Assume	es normality)	88.63				95%	H-Stat UCL	164711				
112			DL/2	s not a recor	nmended me	thod, provid	ed for compa	arisons and h	istorical reas	sons						
113																
114	Nonparametric Distribution Free UCL Statistics															
115	Detected Data appear Normal Distributed at 5% Significance Level															
116																
117		Suggested UCL to Use														
118				95%	5 KM (t) UCL	95.95										
119																
120	I	Note: Sugge	stions regard	ling the seled	tion of a 95%	6 UCL are pr	rovided to he	lp the user to	select the n	nost appropri	ate 95% UC	L.				
121			F	Recommenda	ations are ba	sed upon dat	ta size, data	distribution,	and skewnes	SS.						
122		These record	mmendation	s are based ι	ipon the resu	ults of the sim	nulation stud	ies summari:	zed in Singh	, Maichle, and	d Lee (2006)).				
123	Но	wever, simu	lations result	s will not cov	ver all Real W	/orld data se	ts; for additio	onal insight th	ne user may	want to cons	ult a statistic	cian.				
124																

	A		В		С		D	E		F	G		Н				J			K		L
125	Lead																					
126	Luau																					
127										General	Statistics											
128					Total	Numb	per of (Observatio	ons	8	Number of Distinct Observations											8
129															Num	ber c	of Miss	ing (Obse	rvations	s	0
130								Minimu	um	1.4										Mear	ı	62.21
122								Maximu	318										Mediar	ı	12.6	
133								5	SD	109.4							S	td. E	rror	of Mear	า	38.68
134						Coe	fficien	t of Variati	ion	1.758									Sk	ewness	5	2.324
135																						
136				No	te: Sam	ple siz	e is sn	nall (e.g., <	<10),	if data are	collected	using IS	SM app	proac	h, yoı	u sho	ould us	;e				
137	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.																					
138	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).																					
139	9 Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1																					
140																						
141																						
142					S	hapiro	Wilk	Test Statis	stic	0.633		-		Sha	apiro	Wilk	GOF 1					
143					5% S	hapiro	Wilk C	Critical Val	lue	0.818		L	Data No	ot No	rmal	at 5%	6 Signi	ificar	nce L	evel		
144							etors	l est Statis	stic	0.353		r			.Illieto	ors G		st				
145 5% Lilliefors Critical Value 0.283													IOT INO	rmai	at 5%	% Signi	Ificar	nce L	-evei			
146	6 Data Not Normal at 5% Significance Level																					
147	7 Assuming Normal Distribution																					
148					95% No	ormal l	ICI		7.550				95%		s (Ad	diust	ed for S	Skev	vnes	(a)		
149						95	5% Stu	dent's-t U	CL	135.5				95%	Adiu	usted	-CLT U	JCL	(Che	en-1995) -	159.8
150														95%	% Mo	dified	I-t UCL	L (Jo	hnsc	on-1978) -	140.8
151																					<u> </u>	
152										Gamma (GOF Test											
154							A-D	Test Statis	stic	0.494	Anderson-Darling Gamma GOF Test											
155						5%	A-D C	Critical Val	lue	0.765	Detec	ted dat	a appe	ear Ga	amma	a Dist	tributed	d at !	5% S	Significa	ince	Level
156							K-S	Test Statis	stic	0.245		1	Kolmoç	gorov	-Smiı	rnov	Gamm	na Gé	OF T	est		
157						5%	5 K-S (Critical Val	lue	0.31	Detected data appear Gamma Distributed at 5% Significance Level									Level		
158						De	etected	l data appe	ear G	amma Dis	tributed at	5% Sig	nificar	nce Le	evel						-	
159																						
160										Gamma	Statistics											
161								k hat (ML	.E)	0.483						k sta	ar (bias	s cor	recte	ed MLE)	0.385
162							The	ta hat (ML	-E)	128.8					The	eta sta	ar (bia	s cor	rrecte	ed MLE) 1	161.5
163							1	nu hat (ML	.E)	7.73							nu sta	r (bia	as co	rrected)	6.165
164					M	LE Me	an (bia	as correcte	ed)	62.21						N		d (bia		rrected) 1	100.2
165					۸ مانید			Cignifican		0.0105				Appr	roxim			uare	Valu)	1.725
166					Adjus	sted Le	everor	Significan	ice	0.0195						Adji	usted C		quar	e value	•	1.198
167									Δοοιι	iming Gam	ma Dietrib	ution										
168		95%	Annroy	imate	- Gamm		(1150.)	when n>=	ASSU	222 4		uuon	۵5% ۵	diuste	ad Ga	mm		(1156	whe	on n<50	<u>)</u> (320.2
169		507		innau	Camin		. (030		00)	222.7			5570 A	lujusit				(030			/	20.2
170										Lognormal	GOF Test	t										
170					S	hapiro	Wilk	Test Statis	stic	0.968			Sha	apiro V	Nilk L	ogno	ormal (GOF	Tes	t		
172 172					5% S	hapiro	Wilk (Critical Val	lue	0.818	Data appear Lognormal at 5% Significance Level											
174						Lilli	efors	Test Statis	stic	0.154			Li	illiefor	rs Log	gnorr	nal GC	OF T	est			
175	l				5	% Lilli	efors (Critical Val	lue	0.283		Data	a appe	ar Lo	gnorn	nal a	t 5% S	Signif	fican	ce Leve)	
176	l							Data appe	ear Lo	ognormal a	it 5% Sign	ificance	e Level									
177																						
178										Lognorma	Statistics											
179						Minim	um of	Logged Da	ata	0.336							Mea	an of	logg	ed Data	Э	2.809
	A B C D E F G H I J K								L													
-----	---	--------------	---------------	-----------------	----------------	-----------------	-----------------	----------------	----------------	------------------	--------------	-------										
180				Maximum of I	ogged Data	5.762				SD of log	ged Data	1.783										
181																						
182					Assı	uming Logno	rmal Distribu	ition														
183					95% H-UCL	3370			90%	Chebyshev (MV	/UE) UCL	162										
184			95%	Chebyshev (MVUE) UCL	209.8			97.5%	Chebyshev (MV	/UE) UCL	276										
185			99%	Chebyshev (MVUE) UCL	406.1																
186																						
187					Nonparame	tric Distribut	ion Free UC	L Statistics														
188	B Data appear to follow a Discernible Distribution at 5% Significance Level																					
189																						
190					Nonpai	rametric Dist	ribution Free	UCLs														
191				95	% CLT UCL	125.8				95% Jack	knife UCL	135.5										
192			95%	Standard Bo	otstrap UCL	122.4				95% Bootst	rap-t UCL	600.5										
193			ę	95% Hall's Bo	otstrap UCL	490.8			95%	Percentile Boots	strap UCL	127										
194				95% BCA Bo	otstrap UCL	165.7																
195			90% Cł	nebyshev(Me	an, Sd) UCL	178.2			95% Cł	nebyshev(Mean	, Sd) UCL	230.8										
196			97.5% Cł	nebyshev(Me	an, Sd) UCL	303.7			99% Cł	nebyshev(Mean	, Sd) UCL	447										
197																						
198						Suggested	UCL to Use															
199			95	% Adjusted C	Gamma UCL	320.2																
200																						
201				Red	commended	UCL exceed	s the maxim	um observat	ion													
202	2																					
203		Note: Sugge	stions regard	ding the selec	tion of a 95%	6 UCL are pr	ovided to he	lp the user to	o select the r	nost appropriate	e 95% UCI											
204			F	Recommenda	itions are bas	sed upon dat	ta size, data	distribution,	and skewne	SS.												
205		These reco	mmendation	s are based u	ipon the resu	Ilts of the sin	nulation stud	ies summari	zed in Singh	, Maichle, and L	.ee (2006).											
206	Ho	owever, simu	lations resul	ts will not cov	er all Real W	/orld data se	ts; for additic	onal insight t	he user may	want to consult	a statistici	an.										

	A	В	С	D	E	F	G	Н		J	K		L		
207															
208	Mercury														
209															
210						General	Statistics								
211			Total	Number of (Observations	8			Numbe	r of Distinct C	bservations	5	5		
212				Numb	er of Detects	5				Number of I	Non-Detects	3	3		
213			Ν	umber of Dis	tinct Detects	4			Numbe	er of Distinct I	Non-Detects	1	1		
214				Min	imum Detect	0.05				Minimum	Non-Detect	0	.01		
215				Max	imum Detect	4.25				Maximum	Non-Detect	0	.01		
216				Varia	ance Detects	3.32				Percent	Non-Detects	3	7.5%		
210				N	lean Detects	1.216					SD Detects	1	1.822		
21/ 210				Ме	dian Detects	0.12					CV Detects	1	1.498		
210				Skewr	ness Detects	1.619				Kurte	osis Detects	2	2.194		
219				Mean of Loo	ged Detects	-1.238				SD of Loa	ged Detects	2	2.068		
220											-				
221			Note: Sam	ple size is sn	nall (e.a., <1(), if data are collected using ISM approach, you should use									
222			guidance pr	ovided in ITF	RC Tech Reg	Guide on IS	M (ITRC 20)12) to comp	Jte statistice	of interest					
223			For		I may want to	a Guide on ISM (11 RC, 2012) to compute statistics of Interest.									
224			Chehvehev	UCL can be		sing the Nor			Ontions of P						
225			0.009300		. somputou u										
226					Nom		t on Detooto	Only							
227			c	haniro Wilk	Tost Statiatia				Shanira M						
228			E0/ 0			0.750		Detected D-		al at 5% Sia~	ificance Law				
229			5% 5			0.702		Delected Da				51			
230						0.320		atacted Det-			nificanas L -				
231			5			0.343				ମାସା ସା ୨୬୬ ଚାର୍ଡ୍ର	jiincance Le	vel			
232				Detected	Data appear	Approximate	s normal at :	o no significal	ICE LEVEI						
233			Vanter	Moles (IAA) C	Notiation	a Nama I C									
234			Kapian-	IVIEIEľ (KM) S			iucal values	and other N	onparametri						
235					KINI Mean	0.764			K	vi Standard E	rror of Mean		J.559		
236					KM SD	1.415			0.501 1-1-1	95% KM	I (BCA) UCL	N/	/A		
237				95%	6 KM (t) UCL	1.823			95% KM (F	Percentile Boo	otstrap) UCL	N/	/A		
238				95%	KM (z) UCL	1.683				95% KM Boo	otstrap t UCL	N/	/A		
239			9	90% KM Che	byshev UCL	2.441				95% KM Che	byshev UCL	3	3.201		
240			97	.5% KM Che	byshev UCL	4.256				99% KM Che	byshev UCL	6	5.327		
241					-	_									
242				C	Gamma GOF	Tests on De	tected Obse	ervations Only	у						
243				A-D	Test Statistic	0.523		A	nderson-Da	rling GOF Te	st	_			
244				5% A-D C	Critical Value	0.718	Detecte	ed data appea	ar Gamma D	istributed at 5	5% Significar	nce L	evel		
245				K-S	Test Statistic	0.326		I	Kolmogorov-	Smirnov GOF	=				
246				5% K-S (Critical Value	0.374	Detecte	ed data appea	ar Gamma D	istributed at 5	5% Significar	nce L	evel		
247				Detected	l data appeai	Gamma Dis	stributed at 5	% Significan	ce Level						
248															
249					Gamma	Statistics on	Detected D	ata Only							
250					k hat (MLE)	0.45			k	star (bias cor	rected MLE)	C	0.314		
251				The	eta hat (MLE)	2.699			Theta	star (bias cor	rected MLE)	3	3.879		
252				I	nu hat (MLE)	4.505	05 nu star (bias corrected)						3.135		
253				Me	ean (detects)	1.216									
254							1					1			
255				(Gamma ROS	Statistics us	sing Imputed	Non-Detects	5						
256			GROS may	not be used	l when data s	et has > 50%	% NDs with r	nany tied obs	servations at	multiple DLs					
257		GROS may	/ not be used	d when kstar	of detects is	small such a	is <1.0, espe	cially when t	he sample s	ize is small (e	e.g., <15-20)				
251	1	-	Fc	or such situat	ions, GROS	method may	yield incorre	ect values of	UCLs and B	TVs					
200	l			٦	This is espec	ially true whe	en the sampl	le size is sma	all.						
209		For gar	nma distribu	ted detected	data, BTVs a	and UCLs m	ay be compu	uted using ga	mma distribi	ution on KM e	estimates				
200					Minimum	0.01		3.3~			Mean	0).764		
261											ouri				

	A B C D E	F	G H I J K	L					
262	Maximum	4.25	Median	0.05					
263	SD	1.512	CV	1.98					
264	k hat (MLE)	0.308	k star (bias corrected MLE)	0.276					
265	Theta hat (MLE)	2.481	Theta star (bias corrected MLE)	2.77					
266	nu hat (MLE)	4.925	nu star (bias corrected)	4.411					
267	Adjusted Level of Significance (β)	0.0195							
268	Approximate Chi Square Value (4.41, α)	0.891	Adjusted Chi Square Value (4.41, β)	0.562					
269	95% Gamma Approximate UCL (use when n>=50)	3.783	95% Gamma Adjusted UCL (use when n<50)	5.996					
270									
271	Estimates of Ga	amma Paran	neters using KM Estimates						
272	Mean (KM)	0.764	SD (KM)	1.415					
273	Variance (KM)	2.001	SE of Mean (KM)	0.559					
274	k hat (KM)	0.292	k star (KM)	0.266					
275	nu hat (KM)	4.664	nu star (KM)	4.248					
276	theta hat (KM)	2.62	theta star (KM)	2.876					
277	80% gamma percentile (KM)	1.132	90% gamma percentile (KM)	2.281					
278	95% gamma percentile (KM)	3.63	99% gamma percentile (KM)	7.191					
279	<u>^</u>								
280		a kaplan-Me		0 5 1 0					
281	Approximate Chi Square Value (4.25, α)	0.822	Adjusted Chi Square Value (4.25, β)	0.513					
282	95% Gamma Approximate KM-UCL (use when n>=50)	3.946	95% Gamma Adjusted KM-UCL (use when n<50)	6.327					
283			An education of the second s						
284									
285	Shapiro Wilk Test Statistic	0.84	Snapiro Wilk GOF Test						
286	5% Snapiro Wilk Critical Value	0.762	Lillinger OOF Test	evei					
287		0.200	Lillerors GOF Test						
288	5% Emerors Childar Value	0.343	Detected Data appear Loynormal at 5% Significance Le	evei					
289									
290	Lognormal BOS	S Statistics I	Ising Imputed Non-Detects						
201		DS Statistics Using Imputed Non-Detects							
291	Mean in Original Scale	0 761	Mean in Log Scale	-3 368					
291	Mean in Original Scale SD in Original Scale	0.761	Mean in Log Scale	-3.368					
291 292 293	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of BOS data)	0.761 1.514 1.775	Mean in Log Scale SD in Log Scale 95% Percentile Bootstran UCL	-3.368 3.417 1.673					
291 292 293 294	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstran UCL	0.761 1.514 1.775 2.147	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL	-3.368 3.417 1.673 26.39					
291 292 293 294 295	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log BOS)	0.761 1.514 1.775 2.147 6348866	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL	-3.368 3.417 1.673 26.39					
291 292 293 294 295 296	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS)	0.761 1.514 1.775 2.147 6348866	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL	-3.368 3.417 1.673 26.39					
291 292 293 294 295 296 297	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of	0.761 1.514 1.775 2.147 6348866	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL	-3.368 3.417 1.673 26.39					
291 292 293 294 295 295 296 297 298	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged)	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution	-3.368 3.417 1.673 26.39					
291 292 293 294 295 296 297 298 299 299	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (loaged)	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log)	-3.368 3.417 1.673 26.39 0.082 6.674					
291 292 293 294 295 296 297 298 299 300	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM Standard Error of Mean (logged)	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log)	-3.368 3.417 1.673 26.39 0.082 6.674 226.3					
2991 292 293 294 295 296 297 298 299 300 301	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM SD (logged)	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log)	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674					
292 293 294 295 296 297 298 299 300 301 302 200	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged)	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19 0.866	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log)	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674					
293 292 293 294 295 296 297 298 299 300 301 302 303	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM SD (logged)	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19 0.866	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log)	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674					
293 293 294 295 296 297 298 299 300 301 302 303 304 295	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged)	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19 0.866 2.19 0.866	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log)	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674					
293 293 294 295 296 297 298 299 300 301 301 302 303 304 305 200	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM SD (logged)	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19 0.866 2.19 0.866	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log)	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674					
293 293 294 295 296 297 298 299 300 301 302 300 301 302 303 304 305 306	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged)	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.866	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) Mean in Log Scale	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674 226.3 6.674					
293 293 294 295 296 297 298 299 300 301 301 302 303 304 305 306 307 306	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) SD in Original Scale	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 0.866 0.86	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log)	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674 226.3 6.674 -2.76 2.619					
293 293 294 295 296 297 298 299 300 301 302 303 304 304 305 306 307 308	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) SD in Original Scale SD in Original Scale 95% t UCL (Assumes normality)	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.866 1.513 1.776	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% H-UCL (KM -LOG) 95% H-Stat UCL	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674 226.3 6.674 -2.76 2.619 4894					
293 293 294 295 295 296 297 298 299 300 301 300 301 302 303 304 305 306 307 308 309 210	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) SD in Original Scale SD in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 0.762 1.513 1.776 0.762 1.513 1.776	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% In Log Scale 95% H-Stat UCL ed for comparisons and historical reasons	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674 226.3 6.674 -2.76 2.619 4894					
293 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) SD in Original Scale SD in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 0.866 0.866 0.866 0.866 0.866 0.866 0.866 0.866 0.866 0.866 0.866 0.866 0.866 0.866 0.762 1.513 1.776 0.7762 1.573 1.776	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% In Log Scale SD in Log Scale 95% H-Stat UCL ed for comparisons and historical reasons	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674 226.3 6.674 -2.76 2.619 4894					
291 292 293 294 295 296 297 298 299 300 301 302 300 301 302 303 304 305 306 307 308 309 310 311	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) SD in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19 0.866 2.19 0.866 0.762 1.513 1.776 ethod, provide other constribut	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% In Log Scale 95% H-Stat UCL ed for comparisons and historical reasons	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674 226.3 6.674 -2.76 2.619 4894					
293 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) SD in Original Scale SD in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me Nonparame Detected Data appear Appro	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 0.762 1.513 1.776 0.7776 0.7776 0.776 0.776 0.776 0.776 0.7776 0.7776 0.776 0.776 0.776 0.776 0.776 0.776	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% H-Stat UCL ed for comparisons and historical reasons ion Free UCL Statistics nal Distributed at 5% Significance Level	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674 226.3 6.674 -2.76 2.619 4894					
293 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 311 312 313 314	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) UL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me Nonparame Detected Data appear Appro	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19 0.866 2.19 0.866 0.762 1.513 1.776 othod, provide othod, p	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% H-Stat UCL ed for comparisons and historical reasons ion Free UCL Statistics hal Distributed at 5% Significance Level	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674 226.3 6.674 -2.76 2.619 4894					
293 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) CL/2 Normal DL/2 Normal DL/2 Normal SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me Nonparame Detected Data appear Appro	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.762 1.513 1.776 othod, provide tric Distribut ximate Norm	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% H-Stat UCL ed for comparisons and historical reasons ion Free UCL Statistics nal Distributed at 5% Significance Level UCL to Use	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674 226.3 6.674 -2.76 2.619 4894					
293 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315	Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates of KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) CL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me Detected Data appear Appro	0.761 1.514 1.775 2.147 6348866 on Logged D -2.501 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.866 2.19 0.866 0.762 1.513 1.776 othod, provide tric Distribut ximate Norm Suggested 1.823	Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% H-UCL (KM -Log)<	-3.368 3.417 1.673 26.39 0.082 6.674 226.3 6.674 226.3 6.674 -2.76 2.619 4894					

	A		В	C	D	E	F	G	Н	I	J	K	L	
317														
318				When a o	data set follo	ws an approx	ximate (e.g.,	normal) distr	ribution pass	ing one of th	e GOF test			
319	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL													
320														
321		Not	te: Sugge	stions regard	ding the sele	ction of a 95°	% UCL are p	rovided to he	elp the user to	o select the r	nost appropr	iate 95% U	ICL.	
322	Recommendations are based upon data size, data distribution, and skewness.													
323	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).													
324		However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												

	A	В	С	D	E	F	G	Н		J	K		L		
325															
326	Silver														
327															
<u>32</u> 8						General	Statistics					_			
329			Total	Number of (Observations	8			Numbe	r of Distinct C	bservations	5	5		
330				Numb	er of Detects	5				Number of I	Non-Detects	3	3		
331			N	umber of Dis	tinct Detects	4			Numb	er of Distinct I	Non-Detects	1	1		
332				Min	imum Detect	0.2				Minimum	Non-Detect	C).1		
333				Max	imum Detec	3				Maximum	Non-Detect	C).1		
334				Varia	ance Detects	1.503				Percent I	Non-Detects	3	7.5%		
225				Ν	lean Detects	1.04					SD Detects	1	1.226		
225				Ме	dian Detects	0.3					CV Detects	1	1.179		
227				Skewr	ness Detects	1.365				Kurt	osis Detects	C	0.908		
337 220				Mean of Loo	gged Detects	-0.584				SD of Log	ged Detects	1	1.255		
<u>აა</u> გ						<u> </u>									
339			Note: Sam	ple size is sn	nall (e.a., <1)	0), if data are	collected us	sing ISM app	roach. vou s	hould use					
340			quidance pr	ovided in ITF	RC Tech Rec	Guide on IS	M (ITRC. 20)12) to comp	ute statistics	of interest.					
341			For		I may want t	to use Chebyshev UCL to estimate FPC (ITRC 2012)									
342			Chehvehev	UCI can be		ising the Nor			Options of P	roUCL 5.1					
343			0.00901101		- somputou t		-parametric								
344					Nor	nal COF Too	t on Detecto	Only							
345			c	haniro Wilk	Test Statistic	0 797			Shaniro Mi						
346			د ۲۵/ ۵	haniro Wilk		0.707		atactad Data			nificance La	امر			
347			570 5			0.702						vei			
348						0.327	<u> </u>	atactad Data			nificanas L -	vol			
349			5			0.343				inai al 3% SIG	jiincance Le	vel			
350				De	alected Data	appear Nom	iai at 5% SlQ	ji ilicance Le	VEI						
351			Vanlar	Moles (IAA) C	Notiotics	A Name 10									
352			Kapian-	IVIEIEľ (KM) S		ig inormal Ci	nucal values	and other N	onparametri				1 207		
353					KM Mear	0.688			KI	vi Standard E	rror of Mean		J.38/		
354					KM SD	0.979			0=0	95% KM	I (BCA) UCL	N/	/A		
355				95%	6 KM (t) UCL	1.421			95% KM (F	Percentile Boo	otstrap) UCL	N/	/A		
356				95%	KM (z) UCL	1.324				95% KM Boo	otstrap t UCL	N/	/A		
357			9	90% KM Che	byshev UCL	1.849				95% KM Che	byshev UCL	2	2.374		
358			97	.5% KM Che	byshev UCL	. 3.104				99% KM Che	byshev UCL	4	1.538		
359															
360				C	Gamma GOF	Tests on De	etected Obse	ervations Only	у						
361				A-D	Test Statistic	0.555		A	nderson-Da	rling GOF Te	st				
362				5% A-D (Critical Value	0.693	Detecte	ed data appea	ar Gamma D	istributed at 5	5% Significar	nce L	evel		
363				K-S	Test Statistic	0.334		I	Kolmogorov-	Smirnov GOF	=	_			
364				5% K-S (Critical Value	0.365	Detecte	ed data appea	ar Gamma D	istributed at 5	5% Significar	nce L	evel		
365				Detected	l data appea	r Gamma Dis	stributed at 5	5% Significan	ce Level						
366															
367					Gamma	Statistics or	Detected D	ata Only							
368					k hat (MLE)	0.934			k	star (bias cor	rected MLE)	C	0.507		
369				The	eta hat (MLE)	1.113			Theta	star (bias cor	rected MLE)	2	2.051		
370				I	nu hat (MLE)	9.341	41 nu star (bias corrected)						5.07		
371				Me	ean (detects)	1.04									
372						1	1					1			
372				(Gamma ROS	Statistics us	sing Imputed	Non-Detects	S						
374			GROS may	not be used	I when data	set has > 509	% NDs with r	many tied obs	servations at	multiple DLs					
375		GROS may	y not be used	d when kstar	of detects is	small such a	as <1.0, espe	ecially when t	the sample s	ize is small (e	e.g., <15-20)				
376			Fc	or such situat	ions, GROS	method may	yield incorre	ect values of	UCLs and B	TVs					
370				٦	This is espec	ially true whe	en the samp	le size is sma	all.						
3// 270		For gar	nma distribu	ted detected	data, BTVs	and UCLs m	ay be compl	uted using ga	mma distrib	ution on KM e	estimates				
3/8 272					Minimum	0.01		3.34			Mean	0).654		
3/9	1					2.21					ouri	`			

	A B C D E	F	G	H				J	K	L	
380	Maximum	3							Median	0.2	
381	SD	1.069							CV	1.635	
382	k hat (MLE)	0.396					k star	(bias c	orrected MLE)	0.331	
383	Theta hat (MLE)	1.653				The	ta star	(bias c	orrected MLE)	1.978	
384	nu hat (MLE)	6.328					n	u star (b	ias corrected)	5.289	
385	Adjusted Level of Significance (β)	0.0195									
386	Approximate Chi Square Value (5.29, α)	1.288			A	djusted	l Chi S	Square \	/alue (5.29, β)	0.858	
387	95% Gamma Approximate UCL (use when n>=50)	2.685		95%	Gam	ma Adji	usted	UCL (us	e when n<50)	4.031	
388											
389	Estimates of Ga	amma Paran	neters using	KM Estim	ates						
390	Mean (KM)	0.688							SD (KM)	0.979	
391	Variance (KM)	0.959						SE	of Mean (KM)	0.387	
392	k hat (KM)	0.493							k star (KM)	0.392	
393	nu hat (KM)	7.889							nu star (KM)	6.264	
394	theta hat (KM)	1.394						t	neta star (KM)	1.756	
395	80% gamma percentile (KM)	1.107				9	0% ga	amma p	ercentile (KM)	1.949	
396	95% gamma percentile (KM)	2.878				9	9% ga	amma p	ercentile (KM)	5.218	
397			1								
398	Gamm	a Kaplan-Me	eier (KM) Sta	atistics							
399	Approximate Chi Square Value (6.26, α)	1.776			A	djusted	l Chi S	Square \	/alue (6.26, β)	1.239	
400	95% Gamma Approximate KM-UCL (use when n>=50)	2.424		95% Gan	nma A	Adjuste	d KM-	UCL (us	e when n<50)	3.477	
401			I								
402	Lognormal GO	F Test on De	etected Obse	ervations (Only						
403	Shapiro Wilk Test Statistic	0.83			S	hapiro V	Wilk G	iOF Tes	t		
404	5% Shapiro Wilk Critical Value	0.762	Det	ected Data	a app	ear Log	gnorma	al at 5%	Significance L	evel	
405	Lilliefors Test Statistic	0.289				Lilliefo	rs GO	F Test			
406	5% Lilliefors Critical Value	0.343	Det	ected Data	a app	ear Log	gnorma	al at 5%	Significance I	evel	
407	Detected Data ap	pear Lognor	rmal at 5% Significance Level								
408											
409	Lognormal ROS	S Statistics U	Jsing Impute	d Non-De	tects						
410	Mean in Original Scale	0.658						Mea	n in Log Scale	-1.872	
411	SD in Original Scale	1.066						SI) in Log Scale	2.067	
412	95% t UCL (assumes normality of ROS data)	1.372				959	% Per	centile E	Bootstrap UCL	1.255	
413	95% BCA Bootstrap UCL	1.555						95% Bo	ootstrap t UCL	5.759	
414	95% H-UCL (Log ROS)	182.6									
415			1								
416	Statistics using KM estimates of	on Logged Da	ata and Ass	uming Log	norm	al Distr	ibutior	า			
417	KM Mean (logged)	-1.228						ł	KM Geo Mean	0.293	
418	KM SD (logged)	1.216				959	% Criti	cal H V	alue (KM-Log)	3.979	
419	KM Standard Error of Mean (logged)	0.481					9	5% H-L	ICL (KM -Log)	3.822	
420	KM SD (logged)	1.216				959	% Criti	cal H V	alue (KM-Log)	3.979	
421	KM Standard Error of Mean (logged)	0.481									
422											
423		DL/2 St	tatistics								
424	DL/2 Normal				D	L/2 Log	g-Tran	sformed	1		
425	Mean in Original Scale	0.669						Mea	n in Log Scale	-1.488	
426	SD in Original Scale	1.059						SI) in Log Scale	1.568	
427	95% t UCL (Assumes normality)	1.378						95	% H-Stat UCL	14.3	
428	DL/2 is not a recommended me	thod, provid	ed for compa	arisons an	nd hist	orical r	eason	s			
429											
430	Nonparame	tric Distribut	ion Free UC	L Statistic	s						
431	Detected Data appear	r Normal Dis	tributed at 59	% Signific	ance	Level					
432											
433		Suggested	UCL to Use								
434	95% KM (t) UCL	1.421	.421								

	A	В	C	D	E	F	G	H		J	K	L		
435														
436	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.													
437	Recommendations are based upon data size, data distribution, and skewness.													
438	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).													
439	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.													

	A	В	С	D	E	F	G	Н		J	K	L		
440														
441	Zinc													
442														
443						General	Statistics							
444			Total	Number of C	Observations	8			Numbe	er of Distinct (Observations	8		
445				Numb	er of Detects	7				Number of	Non-Detects	1		
446			N	umber of Dis	tinct Detects	7			Numb	er of Distinct	Non-Detects	1		
447				Min	imum Detect	2.1				Minimum	Non-Detect	1		
448				Max	imum Detect	445				Maximum	Non-Detect	1		
449				Varia	ance Detects	27445				Percent	Non-Detects	12.5%		
450				N	lean Detects	91.67					SD Detects	165.7		
451				Me	dian Detects	14.4					CV Detects	1.807		
452				Skewr	ness Detects	2.124				Kurl	osis Detects	4.427		
453				Mean of Log	ged Detects	2.769				SD of Log	ged Detects	2.113		
454						I	1							
455			Note: Sam	ple size is sm	nall (e.g., <10	0), if data are collected using ISM approach, you should use								
456			guidance pr	ovided in ITF	C Tech Reg	eg Guide on ISM (ITRC, 2012) to compute statistics of interest.								
457			For	example, you	ı may want to	o use Cheby	shev UCL to	estimate EP	C (ITRC, 20	12).				
458			Chebyshev	VUCL can be	computed u	sing the Nor	parametric a	and All UCL (Options of P	roUCL 5.1				
459														
460					Norm	nal GOF Tes	t on Detects	Only						
461			S	Shapiro Wilk	Fest Statistic	0.642			Shapiro W	ilk GOF Test				
462			5% S	hapiro Wilk C	Critical Value	0.803		Detected Dat	ta Not Norm	al at 5% Sigr	ificance Leve	el		
462				Lilliefors	Fest Statistic	0.389			Lilliefors	GOF Test				
464			5	5% Lilliefors C	Critical Value	0.304		Detected Dat	ta Not Norm	al at 5% Sigr	ificance Leve	el		
465				C	etected Data	a Not Norma	at 5% Signi	ificance Leve						
405														
400			Kaplan-	Meier (KM) S	Statistics usin	g Normal Cr	itical Values	and other No	onparametri	c UCLs				
407					KM Mean	80.34			K	M Standard E	Fror of Mean	55.97		
400					KM SD	146.6				95% KN	I (BCA) UCL	172.9		
409				95%	5 KM (t) UCL	186.4			95% KM (F	Percentile Bo	otstrap) UCL	171.7		
470				95%	KM (z) UCL	172.4				95% KM Boo	otstrap t UCL	1798		
471			ļ	90% KM Che	byshev UCL	248.3				95% KM Che	byshev UCL	324.3		
472			97	7.5% KM Che	byshev UCL	429.9				99% KM Che	byshev UCL	637.3		
473														
474				G	amma GOF	Tests on De	tected Obse	ervations Only	v					
475				A-D	Fest Statistic	0.641		A	, nderson-Da	rling GOF Te	st			
470				5% A-D C	Critical Value	0.771	Detecte	d data appea	ar Gamma D) istributed at	5% Significar	nce Level		
477				K-S	Fest Statistic	0.314		···	Kolmogorov-	-Smirnov GO	F			
478				5% K-S (Critical Value	0.332	Detecte	d data appea	ar Gamma D	Distributed at	5% Significar	nce Level		
479				Detected	data appear	Gamma Dis	tributed at 5	% Significan	ce Level		J			
480														
481					Gamma	Statistics on	Detected D	ata Onlv						
482					k hat (MLF)	0.379		,	k	star (bias co	rected MLE)	0.312		
483				The	ta hat (MLE)	241.6			Theta	star (bias co	rected MLE)	293.8		
484				r	nu hat (MLE)	5 311				nu star (biz	as corrected)	4 368		
485				Me	an (detects)	ects) 91.67								
486														
487					amma POS	Statistice us	ing Imputed	Non-Detecto						
488			GROS mor		when data a	$\frac{1}{10000000000000000000000000000000000$	50% NDs with many tied observations at multiple DLs							
489		GROS may		d when keter	of detects is	small such o					, a. <15.201			
490		GROS Hay			ione CPOC	mothod may				אבר וא אוומוו (י דו\פ	o.y., >10-20)			
491			FC	such situat ית	his is sere	interrior may				0175				
492		Fa	nno distuit	+od data - + - '	dete DTV		en une sampl	e size is sma	III.	ution on 1/14	otimate -			
493		⊢or gar	nma distribu	ted detected	data, BIVs a	and UCLs ma	ay be compu	ited using ga	mma distrib	ution on KM e	estimates	00.01		
494					Minimum	0.01					Mean	80.21		

	A B C D E	F	G	H			J	K	L
495	Maximum	445						Median	8.8
496	SD	156.8						CV	1.954
497	k hat (MLE)	0.276				k star (t	pias corre	cted MLE)	0.256
498	Theta hat (MLE)	291.1			Thet	a star (t	pias corre	cted MLE)	313.9
499	nu hat (MLE)	4.408				nu s	star (bias	corrected)	4.089
500	Adjusted Level of Significance (β)	0.0195							
501	Approximate Chi Square Value (4.09, α)	0.757			Adjusted	Chi Sq	uare Valu	ie (4.09, β)	0.467
502	95% Gamma Approximate UCL (use when n>=50)	433.2		95% Ga	ımma Adjı	usted U0	CL (use w	/hen n<50)	702.7
503									
504	Estimates of G	iamma Parar	neters using	KM Estimate	es				
505	Mean (KM)	80.34						SD (KM)	146.6
506	Variance (KM)	21483					SE of N	Mean (KM)	55.97
507	k hat (KM)	0.3					k	star (KM)	0.271
508	nu hat (KM)	4.807					nu	ı star (KM)	4.338
509	theta hat (KM)	267.4					theta	a star (KM)	296.3
510	80% gamma percentile (KM)	119.8			9	0% gan	nma perce	entile (KM)	239.5
511	95% gamma percentile (KM)	M) 379.4 99% gamma percentile (KM							/4/./
512									
513	Gamn	na Kaplan-Me	eler (KM) Sta	atistics	A	01:0		- (4.0.4	0.500
514	Approximate Chi Square Value (4.34, α)	0.859			Adjusted	Chi Sq	uare Valu	ie (4.34, β)	0.539
515	95% Gamma Approximate KM-UCL (use when n>=50)	405.5		95% Gamm	a Adjusted	1 KM-U	CL (use w	/hen n<50)	646
516									
517				ervations Oni	y Ohanim N				
518	Shapiro Wilk Test Statistic	0.879	Det		Snapiro				1
519	5% Shapiro Wilk Critical Value	0.803	Det	ected Data a	ppear Log	normal	at 5% Sig	Inificance L	evel
520		0.205	Det		LIIIETO	SGOF	I est		1
521	5% Lilletors Critical Value	0.304	Det		ppear Log	normai	at 5% Sig	Inificance L	evei
522	Detected Data ap	pear Lognor	mai at 5% 5	ignilicance L	evei				
523	L canormal PO	S Statiation I	loing Impute	d Non Dotoo	to				
524	Logioinial RO				15		Moon in		2 121
525	SD in Original Scale	156.8							2.121
526	95% + LICL (accurace normality of POS data)	195.0			050	/ Dorco	ntilo Boot		175.6
527	95% BCA Bootetran LICL	226.4			307		5% Boots		175.0
528	95% H-UCL (Log BOS)	1096022				5	5 /6 DOUS	and tool	1772
529	33 % H-OCE (LOG NOS)	1030022							
530	Statistics using KM estimates	on Logged D	ata and Ass	umina Loano	rmal Distri	bution			
531	KM Mean (logged)	2 423				bullon	KM	Geo Mean	11 28
532	KM SD (logged)	2.120			959	6 Critics		(KM-I og)	6 266
533	KM Standard Error of Mean (logged)	0.781				959		(KM -L og)	11647
534	KM SD (loaned)	2.046			95%	6 Critics	al H Value	(KM-Log)	6.266
535	KM Standard Frror of Mean (logged)	0.781			507			209)	5.200
536									
537		DL/2 S	tatistics						
538	DL/2 Normal	2220			DL/2 Log	-Transf	ormed		
539	Mean in Original Scale	80.28				,	Mean in	Log Scale	2.336
540	SD in Original Scale	156.7	7 SD in Log Scale						2.308
541	95% t UCL (Assumes normality)	185.3					95% H	I-Stat UCL	67066
542	DL/2 is not a recommended me	ethod. provid	ed for comp	arisons and h	nistorical re	easons			
543		., F							
544	Nonbarame	etric Distribut	tion Free UC	L Statistics					
545	Detected Data appea	r Gamma Dis	stributed at 5	% Significan	ce Level				
546	2 4 appou								
54/		Suggested	UCL to Use						
548	95% KM Bootstran t UCI	1798	Adjusted K	M-UCL (use	when k<=	1 and 1	5 < n < 50) but k<=1)	646
549	· · · · · · · · · · · · · · · · · · ·		,	(- ,	-

	A	В	С	D	E	F	G	Н		J	K	L		
550														
551	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.													
552		Recommendations are based upon data size, data distribution, and skewness.												
553		These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
554	Hc	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												
555														

	A B C D E F G H I J K L UCL Statistics for Data Sets with Non-Detects													
1					UCL Statis	tics for Data	Sets with N	on-Detects						
2														
3		User Selec	cted Options											
4	Date	e/Time of Co	omputation	ProUCL 5.1	20/12/2019 1	0:21:03 AM								
5			From File	NAGD_revC	_j.xls									
6		Ful	I Precision	OFF										
7		Confidence	Coefficient	95%										
8	Number o	f Bootstrap (Operations	2000										
9														
10	a Acenaphthene													
11														
12						General	Statistics							
13			Total	Number of C	bservations	8			Number	of Distinct C	Observations	5		
14				Numbe	er of Detects	1				Number of	Non-Detects	7		
15			N	umber of Dist	inct Detects	1			Numbe	r of Distinct	Non-Detects	4		
16														
17	v	Varning: On	ly one distin	ct data value	was detect	ed! ProUCL	(or any other	r software) s	hould not be	e used on su	ch a data set	!		
18	It is sugge	ested to use	alternative s	ite specific v	alues deteri	mined by the	Project Tea	m to estimat	te environme	ental parame	eters (e.g., El	PC, BTV).		
19														
20				The d	ata set for v	ariable Acer	naphthene wa	as not proce	essed!					
21														

	A	В	С	D	E	F	G	Н	I	J	K	L	
22	A												
23	Acenaphth	yiene											
24						0 1 1	04-41-11						
25			- - · ·	No.	Maran 11	General	Statistics				Nessa	_	
26			l otal	Number of C	voservations	8			Numb	er of Distinct C	Deservations	5	
27				Numbe	er of Detects	<u>კ</u>			KI -	Number of	Non-Detects	5	
28			N	umber of Dist	inct Detects	3			Num	ber of Distinct	Non-Detects	2	
29				Mini	mum Detect	0.105				Minimum	Non-Detect	0.004	
30				Maxi	mum Detect	0.192				Maximum	Non-Detect	0.005	
31				Varia	nce Detects	0.00215				Percent	Non-Detects	62.5%	
32				M	ean Detects	0.158					SD Detects	0.0464	
33				Med	an Detects	0.176					CV Detects	0.293	
34				Skewn	ess Detects	-1.505				Kurt	osis Detects	N/A	
35				Mean of Log	ged Detects	-1.8/8				SD of Log	ged Detects	0.326	
36) M/a D								
37				••••••••	warning: D	ata set nas	only 3 Deter	cted values.					
38			11	nis is not end	bugn to comp	bute meaning	gtul or rellar	DIE STATISTICS	and estima	ites.			
39	39												
40	40 Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
41	41 Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
42	42 guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
43				VICL con bo	a may want u	o use Cheby			Ontiona d	2012).			
44			Chebyshev	OCL Can be	e computed t	Ising the No	nparameuro			DI PIOUCE 5.1			
45					Norm		t on Dotoot	Only					
46			9	haniro Wilk T	Act Statistic			SOIIIy	Shaniro V	Vilk GOE Test			
47			5% SI		ritical Value	0.002		atacted Data	appear No	rmal at 5% Sic	nificanco I o		
48			576 51			0.707	U			e GOE Teet		vei	
49			5		ritical Value	0.321	П	atacted Data	annear No	rmal at 5% Sic	nificance Le		
50			5		tected Data	o.420	nal at 5% Si						
51				De		арреантонн							
52			Kanlan-	Meier (KM) S	Statistics usi	ng Normal C	ritical Value	s and other	Nonnaram	etric UCI s			
53			Rapian		KM Mean	0.0618				M Standard F	rror of Mean	0.0338	
54					KM SD	0.0781			· · ·	95% KM		N/A	
55				95%	KM (t) UCI	0.126			95% KM (Percentile Bo	otstran) UCI	N/A	
56				95%	KM (z) UCI	0.117				95% KM Boo	otstrap t UCI	N/A	
57			ç	0% KM Chel	byshev UCL	0.163				95% KM Che	byshev UCL	0.209	
58			97	.5% KM Chel	byshev UCL	0.273				99% KM Che	byshev UCL	0.398	
59					,						,		
60				G	amma GOF	Tests on De	etected Obs	ervations Or	ly				
61					Not En	ough Data to	Perform G	OF Test					
62						•							
64					Gamma	Statistics or	Detected	Data Only					
64 65					k hat (MLE)	15.28			ł	star (bias cor	rected MLE)	N/A	
60				The	ta hat (MLE)	0.0103			Theta	a star (bias cor	rected MLE)	N/A	
00				n	u hat (MLE)	91.68				nu star (bia	is corrected)	N/A	
69	1			Ме	an (detects)	0.158				•	,		
60				-	. /								
70				G	amma ROS	Statistics us	sing Impute	d Non-Detec	ts				
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs													
70	1	GROS may	y not be used	when kstar o	of detects is	small such a	s <1.0, espe	cially when t	he sample	size is small (e	e.g., <15-20)		
ו /2 די			Fo	r such situati	ons, GROS I	method may	yield incorre	ect values of	UCLs and I	BTVs	- /		
73 77				Т	his is especi	ally true whe	n the sampl	e size is sma	III.				
74 75		For gar	mma distribut	ed detected	data, BTVs a	nd UCLs ma	y be compu	ted using gar	mma distrib	ution on KM e	stimates		
70 76					Minimum	0.01					Mean	0.0755	
10	J												

	A B C D E	F	G H I J K	L							
77	Maximum	0.192	Median	0.0466							
78	SD	0.0745	CV	0.987							
79	k hat (MLE)	1.022	k star (bias corrected MLE)	0.722							
80	Theta hat (MLE)	0.0739	Theta star (bias corrected MLE)	0.105							
81	nu hat (MLE)	16.35	nu star (bias corrected)	11.55							
82	Adjusted Level of Significance (β)	0.0195									
83	Approximate Chi Square Value (11.55, α)	4.934	Adjusted Chi Square Value (11.55, β)	3.898							
84	95% Gamma Approximate UCL (use when n>=50)	0.177	95% Gamma Adjusted UCL (use when n<50)	N/A							
85											
86	Estimates of G	amma Parai	meters using KM Estimates								
87	Mean (KM)	0.0618	SD (KM)	0.0781							
88	Variance (KM)	0.0061	SE of Mean (KM)	0.0338							
89	k hat (KM)	0.626	k star (KM)	0.474							
90	nu hat (KM)	10.01	nu star (KM)	7.589							
91	theta hat (KM)	0.0987	theta star (KM)	0.13							
92	80% gamma percentile (KM)	0.101	90% gamma percentile (KM)	0.169							
93	95% gamma percentile (KM)	0.242	99% gamma percentile (KM)	0.422							
94		12 1 14									
95	Gamm	a Kaplan-Me	eler (KM) Statistics	1.005							
96	Approximate Chi Square Value (7.59, α)	2.499	Adjusted Chi Square Value (7.59, β)	1.825							
97	95% Gamma Approximate KM-UCL (use when n>=50)	0.188	95% Gamma Adjusted KM-UCL (use when h<50)	0.257							
98		E Toot on D	stastad Observations Only								
99	Lognormal GU		Shapira Wilk COE Test								
100	Shapiro Wilk Test Statistic	0.800	Shapiro Wilk GOF Test								
101	5% Shapiro Wilk Chucal Value	0.707	Lilliofore COE Test	vei							
102		0.337	Lilieors GOF Test								
103	5% Linelois Childal Value	0.425	Detected Data appear Lognormal at 5% Significance Lev	vei							
104		ipear Lugrio									
105	Lognormal BOS	S Statistics I	Ising Imputed Non-Detects								
106	Mean in Original Scale	0.0915	Mean in Log Scale	-2 583							
107	SD in Original Scale	0.0617	SD in Log Scale	0.659							
108	95% t UCL (assumes normality of ROS data)	0.133	95% Percentile Bootstrap UCL	0.128							
109	95% BCA Bootstrap UCL	0.133	95% Bootstrap t UCL	0.171							
110	95% H-UCL (Log ROS)	0.182									
111) 0.102									
112	Statistics using KM estimates	on Logged [Data and Assuming Lognormal Distribution								
113	KM Mean (logged)	-4.155	KM Geo Mean	0.0157							
114	KM SD (logged)	1.771	95% Critical H Value (KM-Log)	5.492							
110	KM Standard Error of Mean (logged)	0.767	95% H-UCL (KM -Log)	2.977							
117	KM SD (logged)	1.771	95% Critical H Value (KM-Log)	5.492							
110	KM Standard Error of Mean (logged)	0.767									
110											
120		DL/2 St	atistics								
121	DL/2 Normal		DL/2 Log-Transformed								
122	Mean in Original Scale	0.0606	Mean in Log Scale	-4.56							
123	SD in Original Scale	0.0844	SD in Log Scale	2.229							
124	95% t UCL (Assumes normality)	0.117	95% H-Stat UCL	38.23							
125	DL/2 is not a recommended me	ethod, provid	ded for comparisons and historical reasons								
126											
127	Nonparame	tric Distribu	tion Free UCL Statistics								
128	Detected Data appea	r Normal Dis	stributed at 5% Significance Level								
129											
130		Suggested	UCL to Use								
131	95% KM (t) UCL	0.126									

	A	В	С	D	E	F	G	H		J	K	L	
132													
133	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
134		Recommendations are based upon data size, data distribution, and skewness.											
135	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
136	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												

	A	В	С	D	E	F	G	Н		J	K	L					
137	A																
138	Anthracene	•															
139						General	Statiation										
140			Toto	Number of (hearvations	seneral s	GIAUSUCS		Numbo	ar of Distinct (hearvations	Б					
141			iota	Numb	er of Detecte	3			NUTIDE	Number of	Non-Detecte	5					
142			N	umber of Dis	tinct Detects	3			Numb	er of Distinct	Non-Detects	2					
143			1	Min	imum Detect	0.101			. tamb	Minimum	Non-Detect	0.004					
144				Max	imum Detect	0.11				Maximum	Non-Detect	0.005					
145				Varia	ance Detects	2.3268E-5				Percent	Non-Detects	62.5%					
140				N	lean Detects	0.107					SD Detects	0.00482					
147				Me	dian Detects	0.109					CV Detects	0.0451					
149				Skewr	ness Detects	-1.506				Kurt	osis Detects	N/A					
150				Mean of Log	ged Detects	-2.236				SD of Log	ged Detects	0.0457					
151						1											
152					Warning: D	ata set has	only 3 Detec	cted Values.									
153			Т	his is not en	ough to com	pute meaning	gful or reliat	ole statistics	and estimat	tes.							
154																	
155																	
156			Note: Sam	ple size is si	mall (e.g., <1	0), if data ar		using ISM ap	proach, yo	u should use							
157			guidance pi		RC Tech Reg	g Guide on IS	SM (ITRC, 2	2012) to com	pute statisti	cs of interest	•						
158			Chobyobo	example, yo		o use Cheby	snev UCL t		Ontions of	2012). EBrollCL 5.1							
159	Chebysnev OCL can be computed using the Nonparametric and All OCL Options of ProOCL 5. I																
160	Normal GOF Test on Detects Only																
161			ę	Shapiro Wilk	Test Statistic	0.881	t on Deleca	, only	Shapiro W	/ilk GOF Test							
162			5% S	hapiro Wilk (Critical Value	0.767	D	etected Data	appear Nor	mal at 5% Sic	inificance Le	vel					
163				Lilliefors	Test Statistic	0.321			Lilliefors								
165			5	5% Lilliefors C	Critical Value	0.425	D	etected Data	appear Nor	mal at 5% Sig	Inificance Le	vel					
166				De	tected Data	appear Norn	nal at 5% Si	al at 5% Significance Level									
167																	
168			Kaplan-	Meier (KM)	Statistics usi	ng Normal C	ritical Value	tical Values and other Nonparametric UCLs									
169					KM Mean	0.0426			K	M Standard E	rror of Mean	0.0216					
170					KM SD	0.0499				95% KM	I (BCA) UCL	N/A					
171				95%	5 KM (t) UCL	0.0835			95% KM (F	Percentile Boo	otstrap) UCL	N/A					
172				95%	KM (z) UCL	0.0781				95% KM Boo	tstrap t UCL	N/A					
173			1	90% KM Che	byshev UCL	0.107				95% KM Che	byshev UCL	0.137					
174			97	7.5% KM Che	byshev UCL	0.177				99% KM Che	byshev UCL	0.257					
175						Tests on De			b .								
176					Not En	Tests on De		OF Test	iy								
177					NOL EI		Periorin G	OFTESL									
178					Gamma	Statistics or	Detected [)ata Only									
179					k hat (MLF)	725.2			k	star (bias cor	rected MLE)	N/A					
180				The	ta hat (MLE)	1.4741E-4			Theta	star (bias cor	rected MLE)	N/A					
181				1	nu hat (MLE)	4351	nu star (bias corrected)										
102				Me	ean (detects)	0.107				(
103					. 7	1											
185				(Gamma ROS	Statistics u	sing Impute	d Non-Detec	ts								
186			GROS may	/ not be used	when data s	et has > 50%	NDs with n	nany tied obs	ervations at	t multiple DLs							
187		GROS mag	y not be used	d when kstar	of detects is	small such a	s <1.0, espe	cially when th	ne sample s	ize is small (e	e.g., <15-20)						
188			Fo	or such situat	ions, GROS	method may	yield incorre	ect values of l	JCLs and B	STVs							
189				7	This is especi	ially true whe	n the sampl	e size is sma	II.								
190		For ga	mma distribu	ted detected	data, BTVs a	and UCLs ma	y be compu	ted using gar	nma distribu	ution on KM e	stimates						
191					Minimum	0.0832					Mean	0.0965					

	A B C D E	F	G H I J K	L						
192	Maximum	0.11	Median	0.0943						
193	SD	0.00973	CV	0.101						
194	k hat (MLE)	113.6	k star (bias corrected MLE)	71.06						
195	Theta hat (MLE)	8.4950E-4	Theta star (bias corrected MLE)	0.00136						
196	nu hat (MLE)	1817	nu star (bias corrected)	1137						
197	Adjusted Level of Significance (β)	0.0195								
198	Approximate Chi Square Value (N/A, α)	1060	Adjusted Chi Square Value (N/A, β)	1041						
199	95% Gamma Approximate UCL (use when n>=50)	0.104	95% Gamma Adjusted UCL (use when n<50)	N/A						
200										
201	Estimates of G	iamma Para	meters using KM Estimates	0.0400						
202	Mean (KM)	0.0426	SD (KM)	0.0499						
203	variance (KM)	0.00249	SE OI Mean (KM)	0.0210						
204	K Hat (KW)	0.729	nu stor (KM)	0.559 8.625						
205	theta hat (KM)	0.0584	theta star (KM)	0.023						
206	80% gamma percentile (KM)	0.0304	90% gamma percentile (KM)	0.073						
207	95% gamma percentile (KM)	0 159	99% gamma percentile (KM)	0.271						
208		0.100		0.271						
209	Gamm	na Kaplan-M								
210	Approximate Chi Square Value (8.62, α)	3.102	Adjusted Chi Square Value (8.62, β)	2.327						
211	95% Gamma Approximate KM-UCL (use when n>=50)	0.118	95% Gamma Adjusted KM-UCL (use when n<50)	0.158						
212										
213	Lognormal GC	OF Test on D	etected Observations Only							
215	Shapiro Wilk Test Statistic	0.877	Shapiro Wilk GOF Test							
216	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Le	evel						
217	Lilliefors Test Statistic	0.324	Lilliefors GOF Test							
218	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Le	evel						
219	Detected Data a	opear Logno	rmal at 5% Significance Level							
220										
221	Lognormal RO	S Statistics	s Using Imputed Non-Detects							
222	Mean in Original Scale	0.097	Mean in Log Scale	-2.337						
223	SD in Original Scale	0.0092	SD in Log Scale	0.0939						
224	95% t UCL (assumes normality of ROS data)	0.103	95% Percentile Bootstrap UCL	0.102						
225	95% BCA Bootstrap UCL	0.103	95% Bootstrap t UCL	0.105						
226	95% H-UCL (Log ROS)	N/A								
227										
228	Statistics using KM estimates			0.0127						
229	Kivi Mean (logged)	-4.29	KM Geo Mean	0.0137						
230	KM Standard Error of Moon (logged)	1.59		4.989						
231	Kivi Stanuaru Error or Mean (logged)	1 50	95% Critical H Value (KM Loo)	0.975 <u>4</u> 080						
232	KM Standard Error of Mean (logged)	0.689	3576 Childai 11 Value (KW-LOg)	4.303						
233		0.000								
234		DL/2 S	tatistics							
235	DL/2 Normal		DL/2 Log-Transformed							
236	Mean in Original Scale	0.0414	Mean in Log Scale	-4.695						
231 220	SD in Original Scale	0.0543	SD in Log Scale	2.037						
230 220	95% t UCL (Assumes normality)	0.0778	95% H-Stat UCL	8.898						
239 240	DL/2 is not a recommended m	ethod, provi	ded for comparisons and historical reasons							
240 241		-								
242	Nonparame	etric Distribu	tion Free UCL Statistics							
243	Detected Data appea	ar Normal Dis	stributed at 5% Significance Level							
244										
245		Suggested	UCL to Use							
246	95% KM (t) UCL	0.0835								

	A	В	С	D	E	F	G	Н		J	K	L	
247													
248	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
249		Recommendations are based upon data size, data distribution, and skewness.											
250	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
251	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												

	A	В	(;		D		E	F	G		H						K	┶	L
252	Benz(a)an	thracene																		
253	(a)an																			
254									General	Statistics										
255				Total	Numl	ber of (Observ	/ations	8				N	umbei	r of Dis	tinct C	Obse	rvations	;	6
256					-	Numb	er of D	Detects	4						Numb	er of	Non-	Detects		4
257				Nı	umbe	r of Dis	tinct D	Detects	4				Ν	lumbe	er of Dis	stinct	Non-	Detects		2
258						Min	imum	Detect	0.006						Mir	nimum	n Nor	n-Detec	t (0.004
259						Max	imum	Detect	0.762						Max	kimum	n Nor	n-Detec	t (0.005
260						Varia	ance D	Detects	0.0958						Pe	rcent	Non-	Detects	;	50%
201						N	lean D	Detects	0.4								SD	Detects	;	0.309
262						Ме	dian D	Detects	0.417								CV	Detects	;	0.773
203						Skewr	ness D	Detects	-0.314							Kurt	tosis	Detects	;	1.503
204					Mear	n of Log	ged D	Detects	-1.785						SD	of Log	gged	Detects	;	2.239
200																				
200			Note	: Samp	ole siz	ze is sı	mall (e	ə.g., <1	0), if data ar	e collecte	d usi	ng ISM a	pproac	h, you	ı should	d use				
207			guidar	nce pro	ovide	d in IT	RC Te	ch Reg	Guide on I	SM (ITRC	, 201	2) to com	pute st	tatistic	s of in	terest	t.			
269				For e	exam	ple, yo	u may	want t	o use Cheby	shev UCI	L to e	stimate E	PC (IT	RC, 2	2012).					
270			Cheb	yshev	UCL	. can b	e com	puted ı	ising the No	nparamet	ric ar	nd All UC	L Optio	ons of	ProUC	L 5.1				
270																				
272								Norm	al GOF Tes	t on Dete	cts O	nly								
273				S	hapiro	o Wilk	Test S	tatistic	0.959	Shapiro Wilk GOF Test										
274				5% Sł	napiro	Wilk (Critical	l Value	0.748		Dete	cted Data	appea	r Norr	nal at 5	i% Sig	gnific	ance Le	vel	
275					Lill	liefors	Test S	tatistic	0.251				Lilli	iefors	GOF T	est				
276				59	% Lill	iefors (Critical	Value	0.375		Dete	cted Data	appea	r Norr	nal at 5	i% Sig	gnific	ance Le	vel	
277						De	tected	d Data a	appear Norn	nal at 5%	Signi	ficance L	evel							
278																				
279			Ka	aplan-l	Meier	· (KM) :	Statist	tics usi	s using Normal Critical Values and other Nonparametric UCLs											
280							KM	l Mean	0.202					K١	/I Stanc	lard E	rror	of Mear	i	0.112
281							ł	KM SD	0.274						95	% KN	И (ВС	CA) UCL	1	N/A
282						95%	6 KM (t) UCL	0.414				95%	KM (P	Percenti	le Boo	otstra	ap) UCL	. 1	N/A
283						95%	5 KM (z	z) UCL	0.386						95% KI	M Boo	otstra	ap t UCL	. 1	N/A
284				9	90% K	(M Che	byshe	ev UCL	0.538					ç	95% KN	/I Che	ebysh	nev UCL	-	0.69
285				97.	.5% K	(M Che	byshe	ev UCL	0.901					ç	99% KN	/I Che	ebysh	nev UCL	-	1.316
286																				
287						C	Gamma	a GOF	Tests on De	etected OI	bserv	ations Or	ıly							
288						A-D	Test S	tatistic	0.607			A	nderso	on-Da	rling G	OF Te	est			
289					5%	6 A-D (Critical	l Value	0.673	Detec	cted d	ata appea	ar Gam	ma Di	stribute	ed at 5	5% S	ignifica	nce	Level
290						K-S	Test S	tatistic	0.407				Kolmog	jorov-	Smirno	ov GO)F			
291					5%	% K-S (Critical	l Value	0.406	Dete	ected	Data Not	Gamm	na Dist	tributed	l at 5%	% Sig	gnificano	e Le	evel
292					Dete	cted d	ata fol	low Ap	pr. Gamma	Distributio	on at !	5% Signif	icance	Leve						
293																				
294							G	iamma	Statistics or	Detected	d Data	a Only								
295							k hat	(MLE)	0.696	696 k star (bias corrected MLE)	0.341		
296	Theta hat							(MLE)	0.575				Т	Theta s	star (bia	as cor	rrecte	ed MLE)	' <u> </u>	1.175
297	nu hat							(MLE)	5.565						nu sta	ar (bia	as co	rrected	' <u> </u>	2.725
298		Mean (de							0.4											
299																				
300						(Jamm	a ROS	Statistics u	sing Impu	ted N	ion-Detec	sts							
301		0765	GRO	S may	not b	e used	when	data s	et has > 50%	NDs with	n man	y tied obs	servatio	ons at	multiple	e DLs	5	4		
302		GROS ma	ay not be	e used	wher	n kstar	of dete	ects is s	small such a	s <1.0, es	pecia	lly when t	he sam	nple si	ze is sr	nall (e	e.g.,	<15-20)		
303				Fo	r sucł	h situat	ions, C	GROS	method may	yield inco	rrect	values of	UCLs a	and B	TVs					
304						٦	This is	especi	ally true whe	n the sam	ple s	ize is sma	all.							
305		For ga	ımma di	stribut	ed de	etected	data, I	BTVs a	nd UCLs ma	y be com	puted	using ga	mma di	istribu	tion on	KM e	stima	ates		
306							Mii	nimum	ım 0.006 Mear										0.205	

	A B C D E	F		L							
307	Maximum	0.762	Median	0.01							
308	SD	0.291	CV	1.418							
309	k hat (MLE)	0.407	k star (bias corrected MLE)	0.338							
310	Theta hat (MLE)	0.504	Theta star (bias corrected MLE)	0.607							
311	nu hat (MLE)	6.516	nu star (bias corrected)	5.406							
312	Adjusted Level of Significance (β)	0.0195									
313	Approximate Chi Square Value (5.41, α)	1.344	Adjusted Chi Square Value (5.41, β)	0.901							
314	95% Gamma Approximate UCL (use when n>=50)	0.825	95% Gamma Adjusted UCL (use when n<50)	N/A							
315											
316	Estimates of G	iamma Para	meters using KM Estimates								
317	Mean (KM)	0.202	SD (KM)	0.274							
318	Variance (KM)	0.0752	SE of Mean (KM)	0.112							
319	k hat (KM)	0.544	k star (KM)	0.423							
320	nu hat (KM)	8.697	nu star (KM)	6.769							
321	theta hat (KM)	0.372	theta star (KM)	0.478							
322	80% gamma percentile (KM)	0.328	90% gamma percentile (KM)	0.565							
323	95% gamma percentile (KM)	0.824	99% gamma percentile (KM)	1.47							
324											
325	Gamm	na Kaplan-M	leier (KM) Statistics								
326	Approximate Chi Square Value (6.77, α)	2.045	Adjusted Chi Square Value (6.77, β)	1.454							
327	95% Gamma Approximate KM-UCL (use when n>=50)	0.669	95% Gamma Adjusted KM-UCL (use when n<50)	0.941							
328											
329	Lognormal GC	DF Test on D	Detected Observations Only								
330	Shapiro Wilk Test Statistic	0.743	Shapiro Wilk GOF Test								
331	5% Shapiro Wilk Critical Value	0.748	Detected Data Not Lognormal at 5% Significance Level								
332	Lilliefors Test Statistic	0.401	Lilliefors GOF Test	-							
333	5% Lilliefors Critical Value	0.375	Detected Data Not Lognormal at 5% Significance Level								
334	Detected Data	Not Lognorn	mal at 5% Significance Level								
335											
336		S Statistics	Using Imputed Non-Detects	4.05							
337	Mean in Original Scale	0.201	Mean in Log Scale	-4.65							
338	SD in Original Scale	0.294	SD in Log Scale	3.512							
339	95% t UCL (assumes normality of RUS data)	0.398	95% Percentile Bootstrap UCL	0.358							
340	95% BCA Bootstrap UCL	0.391	95% Bootstrap t UCL	0.511							
341	95% H-UCL (L0g RUS)	5103921									
342	Otobiotics using 1/M activation										
343	Statistics using KM estimates			0.0250							
344	KM Mean (logged)	-3.653	KM Geo Mean	0.0259							
345	KM Standard Error of Moon (lagged)	2.317		7.030							
346		0.940		7 020							
347	KM Standard Ever of Maan (larged)	2.31/		1.030							
348	Kini Stanuaru Error or Mean (logged)	0.940									
349			Statistics								
350	DI /2 Normal	00/2 5	DI /2 Log Transformed								
351	DUZ INUTITIAI Maan in Original Socia	0.201	DL/2 Log- maistormed	_3 072							
352	Mean In Original Scale	0.201	201 Weat In Log Scale								
353		0.294		2.70 1960							
354	DI /2 is not a recommanded m	othod provid	ded for comparisons and historical reasons	-300							
355		eniou, provi	นอน เอ ออกมีคารอาร์ สาม การเอกเปล่า 18450115								
356	Nonsorten	atric Distribu	Ition Free LICL Statistics								
357			istributed at 5% Significance Level								
358			Subated at 0 /0 Cigninicalite Level								
359		Suggested									
360											
361	90% NIVI (1) UCL	JCL 0.414									

	A	В	С	D	E	F	G	H		J	K	L	
362													
363	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
364		Recommendations are based upon data size, data distribution, and skewness.											
365	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
366	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												

	A	В	С		D		E	F	G	ŀ	-			J			K		L
367	Benzo(a) n	vrene																	
368		yi cile																	
369								General	Statistics										
370			Tr	otal N	umber of	Ohse	rvations	8				Nu	Imper	of Disti	nct OF	bserv	ations		6
371					Num	ber of	Detects	4				INU		Numbe	er of N	lon-D	etects		4
372				Num	ber of Di	istinct	Detects	4				N	umhe	r of Dist	inct N	lon-D	etects		2
373				. turi	Mi	nimun	n Detect	0.01						Mini	mum	Non-I	Detect	0	-
374					Ma	ximun	n Detect	0.83						Maxi	mum l	Non-l	Detect	0	.005
3/5					Var	iance	Detects	0.137						Perc	ent N	lon-D	etects	!	50%
3/6						Mean	Detects	0.537							:	SD D	etects		0.37
377					М	edian	Detects	0.653							(CV D	etects		0.688
370					Skev	vness	Detects	-1.469							Kurto	sis D	etects		1.97
380				Μ	ean of Lo	ogged	Detects	-1.416						SD of	f Logg	jed D	etects		2.133
381																			
382			Note: Sa	ample	e size is s	small	(e.g., <1	10), if data aı)), if data are collected using ISM approach, you should use										
383			guidance	prov	ided in l'	TRC 1	Fech Re	g Guide on I	SM (ITRC,	2012) to	o com	pute sta	atistic	s of inte	erest.				
384			F	or ex	ample, y	ou ma	y want i	to use Cheby	/shev UCL	. to estin	nate E	PC (ITF	RC, 2	012).					
385			Chebys	hev L	JCL can	be co	mputed	using the No	using the Nonparametric and All UCL Options of ProUCL 5.1										
386																			
387							Norr	nal GOF Tes	t on Detec	ts Only									
388				Sha	piro Wilk	Test	Statistic	0.868				Shapi	ro Wi	k GOF	Test				
389			5%	6 Sha	piro Wilk	Critic	al Value	0.748		Detected	l Data	appear	Norn	nal at 5%	℅ Sigr	nifical	nce Le	vel	
390					Lilliefors	Test	Statistic	0.272				Lillie	efors	GOF Te	st				
391				5%	Lilliefors	Critic	al Value	0.375		Detected	l Data	appear	Norn	nal at 5%	6 Sigr	nifica	nce Le	vel	
392					D	etecte	ed Data	appear Norr	nal at 5% s	Significa	nce Le	evel							
393																			
394			Kapla	an-Mo	eier (KM)	Stati	stics usi	ing Normal C	ritical Val	ues and	other	Nonpar	ramet	ric UCL:	S			1	
395						K	M Mean	0.27					KN	1 Standa	ard Eri	ror of	Mean		0.143
396							KM SD	0.35						95%	6 KM	(BCA) UCL	N	I/A
397					95	% KM	I (t) UCL	0.541				95% k	KM (P	ercentile	e Boot	tstrap) UCL	N	I/A
398					959	% KM	(z) UCL	0.505					(95% KM	Boot	strap	t UCL	N	I/A
399				90	% KM Ch	lebysh	nev UCL	0.698					g	95% KM	Cheb	yshe	v UCL		0.892
400				97.5	% KM Ch	lebysł	nev UCL	1.162					g	9% KM	Cheb	yshe	v UCL		1.69
401						0					-								
402					A	Gam				servatio	ns On	ly ndoroo	- Do		T Too				
403					A-D		Statistic	0.743	Data	otod Det		Gamme			or 189	Siar	ificanc	01-	vol
404					5 /0 A-D	Teet	Statistic	0.07	Dete	cieu Dal				Smirner		Sign	meane	e Le	
405					ת-ט 5% גר פ	Critic		0.413	Doto	octed Dot	r Ia Not	Gamm		ributed	aUF	Sign	ificano		
406					J /0 N-O		ate Not	Gamma Diet	ributed at	5% Sign					at 070	Sign	meane	e Le	
407					Delec	lieu D			induicu al	o /o Olyfi	medii		/1						
408							Gamma	Statistics	Detected	Data Or	nlv								
409						k h	at (MI E)	0 754			y		k	tar (bia	S COrr	ected			0.355
410					Тһ	eta h	at (MLE)	0.734				т	heta e	star (hia	S COrre	ected			1.512
411		Theta hat													r (hias	S COrr			2.84
412	Mean (de							0.537						114 5141	15103		5510U)		
413				IV		0.007													
414						Gam	ma ROS	Statistics u	sina Imnut	ed Non-	Detect	ts							
415			GROS n	nav n	ot he use	ed whe	en data s	set has $> 50\%$	NDs with	manv tie	ed ohe	ervation	ns at i	multinle	DIs				
416		GROS ma	v not he u	sed w	hen ksta	r of de	etects is	small such a	s <1.0. esr	becially w	vhen ti	le sam	ple si	ze is sm	all (A	a <1	15-20)		
417		2.100 ma	,	For	such situr	ations	GROS	method may	vield incor	rect valu	les of l	JCIsa	nd R1	Vs	(0.	J., .			
418						This	is esner	ially true whe	en the sam	ble size i	is sma								
419	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates																		
420		i ui ya	ส นเรเป	BUIE		u udid	/inimum		iy be comp	ateu usii	ng yai		sandul			andl	Mean		0 276
421						n.	mmum	0.01									wean		0.270

	A B C D E	F	G H I J K	L							
422	Maximum	0.83	Median	0.0209							
423	SD	0.369	CV	1.337							
424	k hat (MLE)	0.414	k star (bias corrected MLE)	0.342							
425	Theta hat (MLE)	0.666	Theta star (bias corrected MLE)	0.807							
426	nu hat (MLE)	6.629	nu star (bias corrected)	5.476							
427	Adjusted Level of Significance (β)	0.0195									
428	Approximate Chi Square Value (5.48, α)	1.378	Adjusted Chi Square Value (5.48, β)	0.927							
429	95% Gamma Approximate UCL (use when n>=50)	1.097	95% Gamma Adjusted UCL (use when n<50)	N/A							
430											
431	Estimates of G	iamma Para	meters using KM Estimates								
432	Mean (KM)	0.27	SD (KM)	0.35							
433	Variance (KM)	0.122	SE of Mean (KM)	0.143							
434	k hat (KM)	0.598	k star (KM)	0.457							
435	nu hat (KM)	9.576	nu star (KM)	7.318							
436	theta hat (KM)	0.452	theta star (KM)	0.591							
437	80% gamma percentile (KM)	0.442	90% gamma percentile (KM)	0.745							
438	95% gamma percentile (KM)	1.072	99% gamma percentile (KM)	1.884							
439											
440	Gamm	na Kaplan-M	eier (KM) Statistics								
441	Approximate Chi Square Value (7.32, α)	2.347	Adjusted Chi Square Value (7.32, β)	1.7							
442	95% Gamma Approximate KM-UCL (use when n>=50)	0.843	95% Gamma Adjusted KM-UCL (use when n<50)	1.164							
443											
444	Lognormal GC	OF Test on D	etected Observations Only								
445	Shapiro Wilk Test Statistic	0.698	Shapiro Wilk GOF Test								
446	5% Shapiro Wilk Critical Value	0.748	Detected Data Not Lognormal at 5% Significance Leve	el							
447	Lilliefors Test Statistic	0.401	Lilliefors GOF Test	_							
448	5% Lilliefors Critical Value	0.375	Detected Data Not Lognormal at 5% Significance Leve	el							
449	Detected Data	Not Lognorn	nal at 5% Significance Level								
450											
451			Using imputed Non-Detects	4.0.40							
452	Mean in Original Scale	0.269	Mean in Log Scale	-4.043							
453	SD in Original Scale	0.374	SD in Log Scale	3.242							
454	95% t UCL (assumes normality of RUS data)	0.52	95% Percentile Bootstrap UCL	0.48							
455	95% BCA Bootstrap UCL	0.501	95% Bootstrap t UCL	0.646							
456	95% H-UCL (L0g RUS)	494796									
457	Otobiation union (/M. antimatoo										
458	Statistics using KM estimates			0.0212							
459	KM Mean (logged)	-3.409	NM Geo Mean	0.0312							
460	KM Standard Error of Moon (lagged)	2.433		7.37							
461		0.993		527.5							
462	KM Standard Ever of Maan (larged)	2.400	95% Chucai n Value (Kivi-Log)	1.31							
463	Kini Stanuaru Error of Mean (logged)	0.993									
464		0.0	tatistics								
465	DI /2 Normal	0023	DI /2 Log-Transformed								
466	Moon in Original Socia	0 260	Moon in Log Social	-3 787							
467	SD in Original Scale	0.209		2 805							
468		0.574		2.035							
469	DI /2 is not a recommended m	ethod provid	ded for comparisons and historical reasons								
470											
471	Nonorom	rametric Distribution Free UCL Statistics									
472			atributed at 5% Significance Level								
473											
474		Suggested									
475											
476	95% KWI (I) UCL	UCL 0.541									

	A	В	С	D	E	F	G	H		J	K	L	
477													
478	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
479		Recommendations are based upon data size, data distribution, and skewness.											
480	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
481	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												

	A	В	С	D	E		F	G	Н			J	K	L			
482	Chrysens																
483	Cnrysene																
484							Ganaral	Statistics									
485			Total	Number of	Obsony	ations		Sidustics		NIU	umbo	r of Dictinct	Observation	5			
486			TULAI				0			INU	innbe	Number of		, J			
487			N		stinct D		4			N	umbo	r of Distinct	Non Detect	, 4			
488							4			IN	unibe	Minimur	n Non Dotor	, 2 + 0.004			
489				IVII Ma			0.005					Maximur	n Non-Detec	t 0.004			
490				Var	ianco De		0.007					Percent		50%			
491				vai			0.0731					Feiceni	SD Detecti	, JU //			
492				М			0.340						CV Detects	, 0.27 . 0.781			
493				Skow			_0.225					Kur		, 1,526			
494				Mean of Lo			-0.223					SD of Lo		2 2 257			
495					iggeu De	Elecis	-1.342					3D 01 L0	ggeu Delecti	, 2.237			
496			Note: Sam	nla siza is (mall (a	a <10	0) if data ar	e collected	using ISM a	nnroach		should use					
497			quidance pr	rovided in I	RC Ter	h Rea	Guide on I		2012) to corr		n, you	s of interes	, t				
498			For			want to			to estimate F								
499			Chebysher	v UCL can			sing the No	nnarametri	c and All LIC		10, 2 ne of	$\frac{1012}{1000}$					
500			Chebyshe					nparametri			13 01	110002 0.1					
501						Norm	al GOF Tes	t on Detect	s Only								
502			9	Shaniro Wilk	Test St	atistic	0.946			Shanir	ro Wi	lk GOF Tes	t				
503			5% S	hapiro Wilk	Critical	Value	0 748	Г	etected Data	annear	evel						
504				Lilliefors	Test St	atistic	0.261			l illie	Lilliefors GOF Test						
505			5	5% Lilliefors	Critical	Value	0.375	Г	etected Data	appear	evel						
506					etected	Data a	appear Norn	nal at 5% S	ignificance l	evel			grinioanoo E				
507						Data c											
508			Kaplan-	Meier (KM)	Statistic	cs usir	na Normal C	ritical Valu	es and other	Nonpar	ame	ric UCLs					
509					KM	Mean	0.175				KN	/ Standard F	Error of Mea	0.0972			
510					K	M SD	0.238					95% KI	M (BCA) UCI	N/A			
511				95	% KM (t)) UCL	0.359			95% K	(M (F	ercentile Bo	otstrap) UCI	N/A			
512				959	% KM (z)) UCL	0.335				(.	95% KM Bo	otstrap t UCI	N/A			
513				90% KM Ch	ebyshev	/ UCL	0.467				ę	95% KM Che	ebyshev UCI	0.599			
514			97	7.5% KM Ch	ebvshev	/ UCL	0.782				(99% KM Che	ebvshev UCI	1.142			
515					- ,								··· , · · · · ·				
516					Gamma	GOF	Tests on De	on Detected Observations Only									
517				A-D	Test Sta	atistic	0.617	Anderson-Darling GOF Test									
518				5% A-D	Critical	Value	0.673	Detecte	ed data appe	ar Gamr	na Di	stributed at	5% Significa	nce Level			
519				K-S	Test Sta	atistic	0.414			Kolmog	orov-	Smirnov GC	OF				
520				5% K-S	Critical	Value	0.406	Detec	ted Data Not	Gamma	a Dis	tributed at 5	% Significan	ce Level			
521				Detected of	lata follo	ow App	pr. Gamma	Distribution	at 5% Signi	ficance	Leve		-				
522																	
523					Ga	amma	Statistics or	Detected	Data Only								
525					k hat (MLE)	0.688	688 k star (bias corrected MLE									
525				Th	eta hat (MLE)	0.503	3 Theta star (bias corrected MLE									
520					nu hat ((MLE)	5.502	02 nu star (bias correcte) 2.709			
527				N	lean (de	tects)	cts) 0.346										
520						,											
529					Gamma	ROS	Statistics us	sing Impute	d Non-Detec	cts							
521			GROS may	/ not be use	d when o	data se	et has > 50%	NDs with r	many tied obs	servatior	ns at	multiple DLs	5				
527		GROS ma	y not be used	d when ksta	r of dete	cts is s	small such a	s <1.0, espe	ecially when	the sam	ple si	ze is small (e.g., <15-20)			
522			Fc	or such situa	itions, G	iROS r	method may	, yield incorr	ect values of	UCLs a	nd B	TVs					
533					This is e	especia	ally true whe	n the samp	le size is sma	all.							
534		For ga	mma distribu	ted detected	d data, B	STVs a	nd UCLs ma	iy be compl	ited using ga	mma dis	stribu	tion on KM e	estimates				
535		0.1			Min	imum	0.005		0.0*				Mear	ı 0.178			
530	I												-	1			

	A B C D E	F	G H I J K	L
<u>53</u> 7	Maximum	0.667	Median	0.01
538	SD	0.252	CV	1.417
539	k hat (MLE)	0.422	k star (bias corrected MLE)	0.347
540	Theta hat (MLE)	0.422	Theta star (bias corrected MLE)	0.513
541	nu hat (MLE)	6.746	nu star (bias corrected)	5.549
542	Adjusted Level of Significance (β)	0.0195		
543	Approximate Chi Square Value (5.55, α)	1.414	Adjusted Chi Square Value (5.55, β)	0.955
544	95% Gamma Approximate UCL (use when n>=50)	0.699	95% Gamma Adjusted UCL (use when n<50)	N/A
545			· · · · · · · · · · · · · · · · · · ·	
546	Estimates of G	amma Para	meters using KM Estimates	
547	Mean (KM)	0.175	SD (KM)	0.238
548	Variance (KM)	0.0567	SE of Mean (KM)	0.0972
549	k hat (KM)	0.541	k star (KM)	0.421
550	nu hat (KM)	8.649	nu star (KM)	6.739
551	theta hat (KM)	0.324	theta star (KM)	0.416
552	80% gamma percentile (KM)	0.284	90% gamma percentile (KM)	0.49
553	95% gamma percentile (KM)	0.714	99% gamma percentile (KM)	1.276
554				
555	Gamm	na Kaplan-M	eier (KM) Statistics	
556	Approximate Chi Square Value (6.74, α)	2.028	Adjusted Chi Square Value (6.74, β)	1.441
557	95% Gamma Approximate KM-UCL (use when n>=50)	0.581	95% Gamma Adjusted KM-UCL (use when n<50)	0.819
558				
559	Lognormal GC	OF Test on D	etected Observations Only	
560	Shapiro Wilk Test Statistic	0.741	Shapiro Wilk GOF Test	
561	5% Shapiro Wilk Critical Value	0.748	Detected Data Not Lognormal at 5% Significance Lev	el
562	Lillietors Test Statistic	0.405	Lilliefors GOF Test	
563	5% Lilliefors Critical Value	0.375	Detected Data Not Lognormal at 5% Significance Lev	el
564	Detected Data	Not Lognorn	nal at 5% Significance Level	
565		O Otatiatian		
566	Lognormal ROS		Using imputed Non-Detects	4.000
567	Mean In Original Scale	0.173	Mean In Log Scale	-4.826
568	SD in Original Scale	0.200	SD IN Log Scale	3.535
569	95% t OCL (assumes normality of ROS data)	0.345	95% Percentile Boolstrap OCL	0.333
570		0.344	95% Boolstrap t OCL	0.430
571	33 % H-UCL (LUY KUS)	5007850		
572	Statistics using KM estimates	on Logged I	Data and Assuming Lognormal Distribution	
573	KM Mean (logged)		KM Geo Mean	0.024
574	KM SD (logged)	2 261	95% Critical H Value (KM-Log)	6.877
575	KM Standard Error of Mean (logged)	0.923	95% H-LICL (KM -Log)	110.2
576	KM SD (logged)	2.261	95% Critical H Value (KM-Log)	6.877
5/7	KM Standard Error of Mean (logged)	0.923		,
578		0.020		
579		DL/2 S	tatistics	
580	DL/2 Normal	2220	DL/2 Loa-Transformed	
581	Mean in Original Scale	0.174	Mean in Log Scale	-4.05
582	SD in Original Scale	0.255	SD in Log Scale	2.696
503	95% t UCL (Assumes normality)	0.345	95% H-Stat UCL	2605
584	DL/2 is not a recommended me	ethod. provid	ded for comparisons and historical reasons	-
585		-, P 1	• • • • • • • • • • • • • • • • • • • •	
507	Nonparame	etric Distribu	tion Free UCL Statistics	
500	Detected Data appea	r Normal Dis	stributed at 5% Significance Level	
200			• • • • • •	
509		Suggested	UCL to Use	
590	95% KM (t) UCL	0.359		
591				

	A	В	С	D	E	F	G	Н		J	K	L		
592														
593		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
594		Recommendations are based upon data size, data distribution, and skewness.												
595		These reco	mmendations	s are based u	pon the resu	Its of the sin	nulation studi	es summariz	zed in Singh,	Maichle, and	I Lee (2006)			
596	F	owever, simu	lations result	s will not cov	er all Real V	Vorld data se	ts; for additio	onal insight th	ne user may	want to cons	ult a statistic	ian.		

	A	В	С	D	E	F	G	Н		J	K	L
597	Dibenz/o h)anthracene										
598	Dibeliz(a,f	Janunacene										
599						Gamaral	Statiation					
600			Total	Number of C	beenvotions	general	SIGUSUCS		Numbo	or of Dictingt C	beenvotions	F
601			I Otal		ar of Dotooto	0			NUMDE			Э Б
602			K1			ა ე			Nimme	or of Dictingt !		ว ว
603			N			3 0 0777			INUMD		Non Detects	2
604					mum Detect	0.0777				Movimum	Non Detect	0.004
605				Wax						Porcont		0.003 62 E0/
606				varia	ean Dotooto	0.0070E-4				reicenti	SD Dotooto	02.3%
607				۱۷ Ma	dian Detects	0.103					CV Detects	0.0241
608				Skowr	and Delects	-1 695				Kurt	neis Detects	0.223 N/A
609				Mean of Loc	aed Detects	-2.269				SD of Log	aed Detects	0.248
610					J 2010013	2.200				55 0, LUY	Jer 2010013	0.2-10
611					Warnina: D	ata set has	only 3 Deter	ted Values.				
612			т	his is not en	ough to com	oute meanin	gful or reliat	ole statistics	and estimat	tes.		
614			• •		U				///			
615												
616			Note: Sam	ple size is sr	nall (e.g., <1	0), if data ar	e collected	using ISM ap	proach, yo	u should use		
617			guidance pi	rovided in ITI	RC Tech Reg	g Guide on Is	SM (ITRC, 2	.012) to com	pute statisti	cs of interest		
618			For	example, yo	u may want t	o use Cheby	shev UCL t	o estimate E	PC (ITRC, 2	2012).		
619			Chebyshe	v UCL can be	e computed u	using the No	nparametric	and All UCL	. Options of	ProUCL 5.1		
620												
621					Norm	nal GOF Tes	t on Detects	s Only				
622			S	Shapiro Wilk	est Statistic	0.807			Shapiro W	ilk GOF Test		
623			5% S	hapiro Wilk C	Critical Value	0.767	D	etected Data	appear Nor	mal at 5% Sig	nificance Le	vel
624				Lilliefors	est Statistic	0.361			Lilliefors	GOF Test		
625			5	5% Lilliefors C	Critical Value	0.425	D	etected Data	appear Nor	mal at 5% Sig	nificance Le	vel
626				De	tected Data a	appear Norn	nal at 5% Sig	gnificance Le	evel			
627												
628			Kaplan-	Meier (KM)	Statistics usi	ng Normal C	ritical Value	es and other	Nonparame	tric UCLs		
629					KM Mean	0.042			K	M Standard E	rror of Mean	0.0219
630					KM SD	0.0506				95% KM	(BCA) UCL	N/A
631				95%	KM (t) UCL	0.0835			95% KM (F	Percentile Boo	otstrap) UCL	N/A
632				95%	KM (z) UCL	0.078				95% KM Boo	tstrap t UCL	N/A
633				90% KM Che	byshev UCL	0.108				95% KM Che	byshev UCL	0.137
634			97	7.5% KM Che	bysnev UCL	0.1/9				ษษ% KM Che	oysnev UCL	0.26
635					amme 005	Tests or D	tootod Oba	notions O-	hz.			
636				(OF Test	iiy			
637					NOL EN							
638					Gamma	Statistice or	Detected F)ata Only				
639					k hat (MLE)	25 84			۲	star (hias cor	rected MI E	N/A
640				The	ta hat (MLE)	0 00408			K Theta	star (bias cor	rected MI E	N/A
641					u hat (MLE)	155			i netd	nu star (hia	s corrected)	N/A
642				Mc	an (detects)	0.105						
643						5.100						
644				(amma ROS	Statistics us	sing Impute	d Non-Detec	ts			
645			GROS may	/ not be used	when data s	et has > 50%	NDs with m	nany tied obs	ervations at	multiple DLs		
646		GROS may	y not be used	d when kstar	of detects is s	small such a	s <1.0, espe	cially when the	ne sample s	ize is small (e	.g., <15-20)	
640			Fc	or such situat	ons, GROS I	method mav	yield incorre	ect values of	UCLs and B	TVs	5,,	
648				1	his is especi	ally true whe	n the sample	e size is sma	II.			
049 650		For gar	nma distribu	ted detected	data, BTVs a	ind UCLs ma	y be compu	ted using gar	nma distribu	ution on KM es	stimates	
050		0.1	-		Minimum	0.01		0.0*			Mean	0.0607
001	1											1

	A	В		C	D	E	F	G	н				J	K		L
652						Maximun	n 0.121							Media	in	0.0496
653						SE	0.0414							С	V	0.682
654						k hat (MLE) 2.095					k st	ar (bias d	corrected MLE	=)	1.392
655						Theta hat (MLE) 0.029				T۲	neta st	ar (bias o	corrected MLE	E)	0.0436
656						nu hat (MLE) 33.51						nu star (bias corrected	(t	22.28
657			A	djusted	Levelo	f Significance (β) 0.0195									
658		Ар	proxim	nate Ch	i Square	Value (22.28, α) 12.55			A	djuste	d Chi S	Square V	alue (22.28,	3)	10.75
659	95	5% Gamm	а Аррі	roximat	e UCL (ι	use when n>=50) 0.108		95%	5 Gar	nma A	djuste	d UCL (u	se when n<50	D)	N/A
660																
661						Estimates of	Gamma Para	meters usin	g KM Est	imate	es					
662						Mean (KM) 0.042							SD (KN	1)	0.0506
663						Variance (KM) 0.00256						SE	E of Mean (KN	1)	0.0219
664						k hat (KM) 0.691							k star (KN	1)	0.515
665						nu hat (KM) 11.06							nu star (KN	1)	8.246
666						theta hat (KM) 0.0608							theta star (KN	1)	0.0816
667				80%	6 gamma	a percentile (KM) 0.0691					90%	gamma į	percentile (KN	1)	0.113
668				95%	6 gamma	a percentile (KM) 0.16					99%	gamma j	percentile (KN	1)	0.274
669							14 I M									
670					h: 0	Gam	ma Kapian-M	eier (KM) Si	atistics		A		0		2)	0.100
671	059/ (A	pproxi	mate C	ni Squar) 2.878		05% 0-		Adjust				5) 2)	2.139
672	95%(Jamma Ap	pioxii			ise when h>=50) 0.12		95% Ga	шпа	Aujus		1-00L (u)	0.162
673						Lognormal G	OF Toot on D	atacted Ob	onation	0 O n	hr					
674					honiro V	Lognormal G			servation	son	Shopir			ot		
675				5% 9		VIIK Test Statistic	0.797	Dot	octod Da	ta an	onapir			Significance		(ol
676				57651			- 0.707	Dei		ia ap					Lev	
677				5		ore Critical Value	0.303	Dot		ta an			nol at 5%	Significance		(ol
678				5		Detected Data a		rmal at 5% (ognon		olgrinicarice	Lev	
679									Signinical							
680						Lognormal RC	OS Statistics	Usina Imput	ed Non-D	Detec	ts					
681					Mean	in Original Scale	e 0.0686						Меа	an in Log Sca	le	-2.783
682					SD	in Original Scale	e 0.0341						S	D in Log Sca	le	0.482
083		95% t	UCL (a	assume	s norma	lity of ROS data) 0.0914				9	95% Pe	ercentile	Bootstrap UC	L	0.0869
604 605					95% BC	A Bootstrap UCI	0.0903						95% E	ootstrap t UC	L.	0.105
696					95% H	-UCL (Log ROS) 0.106									
697																
688				Statis	stics usi	ng KM estimates	s on Logged I	Data and As	suming L	ogno	ormal [Distrib	ution			
689					K	M Mean (logged) -4.302							KM Geo Mea	in	0.0135
690						KM SD (logged) 1.579				9	95% Ci	itical H \	/alue (KM-Log	g)	4.958
691			KM	Standa	rd Error	of Mean (logged) 0.684						95% H-	JCL (KM -Log	g)	0.909
692						KM SD (logged) 1.579				9	5% Cı	itical H V	alue (KM-Lo	g)	4.958
693			KM	Standa	rd Error	of Mean (logged) 0.684									
694																
695							DL/2 S	tatistics								
696				DL/2	Normal						DL/2 L	.og-Tr	ansform	ed		
697					Mean	in Original Scale	e 0.0408						Mea	an in Log Sca	le	-4.707
698					SD	in Original Scale	e 0.055						S	D in Log Sca	le	2.025
<u>69</u> 9				95% t L	JCL (Ass	sumes normality) 0.0777						95	5% H-Stat UC	Ľ	8.084
700				DL/2 i	is not a	recommended r	nethod, provi	ded for com	parisons	and	historio	cal rea	sons			
701																
							etric Distribu	tion Free U	CL Statist	tics						
702						Nonparam										
702 703					Dete	Nonparam ected Data appe	ar Normal Dis	stributed at	5% Signi	fican	ce Lev	el				
702 703 704					Dete	Nonparam	ar Normal Dis	stributed at	5% Signi	fican	ce Lev	vel				
702 703 704 705					Dete	Nonparam	ar Normal Dis Suggested	stributed at	5% Signi	fican	ce Lev	'el				

	A	В	С	D	E	F	G	H		J	K	L		
707														
708		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
709		Recommendations are based upon data size, data distribution, and skewness.												
710		These record	mmendations	are based u	pon the resu	Its of the sim	nulation studi	es summariz	zed in Singh,	Maichle, and	Lee (2006)			
711	H	owever, simu	lations result	s will not cov	er all Real V	/orld data se	ts; for additio	nal insight th	ne user may	want to consi	ult a statistic	ian.		

	A	В		С		D		E	F	G		H			J			K		
712	Chunne - M																			
713	riuoranth	ene																		
714									General	Statistics										
715				Tota	l Nu	mber of (Ohean	vations	Qeneral	Statistics			N	umbo	r of Dist	tinct (Ohea	nyations		6
716				TULA		Numb			0				IN	unne	Numb		Non			0
717				N	lum				4				N	lumbe			Non-			4 2
718					um			Dotoct	4				1	vunnoe	Min					2
719						Max	imum	Detect	1 / 20						Mox	imun				0.005
720	-					Vari	anco F	Detect	0 330						Doi		Non		+	50%
721						N			0.559							Cent				0.582
722						Me	dian F		0.073									Detects	-	0.362
723						Skow	ness F		0.051							Kuri		Detects	<u> </u>	1 523
724					Me	an of Loo			-1 20/						50/				-	2 242
725					IVIC		ggeu L	Jelecis	-1.234						501		Jyeu		1	2.242
726				Note: Sam	nla	eizo ie e	mall (d	on <1	0) if data ar	o collecte	d us	sing ISM ar	nroac	h voi	, should	d uso				
727					rovi	ded in IT		c.y., <i< th=""><th></th><th></th><th>v 20</th><th>12) to com</th><th></th><th>tatietia</th><th></th><th></th><th>+</th><th></th><th></th><th></th></i<>			v 20	12) to com		tatietia			+			
728				For							, 20 1 to	estimate E			25 01 111	.61631	L.			
729				Chebyshe		CL can b		muted i	using the No	nnaramet	L IO			no, z	Prol IC	151				
730				Chebyshe	W U		e com	iputeu t		nparamet					1000	L J. I				
731								Norm		t on Dete	cte (Only								
732					Shai	niro Wilk	Test S	Statistic				Jilly	Shan	iro Wi		Toel	+			
733				5% 5	Shar	biro Wilk (Critica		0.30		Det	ected Data	annea	r Norr	nal at 5		anific	ance l 6		
734				570 C	Juah				0.740		Dei									
735					5%	illiefors (^{ritica}		0.200		Det	ected Data	annea	r Norr	nal at 5		anific	ance I 6		
736					J /0 I			d Data	annear Norn	nal at 5%	Sig				nai at 5		<u></u>			
737											Oigi									
738		Normal GOF Test on Detects Only Shapiro Wilk Test Statistic 0.96 Shapiro Wilk GOF Test 5% Shapiro Wilk Critical Value 0.748 Detected Data appear Normal at 5% Significance Leve Lilliefors Test Statistic 0.253 Lilliefors GOF Test 5% Lilliefors Critical Value 0.375 Detected Data appear Normal at 5% Significance Leve Detected Data appear Normal at 5% Significance Level Detected Data appear Normal at 5% Significance Level Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs KM Mean 0.339 KM Standard Error of Mean KM SD 0.49 95% KM (BCA) UCL 95% KM (t) UCL 0.718 95% KM (Percentile Bootstrap) UCL 95% KM (z) UCL 0.668 95% KM Bootstrap t UCL 0.668 95% KM Bootstrap t UCL																		
739				Каріан	-1410		KM	I Mean	0 339		lues		Nonpa	KN	A Stand	Lo lard F	Frror	of Mear		0.2
740									0.000						95				+	0.2 N/Δ
741						95%	6 KM (0.43				95%	KM (F	Percenti			an) UCI	+	
742						95%			0.668				5570		95% KI	M Bor		an t UCI	+	N/A
743					90%	6 KM Che	hvshe		0.000						95% KN	A Che	hvst		+	1 211
744				<u>ð.</u>	7 5%	6 KM Che	hvshe		1 588						99% KN	A Che	hvst			2 328
745					,		byone	U UUL	1.000						0070 TA		.0 9 01		·	2.020
746						(Gamm	a GOF	Tests on De	etected O	hser	vations Or	lv							
747						A-D	Test S	Statistic	0 493			A	nderso	on-Da	rlina G		est			
/48						5% A-D (Critica	I Value	0.673	Detec	cted	data appea	r Gam	ma Di	istribute	ad at !	5% S	Significa	nce	level
/49						K-S	Test S	Statistic	0.371	2 010			Colmor	norov-	Smirno	w GC)F			
750						5% K-S (Critica	I Value	0.407	Deteo	cted	data appea	r Gam	ma Di	istribute	ed at {	5% S	Significa	nce	Level
751						Detected	d data	appea	r Gamma Di	stributed	at 5º	% Significa	nce Le	evel						
752												.								
753							G	amma	Statistics or	Detecte	d Da	ta Only								
754							k hat	(MLF)	0.675					k	star (bia	as cor	rrecto	ed MI F		0.335
/55						The	eta hat	(MLE)	1.001				7	[heta	star (bia		rrecto	$\frac{1}{1}$ ed MLE	<u> </u>	2.013
/56							nu hat	(MLF)	5.397						nu sta	ar (biz	as co	prrected	<u> </u>	2.683
/5/	Mean (d								0.675										+	
/58						141	(u	5.0000)	5.676											
/59							Gamm		Statistics	sina Imnu	Ited	Non-Detec	ts							
760				GROS ma	v no	t be user	wher	n data e	et has > 50%	NDs with	h ma	inv tied obs	ervatio	ons at	multinle	e DI e				
/61		GROS	Smay	not be use	d wł	nen kstar	of det	ects is	small such a	s <1.0 es	peri	ally when t	hesan	nple si	ize is sr	nall (e.a	<15-20)		
762				E	0r SI	uch situat	tions	GROS	method may	vield inco	rrec	t values of		and R	TVs		a.,			
763				1	51 31		This is	esneri	ally true whe	n the sam	nle	size is ema	<u></u>		. • 3					
764		Fo	n uan	nma distribu	Ited	detected	data	BTVe a	Ind UCI e me		סיקי סוודם		nma di	istrihu	tion on	KM و	stim	ates		
765		гU	n yan		 u		uaid, M:	nimum			Pule	a asing gal	und u	ISUIDU		17101 6	June	Moor		0 3/13
766							IVI	mmum	0.01									weah	"	0.342

	A B C D E	F	G H I J K	L
767	Maximum	1.429	Median	0.01
768	SD	0.521	CV	1.522
769	k hat (MLE)	0.357	k star (bias corrected MLE)	0.306
770	Theta hat (MLE)	0.96	Theta star (bias corrected MLE)	1.118
771	nu hat (MLE)	5.711	nu star (bias corrected)	4.903
772	Adjusted Level of Significance (β)	0.0195		
773	Approximate Chi Square Value (4.90, α)	1.108	Adjusted Chi Square Value (4.90, β)	0.721
774	95% Gamma Approximate UCL (use when n>=50)	1.516	95% Gamma Adjusted UCL (use when n<50)	N/A
775		•		
776	Estimates of G	iamma Para	meters using KM Estimates	
777	Mean (KM)	0.339	SD (KM)	0.49
778	Variance (KM)	0.24	SE of Mean (KM)	0.2
779	k hat (KM)	0.481	k star (KM)	0.384
780	nu hat (KM)	7.693	nu star (KM)	6.142
781	theta hat (KM)	0.706	theta star (KM)	0.884
782	80% gamma percentile (KM)	0.545	90% gamma percentile (KM)	0.966
783	95% gamma percentile (KM)	1.431	99% gamma percentile (KM)	2.605
784				
785	Gamm	na Kaplan-M	eier (KM) Statistics	
786	Approximate Chi Square Value (6.14, α)	1.713	Adjusted Chi Square Value (6.14, β)	1.188
787	95% Gamma Approximate KM-UCL (use when n>=50)	1.217	95% Gamma Adjusted KM-UCL (use when n<50)	1.755
788				
789	Lognormal GC	OF Test on D	etected Observations Only	
790	Shapiro Wilk Test Statistic	0.781	Shapiro Wilk GOF Test	
791	5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Lev	vel
792	Lilliefors Test Statistic	0.384	Lilliefors GOF Test	-
793	5% Lilliefors Critical Value	0.375	Detected Data Not Lognormal at 5% Significance Leve	el
794	Detected Data appear A	Approximate	Lognormal at 5% Significance Level	
795		O Otatiatian		
796	Lognormal Ro-			4.059
797	Mean in Original Scale	0.338	Mean in Log Scale	-4.208
798	SD In Original Scale	0.524		3.014
799	95% LOCE (assumes normality of ROS data)	0.009		0.003
800		0.740	95% Boolstrap t OCL	0.990
801	95 % H-UCE (LUG KUS)	24363129		
802	Statistics using KM estimates		Data and Assuming Lognormal Distribution	
803	KM Mean (logged)		KM Geo Mean	0.0331
804	KM SD (logged)	2 521	95% Critical H Value (KM-Log)	7 622
805	KM Standard Error of Mean (logged)	1 029	95% H-LICL (KM-Log)	1131
806	KM SD (logged)	2.521	95% Critical H Value (KM-Log)	7.622
807	KM Standard Error of Mean (logged)	1.029		
808		1.020		
809		DL/2 S	tatistics	
810	DL/2 Normal		DL/2 Log-Transformed	
811	Mean in Original Scale	0.339	Mean in Log Scale	-3.726
812	SD in Original Scale	0.524	SD in Log Scale	2.987
813	95% t UCL (Assumes normality)	0.69	95% H-Stat UCI / 5	52063
814	DL/2 is not a recommended m	ethod. provid	ded for comparisons and historical reasons	
815				
010	Nonparame	etric Distribu	tion Free UCL Statistics	
×1/	Detected Data appea	r Normal Dis	stributed at 5% Significance Level	
818				
019		Suggested	UCL to Use	
82U	95% KM (t) UCL	0.718		
821	·····(·) •••=			

	A	В	С	D	E	F	G	Н		J	K	L		
822														
823		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
824		Recommendations are based upon data size, data distribution, and skewness.												
825		These reco	mmendations	s are based u	pon the resu	Its of the sin	nulation studi	es summariz	zed in Singh,	Maichle, and	I Lee (2006)			
826	F	owever, simu	lations result	s will not cov	er all Real V	Vorld data se	ts; for additio	onal insight th	ne user may	want to cons	ult a statistic	ian.		

	A	В	С	D	E	F	G	Н	I		J	K		L	
827															
828	Fluorene														
829															
830						General	Statistics								
831			Total	Number of C	bservations)	8			Νι	umbei	of Distinct	Observation	s	5	
832				Numbe	er of Detects	3					Number of	Non-Detect	S	5	
833		A B C D E F G H I J K uorene													
834		A B C D E F G H I J K General Statistics General Statistics Total Number of Observations 8 Number of Distinct Observations Number of Distinct Detects 3 Number of Distinct Non-Detect Number of Distinct Detects 3 Number of Distinct Non-Detect Maximum Detect 0.0235 Minimum Non-Detect Variance Detects 6.2128-5 Percent Non-Detects Warning Detect 0.0337 CV Detects Mean Detects 0.0337 CV Detects Mean of Logged Detects -3.461 SD of Logged Detects Mean of Logged Detects -3.461 SD of Logged Detects Warning: Data set has only 3 Detected Values. This is not enough to compute meaningful or reliable statistics and estimates. Variance be computed using the Nonparametric and All UCL Options of ProUCL 5.1 For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012); Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1 Shapiro Wilk Test Statistic Shapiro Wilk Test Statistic </th													
835		A B C D E F G H I J K iorene iorene Ceneral Statistics Total Number of Distinct Observations Number of Distinct Detects 3 Number of Distinct Observations Number of Distinct Detects 3 Number of Distinct Non-Detects Maximum Detect 0.0235 Minimum Non-Detect Maximum Detect 0.0331 Maximum Non-Detect Mean Detects 0.0321 SD Detects Mean Detects 0.0337 CV Detects Mean of Logged Detects -3.461 SD of Logged Detects Mean of Logged Detects -3.461 SD of Logged Detects Mean of Logged Detects -3.461 SD of Logged Detects Mean of Logged Detects -3.461 SD of Logged Detects Mean of Logged Detects -3.461 SD of Logged Detects Mean of Logged Detects -3.461 SD of Logged Detects SD of Logged Detects -3.461 SD of Logged Detects Gamber Sample size is small (e.g., -10), if data are collected values. -													
836				Varia	nce Detects	6.2123E-5					Percent	Non-Detect	s	62.5%	
837		A B C D E F G H I J K uorene Ceneral Statistics Ceneral Statistics Number of Distinct Observations 8 Number of Distinct Observations 8 Number of Distinct Observations Number of Distinct Detects 3 Number of Distinct Non-Detects 3 Number of Distinct Non-Detects Maximum Detect 0.025 Minimum Non-Detect 0.039 Maximum Non-Detect Variance Detects 6.2123E-5 Percent Non-Detects 0.0321 SD Detects Median Detects 0.037 CV Detects CV Detects Kutosis Detects Median Detects 0.037 Kutosis Detects SD of Logged Detects -3.461 SD of Logged Detects Warning: Data set has only 3 Detected Values. This is not enough to compute meaningful or reliable statistics and estimates. Volts: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use													
838				Med	dian Detects	0.0337						CV Detect	s	0.246	
839				Skewn	ess Detects	-0.876					Kur	tosis Detect	s	N/A	
840				Mean of Log	ged Detects	-3.461					SD of Lo	gged Detect	s	0.261	
841						I	I								
842					Warning: D	ata set has	only 3 Dete	cted Values	•						
843			т	his is not end	ough to com	pute meanin	gful or relia	ble statistics	s and est	timate	es.				
844															
845															
846			Note: Sam	ple size is sr	nall (e.g., <1	0), if data ar	e collected	using ISM a	pproach	n, you	should use)			
847			guidance pr	ovided in ITF	RC Tech Re	g Guide on I	SM (ITRC,	2012) to con	npute sta	atistic	s of interes	t.			
848			For	example, you	u may want t	o use Cheby	shev UCL	to estimate l	EPC (ITI	RC, 2	012).				
849			Chebyshev	v UCL can be	e computed	using the No	nparametri	c and All UC	L Optio	ns of	ProUCL 5.1				
850															
851	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1 Normal GOF Test on Detects Only Shapiro Wilk Test Statistic 0.969 Shapiro Wilk GOF Test Shapiro Wilk Critical Value 0.767 Detected Data appear Normal at 5% Significance Level														
852	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1 Normal GOF Test on Detects Only Shapiro Wilk Test Statistic 0.969 Shapiro Wilk GOF Test 5% Shapiro Wilk Critical Value 0.767 Detected Data appear Normal at 5% Significance Level Lilliefors Critical Value 0.425 Detected Data appear Normal at 5% Significance Level														
853	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1 Normal GOF Test on Detects Only Shapiro Wilk Test Statistic 0.969 Shapiro Wilk Critical Value 0.767 Detected Data appear Normal at 5% Significance Leve Lilliefors Test Statistic 0.247 Lilliefors GOF Test Detected Data appear Normal at 5% Significance Leve Detected Data appear Normal at 5% Significance Leve Detected Data appear Normal at 5% Significance Leve														
854		Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1 Normal GOF Test on Detects Only Shapiro Wilk Test Statistic 0.969 Shapiro Wilk GOF Test 5% Shapiro Wilk Critical Value 0.767 Detected Data appear Normal at 5% Significance Leve Lilliefors Test Statistic 0.247 Lilliefors GOF Test 5% Lilliefors Critical Value 0.425 Detected Data appear Normal at 5% Significance Leve Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs KM Mean 0.0145 KM Standard Error of Mean													
855	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1 Normal GOF Test on Detects Only Shapiro Wilk Test Statistic 0.969 Shapiro Wilk GOF Test 5% Shapiro Wilk Critical Value 0.767 Detected Data appear Normal at 5% Significance Leve Lilliefors Test Statistic 0.247 Lilliefors GOF Test 5% Lilliefors Critical Value 0.425 Detected Data appear Normal at 5% Significance Leve Kaplan-Meler (KM) Statistics using Normal Critical Values and other Nonparametric UCLs KM Mean 0.0145 KM Standard Error of Mean KM SD 0.0142 95% KM (BCA) UCL 95% KM (C) UCL														
856		Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use													
857															
858			Kaplan-	Meier (KM) S	Statistics usi	ng Normal C	ritical Valu	es and othei	r Nonpar	ramet	ric UCLs				
859					KM Mean	0.0145				KN	I Standard E	Error of Mea	n	0.00613	
860					KM SD	0.0142					95% KN	M (BCA) UC	L	N/A	
861				95%	KM (t) UCL	0.0261			95% k	KM (P	ercentile Bo	otstrap) UC	L	N/A	
862				95%	KM (z) UCL	0.0246				9	95% KM Bo	otstrap t UC	L	N/A	
863			ę	90% KM Che	byshev UCL	0.0329				ç	95% KM Che	ebyshev UC	L	0.0413	
864			97	.5% KM Che	byshev UCL	0.0528				ç	99% KM Che	ebyshev UC	L	0.0755	
865															
866				G	iamma GOF	Tests on De	etected Obs	servations O	nly						
867					Not En	ough Data to	Perform C	OF Test							
868															
869					Gamma	Statistics or	Detected	Data Only							
870					k hat (MLE)	23.14				k۶	star (bias co	rrected MLE	E)	N/A	
871				The	ta hat (MLE)	0.00139			Т	heta s	star (bias co	rrected MLE	-)	N/A	
872				r	u hat (MLE)	138.8					nu star (bi	as corrected	I)	N/A	
873				Ме	an (detects)	0.0321							\top		
874							·								
875				G	amma ROS	Statistics u	sing Impute	ed Non-Dete	cts						
876			GROS may	not be used	when data s	et has > 50%	NDs with	many tied ob	servatio	ns at	multiple DLs	6			
877		GROS mag	y not be used	d when kstar o	of detects is	small such a	s <1.0, esp	ecially when	the sam	ple si	ze is small (e.g., <15-20)		
878			Fc	or such situati	ons, GROS	method may	yield incorr	ect values of	f UCLs a	ind B	۲Vs				
879				Т	his is especi	ially true whe	n the samp	le size is sm	all.						
880		For gar	mma distribu	ted detected	data, BTVs a	and UCLs ma	y be compu	uted using ga	amma dis	stribu	tion on KM e	estimates			
881					Minimum	0.01						Mea	n	0.0188	

	A	В		C	D	E	F	G		Н				J		ĸ	L
882						Maximum	0.039									Median	0.0121
883						SD	0.0119									CV	0.63
884						k hat (MLE)	3.308						k sta	ar (bias o	correct	ted MLE)	2.151
885						Theta hat (MLE)	0.00569					The	eta sta	ar (bias o	correct	ted MLE)	0.00875
886						nu hat (MLE)	52.92							nu star (bias c	orrected)	34.41
887			1	Adjusted	l Level o	f Significance (β)	0.0195										
888		Ap	proxi	mate Chi	i Square	Value (34.41, α)	21.99				Adj	usted	Chi S	Square V	/alue (34.41, β)	19.52
889	9	95% Gamm	na App	proximate	e UCL (ı	use when n>=50)	0.0294		!	95% G	Gamn	na Ad	justec	UCL (u	ise wh	en n<50)	N/A
890							I										
891						Estimates of G	iamma Parai	neters usi	ng KM	Estim	ates						
892						Mean (KM)	0.0145									SD (KM)	0.0142
893						Variance (KM)	2.0044E-4							SE	E of Me	ean (KM)	0.00613
894						k hat (KM)	1.054								k۶	star (KM)	0.742
895						nu hat (KM)	16.86								nu s	star (KM)	11.87
896						theta hat (KM)	0.0138								theta s	star (KM)	0.0196
897				80%	% gamma	a percentile (KM)	0.0238						90% (gamma	percer	ntile (KM)	0.036
898				95%	% gamma	a percentile (KM)	0.0484						99% (gamma	percer	ntile (KM)	0.078
899																	
900						Gamm	na Kaplan-Mo	eier (KM) S	Statisti	cs							
901		Ар	proxi	mate Chi	i Square	Value (11.87, α)	5.142				Adj	usted	Chi S	Square V	/alue (11.87, β)	4.079
902	95%	Gamma Ap	pproxi	mate KN	Λ-UCL (ι	use when n>=50)	0.0336		95%	Gam	ma A	djuste	ed KM	I-UCL (u	ise wh	en n<50)	0.0423
903																	
904						Lognormal GC	F Test on D	etected OI	bserva	tions (Only						
905				S	hapiro V	Vilk Test Statistic	0.945				Sł	napiro	Wilk	GOF Te	est		
906				5% SI	hapiro V	/ilk Critical Value	0.767	De	etected	Data	appe	ear Lo	gnorn	nal at 5%	6 Sign	ificance L	evel
907					Lillief	ors Test Statistic	0.273					Lillief	ors G	OF Tes	t		
908				5	% Lillief	ors Critical Value	0.425	De	etected	Data	appe	ear Lo	gnorn	nal at 5%	6 Sign	ificance L	evel
909						Detected Data ap	opear Logno	rmal at 5%	5 Signif	icance	e Lev	/el					
910																	
911						Lognormal RO	S Statistics	Jsing Imp	uted No	on-De	tects						
912					Mean	in Original Scale	0.0197							Mea	an in L	og Scale	-4.064
913		050/ 1		1	SD	In Original Scale	0.0113						-0/ D			og Scale	0.561
914		95% t	UCL	(assume	es norma	A D is in the line of ROS data)	0.0273					95	o% Pe		Boots	trap UCL	0.0262
915				;	95% BC	A Bootstrap UCL	0.027							95% E	sootstr	aptUCL	0.0303
916					95% H	-UCL (LOG RUS)	0.0339										
917				Statia		ng KM potimotoo	on Loggod [Note and A					iotribu	ition			
918				Statis				Jata and A	ssumi	ng Loę	gnorr	nai D	ISUIDU	luon	KMC	oo Moon	0.00966
919					ĸ	KM SD (logged)	-4.749					05					2 441
920			kM	Standa	rd Error	of Moon (logged)	0.436					90				KM Log)	0.0532
921			NIV	Janual		KM SD (logged)	1 006					QF	5% Cr	itical H \	/alue /	(KM-Log)	3 441
922			КW	Standa	rd Error	of Mean (logged)	0.436					90				LOy)	5.771
923			I XIV			c. mean (loggeu)	0.400										
924							DI /2 St	atistics									
925				DL /2 I	Normal						ח	L/2 I a	og-Tra	ansform	ed		
926					Mean	in Original Scale	0.0133							Me	an in l	og Scale	-5.154
927					SD	in Original Scale	0.0161								SD in I	og Scale	1.411
928				95% t l	JCL (As	sumes normality)	0.0241							9	5% H-	Stat UCL	0.172
929				DL/2 i	is not a	recommended m	ethod. provid	led for cor	mpariso	ons ar	nd his	storic	al rea	sons			
930							-, p , n										
931						Nonparame	etric Distribu	tion Free l	JCL St	atistic	S						
932					Dete	ected Data appea	r Normal Dis	stributed a	t 5% S	ignific	ance	Leve	əl				
933 024																	
უ <u>ა</u> 4							Suggested	UCL to Us	se								
935						95% KM (t) UCL	0.0261										
930						() =) =	-										

	A	В	С	D	E	F	G	H		J	K	L		
937														
938		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
939		Recommendations are based upon data size, data distribution, and skewness.												
940		These record	mmendations	are based u	pon the resu	Its of the sin	nulation studi	es summariz	zed in Singh,	Maichle, and	Lee (2006)			
941	Н	owever, simu	lations result	s will not cov	er all Real V	/orld data se	ts; for additio	nal insight th	ne user may	want to consi	ult a statistic	ian.		

	A	В	С	D	E	F	G	Н		J	K	L			
942	Naphthalen	e													
943		~													
944						Genera	Statistics								
945			Total	Number of	Observatio	ns 8			Numbe	er of Distinct C)bservations	4			
946				Num	er of Dete	ts 2				Number of I	Non-Detects	6			
947			N	umber of Di	stinct Dete	cts 2			Numb	er of Distinct I	Non-Detects	2			
948				Mi	nimum Dete	ect 0.0294				Minimum	Non-Detect	0.005			
949				Ma	kimum Dete	ect 0.0571				Maximum	Non-Detect	0.0709			
950				Var	ance Dete	cts 3.8451E-4				Percent I	Non-Detects	75%			
951					Mean Dete	cts 0.0433					SD Detects	0.0196			
952				M	edian Dete	cts 0.0433					CV Detects	0.453			
955				Skew	ness Dete	cts N/A				Kurt	osis Detects	N/A			
954				Mean of Lo	gged Dete	cts -3.194				SD of Log	ged Detects	0.47			
955															
950					Warning	: Data set has	only 2 Dete	cted Values.							
958			т	his is not er	nough to co	mpute meani	ngful or relial	ble statistics	and estimat	tes.					
959															
960															
961			Note: Sam	ple size is s	mall (e.g.,	<10), if data a	re collected	using ISM a	pproach, yo	u should use					
962			guidance pr	rovided in IT	RC Tech I	Reg Guide on	ISM (ITRC, 2	2012) to com	pute statisti	cs of interest	•				
963			For	example, yo	ou may wa	nt to use Cheb	yshev UCL t	o estimate E	PC (ITRC, 2	2012).					
964	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1 Normal GOF Test on Detects Only														
965	Normal GOF Test on Detects Only Not Enough Data to Perform GOF Test														
966															
967		Normal GOF Test on Detects Only Not Enough Data to Perform GOF Test													
968	Not Enough Data to Perform GOF Test														
969			Kaplan-	Meier (KM)	Statistics	using Normal	Critical Value	es and other	Nonparame	etric UCLs					
970					KM Me	an 0.0159			K	M Standard E	rror of Mean	0.0101			
971					KMS	SD 0.0188				95% KM	I (BCA) UCL	N/A			
972				95	% KM (t) U	CL 0.035			95% KM (F	Percentile Boo	otstrap) UCL	N/A			
973				95%	6 KM (z) U	CL 0.0325				95% KM Boo	tstrap t UCL	N/A			
974			ę	90% KM Ch	ebyshev U	CL 0.0461				95% KM Che	byshev UCL	0.0598			
975			97	7.5% KM Ch	ebyshev U	CL 0.0787				99% KM Che	byshev UCL	0.116			
976									-						
977					Gamma G	OF Tests on D	etected Obs	ervations Or	nly						
978					Not	Enough Data	to Perform G	OF Test							
979						0 , , , , , ,									
980					Gam	na Statistics o	on Detected [Data Only							
981				T L	k hat (ML	E) 9.397			K Thata	star (bias cor	rected MLE)	N/A			
982				Ih		E) 0.00461			Ineta	star (blas cor		IN/A			
983						E) 37.59				nu star (bia	is corrected)	N/A			
984				IV	ean (uetec	15) 0.0433									
985				C	ctimatos a	f Gamma Par	motors usin	a KM Estima	toc						
986					Mean /K			a izini ⊏sniijs	1103		SU (RW)	በ በ1ዩዩ			
987						M) 3 5301 1					f Mean (KM)	0.0100			
988					k hat (K	M) 0.712				3⊏0	k star (KM)	0.0101			
989					nu hat (K	M) 11 48					nu star (KM)	8 509			
990				+	heta hat (K	M) 0.0222				the	ta star (KM)	0.03			
991			80%	aamma ne	ercentile (K	M) 0.0262			90	% gamma ner	centile (KM)	0.0426			
992			95%	% gamma pr	ercentile (K	M) 0.0599			90	% gamma ner	centile (KM)	0.102			
993				ganna pe		0.0000				- gamma per		0.102			
994					Ga	nma Kanlan-N	leier (KM) St	tatistics							
995									Adjuster	d Level of Sig	nificance (R)	0 0195			
996									Aujusie	a Lover of Sig	(p)	0.0130			
	А	В	С	D	E	F	G	Н		J	К	L			
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997		A	pproximate Cl	hi Square Va	lue (8.51, α)	3.033			Adjusted C	hi Square Va	lue (8.51, β)	2.269			
998	95%	Gamma Ap	proximate KN	1-UCL (use w	/hen n>=50)	0.0447		95% Gamm	na Adjusted k	M-UCL (use	when n<50)	0.0598			
999															
1000				Lo	gnormal GC	OF Test on D	etected Obs	ervations C	only						
1001					Not En	ough Data to	Perform G	OF Test							
1002															
1003				Lo	gnormal RO	S Statistics	Using Impute	ed Non-Det	ects						
1004				Mean in Or	iginal Scale	0.0151				Mean	in Log Scale	-4.849			
1005				SD in Or	iginal Scale	0.0192				SDi	in Log Scale	1.24			
1006		95% t l	UCL (assume	s normality o	f ROS data)	0.0279			95% I	Percentile Bo	otstrap UCL	0.0254			
1007			9	95% BCA Bo	otstrap UCL	0.0303				95% Boo	tstrap t UCL	0.0699			
1008				95% H-UCL	(Log ROS)	0.112									
1009															
1010			Statis	tics using KI	V estimates	on Logged I	Data and As	suming Log	normal Distri	bution					
1011				KM Me	an (logged)	-4.697				KN	I Geo Mean	0.00912			
1012				KM	SD (logged)	0.967			95% (Critical H Valu	ue (KM-Log)	3.345			
1013			KM Standar	d Error of Me	ean (logged)	0.517				95% H-UC	L (KM -Log)	0.0494			
1014				KM	SD (logged)	0.967			95% (Critical H Valu	ue (KM-Log)	3.345			
1015			KM Standar	d Error of Me	ean (logged)	0.517									
1016															
1017						DL/2 S	tatistics		-	-					
1018			DL/2 N	Normal		1			DL/2 Log-1	ransformed					
1019				Mean in Or	iginal Scale	0.0168				Meani	in Log Scale	-4.961			
1020				SD in Or	iginal Scale	0.0212				SDi	in Log Scale	1.434			
1021			95% t U	JCL (Assume	s normality)	0.031				95%	H-Stat UCL	0.232			
1022			DL/2 i	s not a recor	nmended m	ethod, provi	ded for com	parisons and	d historical re	easons					
1023															
1024				<u> </u>	Nonparame	etric Distribu	tion Free UC	L Statistics	, 						
1025				Data do no	ot follow a D	Iscernible D	istribution at	5% Signific	ance Level						
1026						Overseted									
1027				050/							KMULIO	0.0404			
1028				95%		0.035					KM H-UCL	0.0494			
1029				95% KM			mondedUC	l (a) not a							
1030				vvarni	ny. One of I	nore Recolf		L(S) NOT AVA							
1031		Note: Sugar	etione rogard	ing the color	tion of a QE®		ovided to ha	n the user t	a salact the m						
1032		Note. Sugge		Acommenda	tions are had			distribution	and skownos		ale 35 /0 UCL	•			
1033		These reco		are based u	non the resu	lts of the sim	ulation studi	es summari		Maichle and					
1034	На		Ilations result	s will not cov	er all Real M	/orld data se	ts: for additio	nal insight t	he user may	want to cons	ult a statistici	an			
1035	110	mover, sint	anationa reault				io, ioi auuille	nai maiyint t	ne user may						

	A	В	(C	D)	E		F	G		H				J		K		L
1036	Dhenonth-																			
1037		a le																		
1038									Ganaral	Statistic										
1039				Total	Numbe	ar of C)hserva	ations	8	otatistic	.5		N	umbe	r of Di	stinct	Ohse	rvations		6
1040				Total	Numbe		er of De	etects	4					umbe	Num	ber of	f Non	-Detects		4
1041				Nı	umber o	of Dist	tinct De	etects	4				Ν	lumbe	er of D	istinct	Non	-Detects		2
1042						Mini	mum D	Detect	0.016						M	inimur	n No	n-Detect	t (0.004
1043						Махі	mum D	Detect	0.667						Ма	aximur	n No	n-Detect	t (0.005
1044						Varia	ince De	etects	0.0713						P	ercent	Non	-Detects		50%
1045						М	ean De	etects	0.32								SD	Detects	;	0.267
1040						Med	dian De	etects	0.298								CV	Detects	;	0.835
1047					S	Skewn	iess De	etects	0.479							Kur	rtosis	Detects	;	1.561
1049					Mean	of Log	ged De	etects	-1.741						SD	of Lo	gged	Detects	;	1.641
1050																				
1051			Note	: Samp	ole size	e is sn	nall (e.	g., <10	0), if data ar	e collec	ted us	sing ISM a	pproac	h, you	ı shou	ld use	e			
1052			guida	nce pr	ovided	in ITF	RC Tec	h Reg	Guide on I	SM (ITR	RC, 20	12) to com	npute st	atistic	cs of i	nteres	st.			
1053				For e	exampl	le, you	u may v	want to	o use Cheby	shev U	CL to	estimate E	EPC (IT	RC, 2	2012).					
1054			Chet	oyshev	UCLo	can be	e comp	uted u	ising the No	nparam	etric a	and All UC	L Optio	ns of	ProU	CL 5.1				
1055																				
1056								Norm	al GOF Tes	t on Dei	tects (Only								
1057				S	hapiro	Wilk T	est Sta	atistic	0.956				Shap	iro Wi	lk GO	FTes	st			
1058				5% Sł	napiro \	Wilk C	Critical V	Value	0.748		Det	ected Data	appea	r Norr	nal at	5% Si	ignific	cance Le	vel	
1059					Lillie	efors T	est Sta	atistic	0.259				Lilli	efors	GOF	Test				
1060				5	% Lillie	fors C	Critical	Value	0.375		Det	ected Data	appea	r Norr	nal at	5% Si	ignifio	cance Le	vel	
1061						Det	tected	Data a	appear Norn	hal at 5%	% Sigr	nificance L	evel							
1062							<u></u>				/-l		N			N -				
1063			Ka	apian-i	vieler ((КМ) С	statistic	cs usir		ritical v	alues	and other	Nonpa			JLS	-	of Maar		0.0000
1064								MSD	0.102					NIV						0.0920
1065						05%			0.227				05%		9 Dorcon	tilo Ro			· · ·	
1066						95%	KM (7)		0.338				90 /0		95% k		otstr	ap) UCL	+	
1067				c	0% KM	/ Chel	hvshev		0.010					(95% K	M Che	ehvsl		+	0.566
1068				97	5% KN	/ Chel	byshev		0.741						99% K	M Che	ebys	hev UCI		1.085
1069																	,-		1	
1070						G	iamma	GOF	Tests on De	etected	Obser	vations O	nly							
1071						A-D T	est Sta	atistic	0.416			ŀ		on-Da	rling C	GOF T	est			
1072					5%	A-D C	ritical	Value	0.667	Det	ected	data appe	ar Gam	ma Di	istribu	ted at	5% 5	Significa	nce	Level
1073						K-S T	est Sta	atistic	0.34				Kolmoç	jorov-	Smirn	iov GC	OF			
1074					5%	K-S C	critical `	Value	0.403	Det	ected	data appe	ar Gam	ma Di	istribu	ted at	5% 5	Significa	nce	Level
1076					Det	tected	data a	ppear	Gamma Di	stributed	d at 59	% Significa	ance Le	vel						
1077																				
1078							Ga	mma	Statistics or	Detect	ed Da	ta Only								
1079	-						k hat (MLE)	0.965					k :	star (b	ias co	orrect	ed MLE)	i	0.408
1080						The	ta hat (MLE)	0.331				T	heta	star (b	ias co	orrect	ed MLE)	i	0.784
1081						n	nu hat (MLE)	7.72						nu s	tar (bi	ias co	orrected)	i	3.263
1082						Ме	ean (de	tects)	0.32											
1083																				
1084						G	amma	ROS	Statistics u	sing Imp	outed	Non-Detec	cts							
1085			GRO	S may	not be	used	when	data se	et has > 50%	NDs w	ith ma	iny tied ob	servatio	ons at	multip	le DLs	s			
1086		GROS ma	ay not be	e used	when I	kstar o	of dete	cts is s	small such a	s <1.0, e	especi	ally when	the sam	nple si	ze is s	small ((e.g.,	<15-20)		
1087				Fo	r such :	situati	ons, G	ROS r	method may	yield ind	correc	t values of	UCLs a	and B	TVs					
1088						Т	his is e	especia	ally true whe	n the sa	ample	size is sma	all.				_			
1089		For ga	amma di	istribut	ed dete	ected	data, B	TVs a	nd UCLs ma	y be co	mpute	d using ga	mma di	stribu	tion o	n KM e	estim	ates		
1090							Min	imum	0.01									Mean	1	0.165

	A B C D E	F	G H I J K	L
1091	Maximum	0.667	Median	0.013
1092	SD	0.241	CV	1.461
1093	k hat (MLE)	0.468	k star (bias corrected MLE)	0.376
1094	Theta hat (MLE)	0.352	Theta star (bias corrected MLE)	0.438
1095	nu hat (MLE)	7.492	nu star (bias corrected)	6.016
1096	Adjusted Level of Significance (β)	0.0195		
1097	Approximate Chi Square Value (6.02, α)	1.648	Adjusted Chi Square Value (6.02, β)	1.137
1098	95% Gamma Approximate UCL (use when n>=50)	0.602	95% Gamma Adjusted UCL (use when n<50)	N/A
1099			L	
1100	Estimates of G	amma Para	meters using KM Estimates	
1101	Mean (KM)	0.162	SD (KM)	0.227
1102	Variance (KM)	0.0517	SE of Mean (KM)	0.0928
1103	k hat (KM)	0.507	k star (KM)	0.4
1104	nu hat (KM)	8.111	nu star (KM)	6.403
1105	theta hat (KM)	0.319	theta star (KM)	0.404
1106	80% gamma percentile (KM)	0.261	90% gamma percentile (KM)	0.457
1107	95% gamma percentile (KM)	0.672	99% gamma percentile (KM)	1.214
1108				
1109	Gamm	a Kaplan-M	eier (KM) Statistics	
1110	Approximate Chi Square Value (6.40, α)	1.849	Adjusted Chi Square Value (6.40, β)	1.297
1111	95% Gamma Approximate KM-UCL (use when n>=50)	0.56	95% Gamma Adjusted KM-UCL (use when n<50)	0.799
1112				
1113	Lognormal GC	F Test on D	etected Observations Only	
1114	Shapiro Wilk Test Statistic	0.824	Shapiro Wilk GOF Test	
1115	5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Lev	vel
1116	Lilliefors Test Statistic	0.364	Lilliefors GOF Test	
1117	5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Lev	vel
1118	Detected Data ap	opear Logno	rmal at 5% Significance Level	
1119				
1120	Lognormal RO	S Statistics	Using Imputed Non-Detects	
1121	Mean in Original Scale	0.161	Mean in Log Scale	-3.991
1122	SD in Original Scale	0.243	SD in Log Scale	2.727
1123	95% t UCL (assumes normality of ROS data)	0.324	95% Percentile Bootstrap UCL	0.321
1124	95% BCA Bootstrap UCL	0.335	95% Bootstrap t UCL	0.46
1125	95% H-UCL (Log ROS)	3625		
1126				
1127	Statistics using KM estimates	on Logged I	Data and Assuming Lognormal Distribution	0.0005
1128	KM Mean (logged)	-3.631	KM Geo Mean	0.0265
1129	KM SD (logged)	2.141	95% Critical H Value (KM-Log)	6.534
1130		0.8/4		01.0 6.524
1131	KM Standard Error of Maan (laced)	2.141 0 074		0.004
1132	Nivi Stanuaru Error or Mean (logged)	0.074		
1133		0.0	tatistics	
1134	DI /2 Normal	0023	DI /2 Log_Transformed	
1135	Mean in Original Scale	0 161	Mean in Log Scale	-3 95
1136	SD in Original Scale	0.244	SD in Log Scale	2 595
1137	95% t LICL (Assumes normality)	0.324		1219
1138	DI /2 is not a recommended m	ethod provid	ded for comparisons and historical reasons	
1139				
1140	Nonnarame	etric Distribu	tion Free UCL Statistics	
1141	Notipatania Detected Data annea	r Normal Die	stributed at 5% Significance Level	
1142				
1143		Suggested	UCL to Use	
1144	95% KM (t) LICI	0.338		
		0.000		

	A	В	С	D	E	F	G	H		J	K	L
1146												
1147		Note: Sugge	stions regard	ing the selec	tion of a 95%	6 UCL are pr	ovided to hel	p the user to	select the m	iost appropria	ate 95% UCI	
1148			F	Recommenda	tions are ba	sed upon dat	ta size, data (distribution, a	and skewnes	S.		
1149		These reco	mmendations	are based u	pon the resu	Its of the sim	nulation studi	es summariz	zed in Singh,	Maichle, and	Lee (2006)	
1150		łowever, simu	lations result	s will not cov	er all Real V	Vorld data se	ts; for additic	nal insight th	ne user may	want to consi	ult a statistic	ian.

	A	В	C	D		E	F	G	Н			J		K	<u> </u>
1151	Durono														
1152	ryrene														
1153							Cororsi	Statistics							
1154			Tata		(Ohaa		General	Statistics				r of Disting	• 0 • • •	m vetiene	
1155			lota	I Number o	t Obse	Detecto	8			IN	umbe	Number	t Obse	Detecto	0
1156			N			Detects	4					Number (Detects	4
1157			IN		inimun	Detects	4			r	NUMDE	Minim			2
1158						Detect	1.420					Maxim			0.004
1159					rionoo	Detect	0.227					Doroo		I-Deleci	0.005
1160				Va	Moon	Detects	0.337					Percer		Detects	0.591
1161				Λ		Detects	0.077							Detects	0.561
1162				Ska	wnoss	Detects	0.000					K		Detects	1 605
1163				Moon of L		Detects	1 266					SD of I		Detects	2 106
1164					oyyeu	Delecis	-1.200					3D 01 L	oyyeu	Delecis	2.190
1165	-		Note: Sam	nla eiza ie	emall		0) if data a	o collected	using ISM a	nnroac	h voi	u should us	20		
1166			quidance n	rovided in l		lech Re	a Guide on I		2012) to corr		n, you	r should us	et		
1167			guiuance pi						to estimate F			25 01 III.ere	<i>.</i> σι.		
1168			Chebyshe				using the No	nnarametri	c and All LIC		no, z	ProLICE 5	1		
1169			Chebyshe		De COI	nputeu		nparameur				FIDUCED			
1170						Norn	nal COF Tee	t on Detect							
1171			ç	Shaniro Wil	k Test	Statistic		l on Delect	is only	Shan	iro Wi	Ik GOF Te	et		
1172			5% S	Shaniro Will	Critic	al Value	0.34	Г)etected Data	annea	r Norr	mal at 5% S	Signific	ancele	vel
1173			5700			Statistic	0.740	E			efore	GOF Test	Jighine		
1174			7		s Critic	al Value	0.277	Г)etected Data	annea		$\frac{1}{1}$	Signific	ancele	vel
1175							annear Norr	hal at 5% S					Jighine		
1176				•											
1177			Kanlan-	-Meier (KM) Stati	stics usi	ng Normal C	ritical Valu	es and other	Nonna	rame	tric UCI s			
1178			Rupiun		K	M Mean	0.341			Nonpa	K	A Standard	Frror	of Mean	0.2
1179						KM SD	0.49					95% k	CM (BC	CA) UCI	N/A
1180				9!	5% KM	(t) UCI	0.719			95%	KM (F	Percentile F	Bootstra	an) UCI	N/A
1181				95	% KM	(r) 001	0.669				(.	95% KM B	ootstra	apt UCL	N/A
1182				90% KM C	hebysh	nev UCL	0.94				9	95% KM C	hebysh	nev UCL	1.212
1183			97	7.5% KM C	hebvsh	nev UCL	1.589					99% KM C	hebvsh	nev UCL	2.33
1184					,								,		
1185					Gamr	na GOF	Tests on De	etected Ob	servations O	nly					
1180				A-[D Test	Statistic	0.524		A		on-Da	rling GOF	Test		
1107				5% A-D) Critic	al Value	0.673	Detect	ed data appe	ar Gam	ma Di	istributed a	t 5% S	Significan	ce Level
1100				K-\$	S Test	Statistic	0.387			Kolmog	jorov-	Smirnov G	OF	•	
1109				5% K-8	6 Critic	al Value	0.406	Detect	ed data appe	ar Gam	ma Di	istributed a	t 5% S	Significan	ce Level
1101				Detect	ed data	a appea	r Gamma Di	stributed at	5% Significa	ance Le	vel			-	
1102	-														
1192						Gamma	Statistics or	Detected	Data Only						
1104					k ha	at (MLE)	0.691				k	star (bias c	orrecte	ed MLE)	0.339
1105				T	heta ha	at (MLE)	0.98			٦	heta	star (bias c	orrecte	ed MLE)	1.995
1106					nu ha	at (MLE)	5.53					nu star (l	bias co	orrected)	2.716
1107					Mean (detects)	0.677								
1109						,	1	<u> </u>							
1100					Gam	ma ROS	Statistics u	sing Impute	ed Non-Detec	cts					
1200			GROS may	y not be use	ed whe	en data s	et has > 50%	NDs with	many tied obs	servatio	ons at	multiple DI	Ls		
1200		GROS may	y not be used	d when ksta	ar of de	etects is	small such a	s <1.0, esp	ecially when	the sam	nple si	ze is small	(e.g.,	<15-20)	
1201			Fo	or such situ	ations,	GROS	method may	yield incorr	ect values of	UCLs a	and B	TVs		-	
1202					This i	s espec	ially true whe	n the samp	le size is sma	all.					
1203		For gar	mma distribu	ted detecte	ed data	, BTVs a	and UCLs ma	iy be compi	uted using ga	mma d	istribu	tion on KM	estima	ates	
1204					N	1inimum	0.01	•						Mean	0.344
1200	I														

	A	В		C		D	E		F	G		H					J		ĸ		L
1206							Maxi	imum	1.429										Mediar	1	0.0105
1207								SD	0.521										C٧	′	1.517
1208							k hat (l	MLE)	0.359						k s	tar (bi	as co	orrect	ed MLE)		0.308
1209						The	ta hat (l	MLE)	0.958					Т	heta s	tar (bi	as co	orrect	ed MLE)		1.117
1210						r	nu hat (l	MLE)	5.739							nu st	ar (b	ias co	orrected		4.92
1211			A	Adjusted	Level	l of Sig	nificano	ce (β)	0.0195												
1212		A	pprox	imate C	hi Squ	iare Va	alue (4.9	92, α)	1.116					Adjus	ted Ch	ii Squ	are V	alue	(4.92, β)		0.727
1213	9	5% Gamm	na App	proximate	e UCL	. (use v	when n>	>=50)	1.516			95%	% Gai	mma A	Adjuste	d UC	L (us	e whe	en n<50)	N	N/A
1214																					
1215						Es	stimates	s of G	amma Para	neters us	sing	KM Es	timat	es							
1216							Mean	(KM)	0.341										SD (KM)		0.49
1217						Va	ariance	(KM)	0.24								SE	of Me	ean (KM)		0.2
1218							k hat	(KM)	0.484									k s	star (KM)		0.386
1219							nu hat	(KM)	7.741									nu s	star (KM)		6.171
1220						th	eta hat	(KM)	0.704								th	neta s	star (KM)		0.883
1221				80%	6 gamr	ma per	rcentile	(KM)	0.547						90%	gamr	na pe	ercen	tile (KM)		0.968
1222				95%	6 gamr	ma per	rcentile	(KM)	1.433						99%	gamr	na pe	ercen	tile (KM)		2.607
1223									- K 1 M		0										
1224									a Kapian-M	eier (KM)) Stat	ISTICS		A 11					(0.17.0)	1	1 001
1225	050/	A		imate C	ni Squ	iare va	alue (6.1	17, α)	1.728			<u> </u>		Adjus	ted Cr	i Squ	are v	alue	(6.17, β)	-	1.201
1226	95%	Gamma Ap	pproxii	mate Ki	/I-UCL	. (use v	vnen n>	>=50)	1.216		9	5% Ga	amma	i Aajus	sted KI		L (US	e whe	en n<50		1.751
1227									E Toot on D	ata ata d C	Ohaa	n otion		h.							
1228				6	honiro						Juse	rvauor	is On	Shani	ro \//ill		Too				
1229					hapiro				0.774	F	Dotor		to or	Snapi			+ 5%	6L Ciani	ficanco	0.10	1
1230				5%31					0.740	L	Delet	leu Da	ala ah					Sigili	licance	Leve	1
1231				E		leiuis		ausuc	0.393		<u> </u>	ootod [Data				esi			wol	
					V/ I III//	oforo (rition \	/oluo	0 275		1 10+		ואמ				50/ C	ianifi	nonoo I c		
1232				5		efors C	Critical \	Value	0.375	Lognorm	Det	5% Si	anific	ance		al at t	5% Si	ignifio	cance Le	vei	
1232 1233				5	[%] Lillie Detec	efors C cted D	Critical \ P ata app	√alue Dear A	0.375 pproximate	Lognorm	Det nal at	5% Si	gnific	ance	Level	al at t	5% Si	ignifio	cance Le	vei	
1232 1233 1234				5	% Lillie	efors C cted D	Critical \ ata app	Value Dear A	0.375 pproximate	Lognorm	Det	5% Si	gnific Deter		Level	al at t	5% Si	ignifio	cance Le		
1232 1233 1234 1235				5	Mea	efors C cted D Lo	Critical \ ata app gnorma	Value bear A al ROS	0.375 pproximate S Statistics	Lognorm Jsing Imp	Det nal at puteo	5% Si	gnific Detec	ance	Level	alatt	5% Si Mear	ignific	cance Le		4 152
1232 1233 1234 1235 1236				5	Mea	efors C cted D Lo an in O iD in O	Critical \ pata app gnorma riginal { riginal {	Value Dear A al ROS Scale	0.375 pproximate S Statistics 0.339 0.524	Lognorm Jsing Imp	Det nal at	5% Si	gnific Detec	ance	Level	al at t	5% Si Mear	ignific	og Scale		4.152
1232 1233 1234 1235 1236 1237		95% t		assume	Mea Since	efors C cted D Lo an in O D in O mality c	critical \ pata app gnorma riginal S riginal S of ROS	Value Dear A al ROS Scale Scale data)	0.375 pproximate S Statistics 0.339 0.524 0.691	Lognorm Jsing Imp	Det nal at	5% Si	gnific Detec	cts	95% P	ercen	5% Si Mear SD	ignific	og Scale		4.152 3.522 0.618
1232 1233 1234 1235 1236 1237 1238		95% t	UCL (assume	Mea Si 95% B	efors C cted D Lo an in O iD in O mality c 3CA Bo	Critical \ ata app gnorma riginal { riginal { of ROS	Value bear A al ROS Scale Scale data)	0.375 pproximate S Statistics (0.339 0.524 0.691 0.716	Lognorm Jsing Imp	Det nal at	5% Si	gnific		95% P	ercen	5% Si Mear SD tile B % Bo	ignific n in Lo 0 in Lo 0 ootstr	og Scale og Scale og Scale rap UCL		4.152 3.522 0.618 0.941
1232 1233 1234 1235 1236 1237 1238 1239		95% t	UCL (assume	Mea Si 95% B 95%	efors C cted D Lo an in O D in O nality c BCA Bo H-UC	gnorma riginal s of ROS potstrap	Value bear A al ROS Scale Scale data) UCL ROS)	0.375 pproximate 5 Statistics 0.339 0.524 0.691 0.716 9460188	Lognorm Jsing Imp	Det	5% Si	gnific	cts	95% P	ercen 95	5% Si Mear SC tile B % Bo	ignific n in Lo 0 in Lo 0 otstra	og Scale og Scale rap UCL ap t UCL		4.152 3.522 0.618 0.941
1232 1233 1234 1235 1236 1237 1238 1239 1240		95% t	UCL (assume	Mea Si 95% B	efors C cted D Lo an in O D in O nality c BCA Bo H-UC	Critical \ ata app gnorma riginal { of ROS botstrap L (Log F	Value Dear A al ROS Scale Scale data) UCL ROS)	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188	Lognorm Jsing Imp	Det	5% Si	gnific		95% P	ercen 95	5% Si Mear SC tile B % Bo	ignific n in Lo 0 in Lo 0 ootst	og Scale og Scale rap UCL ap t UCL		4.152 3.522 0.618 0.941
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241		95% t	UCL (assume	Mea S 95% B 95%	efors C cted D Lo an in O iD in O nality c BCA Bo H-UC H-UC	critical \ ata app gnorma riginal \$ riginal \$ of ROS ootstrap L (Log F	Value bear A al ROS Scale data) UCL ROS)	0.375 pproximate S Statistics 0.339 0.524 0.691 0.716 9460188 on Logged I	Lognorm Jsing Imp Data and	Det nal at puteo	1 Non-l			95% P	ercen 95	5% Si Mear SC tile B % Bo	ignific n in Lo 0 in Lo 0 otstra	og Scale og Scale rap UCL ap t UCL		4.152 3.522 0.618 0.941
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242		95% t	UCL ((assume	Mea Mea Si es norm 95% B 95%	efors C cted D Lo an in O D in O D in O nality c BCA Bo H-UC H-UC Sing K	critical \ ata app gnorma riginal \$ of ROS ootstrap L (Log F M estin ean (loc	Value pear A al ROS Scale Scale data) UCL ROS) nates gged)	0.375 pproximate S Statistics 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394	Lognorm Jsing Imp Data and	Det hal at	I Non-l	gnific	cts	95% P	ercen 95	5% Si Mear SE tile B % Bo	ignific n in L) in L) ootstra wotstra	og Scale og Scale rap UCL ap t UCL		4.152 3.522 0.618 0.941 0.0336
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243		95% t	UCL (assume	Mea Mea Si s norm 95% B 95%	efors C cted D Lo an in O iD in O iD in O iD in O mality c BCA Bo BCA Bo KA Bo H-UC Sing K KM Mo KM	critical \ ata app gnorma riginal \$ riginal \$ of ROS ootstrap L (Log F L (Log F M estin ean (log SD (log	Value pear A al ROS Scale Scale data) 0 UCL ROS) mates gged) gged)	0.375 pproximate S Statistics 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517	Lognorm Jsing Imp Data and	Assu	I Non-	gnific	cts	95% P	ercen 95 pution	Mear SE tile B % Bo	ignific n in L) in L) ootstr ootstra (M G	og Scale og Scale rap UCL ap t UCL eo Mear KM-Log		4.152 3.522 0.618 0.941 0.0336 7.613
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245		95% t	UCL ((assume Statis	Mea Mea Si es norm 95% B 95% stics us	efors C cted D Lo an in O D in O D in O D in O Mality C 3CA Bo 3CA Bo 3CA Bo 3CA Bo 4 H-UC Sing K KM Mo KM	critical \ ata app gnorma riginal S of ROS ootstrap L (Log F M estin ean (log SD (log ean (log	Value pear A al ROS Scale Scale data) UCL ROS) nates gged) gged) gged)	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028	Lognorm Jsing Imp	puted	I Non-l	gnific	ormal	95% P	ercen 95 vution 95%	Mear SE tile B % Bo k H Va H Va	ignific n in Lu) in Lu iootstr otstra k(M G	og Scale og Scale rap UCL ap t UCL eo Mear KM-Log		4.152 3.522 0.618 0.941 0.0336 7.613
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246		95% t	UCL (assume Statis	Mea Mea Si s norm 95% B 95% stics us	efors C cted D Lo an in O iD in O iD in O iD in O mality c BCA Bo iD in O sing K KM Mi KM KM	critical \ ata app gnorma riginal \$ of ROS otstrap L (Log F L (Log F M estin ean (log SD (log SD (log	Value Dear A al ROS Scale Scale data) UCL ROS) mates gged) gged) gged) gged)	0.375 pproximate S Statistics 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517	Lognorm Jsing Imp	Assu	I Non-I	Detec		95% P 95% C 95% C	ercen 95 ution 95% ritical	Mear SC tile B % Bo k H V <i>a</i> i H-V	ignific n in Lu) in Lu cootst ootstra slue (CL (Y cl (Y	og Scale og Scale og Scale rap UCL ap t UCL eo Mear KM-Log) KM-Log)		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247		95% t	UCL (Standan Standan	Mea Mea Si s norm 95% B 95% stics us rd Erro	efors C cted D Lo an in O D in O D in O D in O D in O C A Bo BCA Bo BCA Bo C A	Critical \ Pata app Ignorma riginal S of ROS ootstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log	Value Dear A al ROS Scale Scale data) UCL ROS) nates gged) gged) gged) gged) gged)	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028	Lognorm Jsing Imp	Assu	I Non-l		ormal	95% P 95% C 95% C	ercen 95 vution 95% ritical	Mear SE tile B % Bo k H Va h H Va h H Va	ignific n in Lu) in Lu iootstra otstra alue (CL (/	eo Mear KM-Log KM-Log		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248		95% t	UCL (Statis Statis	Mea Mea Si s norm 95% B 95% stics us rd Erro	efors C cted D Lo an in O D in O D in O D in O mality c BCA Bo BCA Bo BCA Bo C BCA Bo C M H-UC S KM M KM KM KM C r of M C KM	Critical \ Pata app Ignorma riginal S of ROS ootstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log	Value Dear A al ROS Scale Scale data) UCL ROS) nates gged) gged) gged) gged) gged)	0.375 pproximate S Statistics 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028	Lognorm Jsing Imp	Assu	I Non-I		ormal	95% P 95% C 95% C	ercen 95 pution ritical	Mear SE SE Kitile B % Bo K H Va H Va H Va H Va	ignific n in L) in L) in L) ootstra alue (CL (K alue (eo Mear KM-Log) KM-Log)		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249		95% t	UCL (Standar	Mea Mea Si s norm 95% B 95% Stics us rd Erro	efors C cted D Lo an in O D in O D in O D in O Mality C BCA Bo H-UC Sing K KM Mo KM Fr of Mo KM Fr of Mo	Critical \ Pata app Ignorma riginal S of ROS ootstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log	Value Dear A al ROS Scale Scale data) UCL ROS) nates gged) gged) gged) gged) gged)	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028 2.517 1.028	Lognorm Jsing Imp Data and a	Assi	I Non-l		ormal	95% P 95% C 95% C	ercen 95 vution 95% ritical	Mear SE tile B % Bo k H Va h H Va	ignific n in Lu) in Lu iootstra otstra alue (CL (/	eo Mear KM-Log;		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250		95% t	UCL (Statis Statis Standar Standar	Mea Mea Si ss norm 95% B 95% stics us rd Erro rd Erro	efors C cted D Lo an in O D in O D in O mality c BCA Bo BCA Bo BCA Bo C BCA Bo C BCA Bo C BCA Bo C H-UC S KM Mo KM KM C F O O M C S C A Bo C S C A Bo C S S C A Bo C S S C A Bo C S S C A Bo C S S C A Bo C S S S S S S S S S S S S S S S S S S	Critical \ Pata app Ignorma riginal S of ROS ootstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log	Value Dear A al ROS Scale Scale data) UCL ROS) nates gged) gged) gged) gged) gged)	0.375 pproximate S Statistics 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028 2.517 1.028	Lognorm Jsing Imp Data and	Assu	I Non-I		ormal	95% P 95% C 95% C 95% C	ercen 95 oution ritical 95% ritical	5% Si Mear SE tile B % Bo % Bo k H V <i>a</i> H V <i>a</i>	ignific n in L) in L) in L) ootstra alue (CL (ł alue (eo Mear KM-Log)		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250		95% t	UCL (Standar Standar Standar	Mea Mea Sis norm 95% B 95% Stics us rd Erro rd Erro Rorma Mea	efors C cted D Lo an in O D in O D in O D in O Mality C SCA Bo H-UC Sing K KM Ma KM Fr of Ma KM or of Ma an in O	Critical \ Pata app Ignorma riginal S of ROS ootstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log	Value Dear A al ROS Scale Scale data) UCL ROS) nates gged) gged) gged) gged) gged) gged) gged) gged)	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028 DL/2 S 0.34	Lognorm Jsing Imp Data and a	Assi	I Non-l		ormal	95% P 95% P 95% C 95% C	ercen 95 vution ritical 95% ritical	Mear SE tile B % Bo k H Va h H H H Va h H H H H H H H H H H H H H H H H H H H	ignific n in Lu) in Lu iootstr iotstra i i i	og Scale og Scale rap UCL ap t UCL eo Mear KM-Log, KM-Log,		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613 3.712
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250 1251 1252		95% t	UCL (Statis Statis Standar Standar	% Line Detect Mea Si ss norm 95% B 95% stics us rd Erro rd Erro rd Erro Norma Mea Si	efors C cted D Lo an in O D in O D in O BCA Bo CA B	riginal S of ROS otstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log riginal S	Value Dear A al ROS Scale Scale data) UCL ROS) aged) gged) gged) gged) gged) gged) gged) gged) gged) Scale Scale	0.375 pproximate S Statistics 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028 2.517 1.028 0.34 0.34 0.34 0.524	Lognorm Jsing Imp Data and	Assu	I Non-l		ormal	95% P 95% C 95% C 95% C	ercen 95 oution ritical 95% ritical	5% Si Mear SE tile B % Bo % Bo % Bo % Bo % Bo % Bo % Bo %	ignific n in L) in L) in L) in L) in L (CL (f alue (CL (f alue () in L	og Scale og Scale rap UCL ap t UCL ap t UCL eo Mear KM-Log) KM-Log) KM-Log)		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613 17 7.613 3.712 2.986
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250 1251 1251		95% t	UCL (Standar Standar Standar DL/2 t	% Line Detect Mea Sis norm 95% B 95% B 95% stics us rd Erro rd Erro rd Erro Norma Mea Si JCL (A	efors C cted D Lo an in O D in O D in O BCA Bo BCA Bo H-UCI Sing K KM Mo F CA Bo H-UCI Sing K KM Mo F O of Mo F C of Mo F O of Mo F D in O Mo F D in O Mo F D in O Scart Sing C K M D or of Mo F D in O Mo F D in O Scart Sing C K M D or of Mo F D in O Scart Sing C K M D or of Mo F D in O Scart Sing C K M D or of Mo F D or of Mo F Scart Sing C K M D or of Mo F Scart Sing C K M D or of Mo F Scart Sing C K K M D or of Mo F Scart Sing C K K M D or of Mo F Scart Sing C K K M D or of Mo F Scart Sing C K Scart Sing C Scart Sing C Scart Scart Sing C Scart Sing C Scart Scart Sing C Scart Scart Sca	Critical \ ata app gnorma riginal {	Value Dear A al ROS Scale Scale data) UCL ROS) (UCL ROS)	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028 2.517 1.028 0.34 0.524 0.34 0.524 0.691	Lognorm Jsing Imp Data and a	Assi	I Non-l		ormal	95% P 95% C 95% C	ercen 95 pution ritical 95% ritical	Mear SE tile B % Bo k H Va h H Va h H Va h H Va SE SE SE SE	ignific in Lu in Lu in Lu in Lu in Lu CL (P CL (P))))))))))))))))))))))))))))))))))))	og Scale og Scale rap UCL ap t UCL eo Mear KM-Log) KM-Log) KM-Log KM-Log Stale og Scale og Scale		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613 3.712 2.986 081
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1245 1248 1249 1250 1251 1252 1253		95% t	UCL (Standar Standar Standar Standar DL/2 t 95% t L DL/2 t	Mea Mea Si s norm 95% B 95% stics us rd Erro rd Erro rd Erro Norma Mea Si JCL (A is not a	efors C cted D Lo an in O D in O D in O BCA Bo CA B	riginal S of ROS otstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log riginal S riginal S riginal S riginal S	Value Dear A al ROS Scale Scale data) UCL ROS) DUCL ROS) gged gged	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028 2.517 1.028 0.34 0.34 0.524 0.691 ethod, provis	Lognorm Jsing Imp Data and Data and tatistics	Assu	I Non-I	Logn	DL/2	95% P Distrik 95% C 95% C 95% C	ercen 95 oution ritical 95% ritical	5% Si Mear SE tile B % Bo % Bo % Bo % Bo % Bo % Bo % Bo %	ignific in in Li in the in he in the in t	og Scale og Scale rap UCL ap t UCL ap t UCL eo Mear KM-Log) KM-Log) KM-Log) KM-Log) cog Scale og Scale og Scale		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613 3.712 2.986 081
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1245 1246 1247 1248 1249 1250 1251 1252 1253		95% t	KM	Statis Statis Standar Standar DL/2 t 95% t L DL/2 i	% Line Detect Mea Sis norm 95% B 95% B 95% B 95% stics us rd Erro rd Erro rd Erro rd Erro Norma Mea Si JCL (A is not a	efors C cted D Lo an in O D in O D in O BCA Bo CA B	riginal S riginal S riginal S riginal S of ROS ootstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log sD (log ean (log riginal S riginal S riginal S riginal S	Value Dear A Scale Scale Scale data) UCL ROS) (UCL ROS) (UCL ROS) (000000000000000000000000000000000000	0.375 pproximate S Statistics 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028 DL/2 S 0.34 0.524 0.691 ethod, provid	Lognorm Jsing Imp Data and Data	Assu	I Non-I		ormal DL/2 histori	95% P Distrit 95% C 95% C 95% C	ercen 95 pution ritical 95% ritical	5% Si Mear SE tile B % Bo % Bo % Bo % Bo % Bo % Bo % Bo %	ignific in Lu in Lu in Lu in Lu in Lu cootstra co	og Scale og Scale rap UCL ap t UCL eo Mear KM-Log) KM-Log, KM-Log, KM-Log, Stat UCL		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613 3.712 2.986 081
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1245 1246 1247 1248 1249 1250 1251 1252 1254 1255 1256		95% t	UCL (Standar Standar Standar DL/2 I 95% t L DL/2 i	% Line Detect Mea Si es norm 95% B 95% B 95% stics us 95% stics us 95% dtics us 95% stics us 95%	efors C cted D Lo an in O D in O D in O BCA Bo CA B	Critical \ Pata app gnorma riginal S riginal S of ROS otstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log SD (log ean (log sD (log sD (log	Value Dear A al ROS Scale Scale data) UCL ROS) DUCL ROS) gged gged	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028 2.517 1.028 0.34 0.524 0.34 0.524 0.691 ethod, provid tric Distribu	Lognorm Jsing Imp Data and Data and ded for co tion Free	Assu Assu	I Non-I	Logn a and stics	ormal DL/2	95% P Distrit 95% C 95% C 95% C	ercen 95 oution ritical 95% ritical	5% Si Mear SE tile B % Bo % Bo % Bo % Bo % Bo % Bo % Bo %	ignific in in Li in Li in Li in Li in Li in Li ootstra alue (CL (k alue (CL (k alue (CL (k alue () in Li) in	og Scale og Scale rap UCL ap t UCL ap t UCL eo Mear KM-Log) KM-Log) KM-Log) cog Scale og Scale og Scale		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613 3.712 2.986 081
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1248 1248 1249 1250 1251 1253 1254 1255 1255		95% t	UCL (Standar Standar Standar Standar DL/2 t 95% t L DL/2 i	% Line Detect Mea Sis norm 95% B 95% stics us rd Erro rd Erro rd Erro Norma Mea Si JCL (A is not a	efors C cted D Lo an in O iD in O iD in O iD in O iD in O iD in O iD in O iD in O KM KM or of Ma or of Ma id an in O iD in O id i	Critical \ Pata app gnorma riginal \$ riginal \$ riginal \$ riginal \$ f ROS botstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log ean (log riginal \$ riginal \$ riginal \$ riginal \$ riginal \$ riginal \$ riginal \$ commend Nonpa I Data a	Value Dear A Dear A Scale Scale data) UCL ROS) UCL ROS) gged gged	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028 DL/2 S 0.34 0.524 0.691 ethod, provid stric Distribu r Normal Dist	Lognorm Jsing Imp Data and Data	Assu ompa	I Non-I	Detection Logn	ormal DL/2 histori ce Lev	95% P Distrit 95% C 95% C 95% C 95% C	ercen 95 pution ritical 95% ritical	5% Si Mear SE tile B % Bo % Bo H Vz H Vz H Vz H Vz S G Mear SE 95% 3	ignific in Lu in Lu in Lu in Lu in Lu cootstra co	cance Le og Scale og Scale rap UCL ap t UCL ap t UCL eo Mear KM-Log) KM-Log) KM-Log) KM-Log Stat UCL		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613 3.712 2.986 081
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1245 1245 1246 1247 1248 1249 1250 1251 1252 1253 1254 1255 1256		95% t		Startis Startis Standar Standar DL/2 I 95% t U DL/2 i	% Line Detect Mea Si s norm 95% B 95% B 95% B 95% B 95% B 95% C stics us rd Erro rd Erro rd Erro rd Erro Norma Mea Si JCL (A is not a Si JCL (A	efors C cted D Lo an in O D in O D in O anality c CA Bo H-UC Sing K KM Ma KM A CA Bo H-UC Sing K KM Ma A CA Bo H-UC Sing K KM Ma A D in O Ma Sing N CA Bo H-UC Sing N CA Bo CA Bo CA Bo H-UC Sing N CA Bo CA	Critical \ Pata app gnorma riginal S riginal S of ROS ootstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log sD (log ean (log ean (log sD (log ean (log sD (log ean (log sD (log ean (log sD (log ean (l	Value Dear A al ROS Scale Scale data) UCL ROS) (UCL ROS) (0000 (0000) (0	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188 on Logged I -3.394 2.517 1.028 2.517 1.028 2.517 1.028 0.34 0.524 0.691 ethod, provid tric Distribu r Normal Distribu	Lognorm Jsing Imp Data and Data and ded for co tion Free stributed a	Assu Assu	I Non-I	Detection Detection Logn Stics ifican	cts	95% P Distrit 95% C 95% C 95% C 95% C	ercen 95 vution 95% ritical	5% Si Mear SE tile B % Bo % Bo % Bo % Bo % Bo % Bo % Bo %	ignific in in Li in L	og Scale og Scale rap UCL ap t UCL eo Mear KM-Log) KM-Log) KM-Log) cog Scale og Scale og Scale		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613 3.712 2.986 081
1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1245 1248 1248 1249 1250 1251 1252 1253 1254 1255 1255 1255		95% t	UCL (Standar Standar Standar DL/2 I 95% t U DL/2 i	% Line Detect Mea Si ss norm 95% B 95% stics us rd Erro rd Erro rd Erro rd Erro Norma Mea Si JCL (A is not a	efors C cted D Lo an in O iD in O iD in O mality c SCA Bo iD in O SCA Bo iD in O SCA Bo iD in O SCA Bo KM Mi KM or of Mi br of Mi br of Mi con of Mi an in O iD in O sing K KM con of Mi br of Mi con of Mi	Critical \ Pata app gnorma riginal S riginal S of ROS ootstrap L (Log F M estin ean (log SD (log ean (log SD (log ean (log riginal S riginal S riginal S es norm mmend Nonpa I Data a	Value Dear A al ROS Scale Scale data) UCL ROS) gged gged	0.375 pproximate S Statistics 0 0.339 0.524 0.691 0.716 9460188 on Logged 1 -3.394 2.517 1.028 2.517 1.028 DL/2 S ² 0.34 0.524 0.691 ethod, provid stric Distribu r Normal Dist Suggested	Lognorm Jsing Imp Data and A Data A	Assu ompa at 59	I Non-I	Detection Detection Logn Control Contr	brmal	95% P Distrit 95% C 95% C 95% C 95% C	ercen 95 pution ritical 95% ritical	5% Si Mear SE SE % Bo % Bo % Bo % Bo % Bo % Bo % Bo % Bo	ignific in Lu in Lu in Lu in Lu in Lu in Cu in Lu in Lu	og Scale og Scale rap UCL ap t UCL eo Mear KM-Log) KM-Log) KM-Log og Scale Stat UCL		4.152 3.522 0.618 0.941 0.0336 7.613 17 7.613 3.712 2.986 081

	A	В	С	D	E	F	G	H		J	K	L
1261												
1262		Note: Sugge	stions regard	ing the selec	tion of a 95%	6 UCL are pr	ovided to hel	p the user to	select the m	iost appropria	ate 95% UCI	
1263			F	Recommenda	tions are ba	sed upon dat	ta size, data o	distribution, a	and skewnes	S.		
1264		These record	mmendations	are based u	pon the resu	Its of the sim	nulation studi	es summariz	zed in Singh,	Maichle, and	Lee (2006)	
1265	-	łowever, simu	lations result	s will not cov	er all Real V	/orld data se	ts; for additio	nal insight th	ne user may	want to consi	ult a statistic	ian.

	A	В	(C		D		E	F	G		H				J		K		L
1266		n of total)																		
1267	rans (Sul																			
1268									General	Statietia	<u></u>									
1269				Total	Numł	her of (hsen	vations	8	Statistic			Ni	imhei	r of Dis	tinct (Ohse	rvations		6
1270				Total	T UIIII	Numb	er of F	Detects	4						Numł	ner of	Non-	-Detects	+	4
1271				Ni	umber	of Dis	tinct D	Detects	4				N	umbe	er of Di	stinct	Non-	-Detects	-	2
12/2						Min	imum	Detect	0.079						Mir	nimun	n Nor	n-Detect	(0.004
1273						Max	imum	Detect	7.143						Мах	ximun	n Nor	n-Detect	(0.005
1274						Varia	ance D	Detects	10.18						Pe	rcent	Non-	-Detects	-	50%
1275						N	lean D	Detects	4.72								SD	Detects	1	3.191
1270						Me	dian D	Detects	5.83								CV	Detects		0.676
1278						Skewr	ness D	Detects	-1.657							Kur	tosis	Detects		2.79
1279					Mean	of Log	gged D	Detects	0.736						SD	of Log	gged	Detects		2.187
1280									I										<u> </u>	
1281			Note	: Samp	ple siz	ze is sı	mall (e	e.g., <1	0), if data aı	e collec	ted us	sing ISM a	pproact	n, you	I shoul	d use)			
1282			guidar	nce pr	ovide	d in ITI	RC Te	əch Reç	g Guide on I	SM (ITR	RC, 20	12) to com	pute st	atistic	s of in	teres	t.			
1283				For e	examp	ole, yo	u may	/ want t	o use Cheby	/shev U	CL to	estimate E	PC (IT	RC, 2	2012).				-	
1284			Cheb	oyshev	/ UCL	can b	e com	iputed i	using the No	nparam	etric a	and All UC	L Optio	ns of	ProUC	CL 5.1				
1285																				
1286								Norm	nal GOF Tes	t on De	tects	Only								
1287				S	hapiro	o Wilk	Test S	statistic	0.835				Shapi	ro Wi	ik gof	- Test	t			
1288				5% Sł	hapiro	Wilk C	Critica	l Value	0.748		Det	ected Data	appear	r Norr	nal at 5	5% Sig	gnific	ance Le	vel	
1289					Lill	iefors -	Test S	statistic	0.316				Lilli	efors	GOF 1	Fest				
1290				5	% Lilli	efors (Critica	I Value	0.375		Det	ected Data	appear	r Norr	nal at 5	5% Si	gnific	ance Le	vel	
1291						De	tected	d Data a	appear Norr	nal at 5%	% Sigi	nificance L	evel							
1292							0				/-l		N							
1293			Ka	apian-i	Meler	(KM) \$	Statis			ritical v	alues	and other	Nonpa			LS		-		1.05
1294									2.302					NI					⊢,	1.20
1295						05%			3.003				05%		Porcont				<u> </u>	
1296						95%			4.731				90 /0 I			M Bor	otetra		<u> </u>	
1297				c	90% K	M Che	hvshe		6 113					(95% KI	M Che	hvsh		⊢ ∙	7 812
1298				97	5% K	M Che	byshe	ev UCI	10.17						99% KI	V Che	ebysh		+	14.8
1299							-,													
1300						0	amm	a GOF	Tests on De	etected	Obsei	vations O	nly							
1202						A-D	Test S	Statistic	0.804			A	nderso	n-Da	rling G	OF T	est			
1302					5%	6 A-D C	Critica	l Value	0.671	D	etecte	d Data Not	Gamm	a Dist	tributed	d at 59	% Sig	gnificand	e Le	evel
1303						K-S	Test S	Statistic	0.435				Kolmog	orov-	Smirno	ov GC	DF			
1305					5%	6 K-S (Critica	l Value	0.405	D	etecte	d Data Not	Gamm	a Dist	tributed	d at 59	% Sig	gnificand	e Le	evel
1306					[Detecte	ed Da	ta Not (Gamma Dist	ributed	at 5%	Significan	ce Leve	əl						
1307																				
1308							G	amma	Statistics or	n Detect	ted Da	ta Only								
1309							k hat	i (MLE)	0.736					k s	star (bi	as co	rrecte	ed MLE)		0.351
1310						The	eta hat	: (MLE)	6.417				Т	heta s	star (bi	as co	rrecte	ed MLE)		13.47
1311						I	nu hat	(MLE)	5.885						nu st	ar (bia	as co	orrected)		2.805
1312						Me	ean (d	etects)	4.72											
1313																				
1314						C	Gamm	າa ROS	Statistics u	sing Imp	puted	Non-Detec	cts							
1315			GRO	S may	not b	e used	when	ו data s	et has > 50%	6 NDs w	vith ma	any tied obs	servatio	ns at	multipl	e DLs	6			
1316		GROS ma	ay not be	e used	l wher	n kstar	of det	ects is s	small such a	s <1.0, e	especi	ally when	the sam	ple si	ze is s	mall (e.g.,	<15-20)		
1317				Fo	r such	n situat	ions, (GROS	method may	yield ind	correc	t values of	UCLs a	ind B	۲Vs					
1318						٦ · · · ·	his is	especi	ally true whe	en the sa	ample	size is sma	əll.			1/1-2		<u> </u>		
1319		⊦or ga	amma di	stribut	ed de	tected	data,	BIVsa	IND UCLS Ma	iy be co	mpute	a using ga	mma di	stribu	tion on	КМ е	estima	ates	т 	0.40
1320							Mi	nimum	0.01									Mean		2.43

		F		_
1321	Maximum	7.143	Median	0.304
1322	SD	3.223	CV	1.326
1323	k hat (MLE)	0.297	k star (bias corrected MLE)	0.269
1324	Theta hat (MLE)	8.185	Theta star (bias corrected MLE)	9.037
1325	nu hat (MLE)	4.751	nu star (bias corrected)	4.302
1326	Adjusted Level of Significance (β)	0.0195		
1327	Approximate Chi Square Value (4.30, α)	0.845	Adjusted Chi Square Value (4.30, β)	0.529
1328	95% Gamma Approximate UCL (use when n>=50)	12.38	95% Gamma Adjusted UCL (use when n<50)	N/A
1329				
1330	Estimates of G	amma Parai	meters using KM Estimates	
1331	Mean (KM)	2.362	SD (KM)	3.063
1332	Variance (KM)	9.38	SE of Mean (KM)	1.25
1333	k hat (KM)	0.595	k star (KM)	0.455
1334	nu hat (KM)	9.518	nu star (KM)	7.282
1335	theta hat (KM)	3.9/1	theta star (KM)	5.19
1336	80% gamma percentile (KM)	3.859	90% gamma percentile (KM)	6.513
1337	95% gamma percentile (KM)	9.382	99% gamma percentile (KM)	16.5
1338	Comm	o Konlon M	olor (KN) Statiation	
1339	Approvimete Chi Squere Velue (7.29, g)		Adjusted Chi Square Value (7.28, P)	1 692
1340	Approximate Chi Square value (7.26, u)	7 202	Adjusted Chil Square Value (7.26, p)	10.000
1341		7.595		10.22
1342	Lognormal GO	F Test on D	etected Observations Only	
1343	Shaniro Wilk Test Statistic	0.683	Shaniro Wilk GOF Test	
1344	5% Shapiro Wilk Critical Value	0.748	Detected Data Not Lognormal at 5% Significance Lev	/el
1345	Lilliefors Test Statistic	0.413	Lilliefors GOF Test	
1346	5% Lilliefors Critical Value	0.375	Detected Data Not Lognormal at 5% Significance Lev	/el
1347	Detected Data	Not Loanorm	nal at 5% Significance Level	
1 2/10				
1340		•		
1349	Lognormal RO	S Statistics	Using Imputed Non-Detects	
1348 1349 1350	Lognormal ROS Mean in Original Scale	S Statistics 0	Using Imputed Non-Detects Mean in Log Scale	-1.917
1349 1350 1351	Lognormal RO Mean in Original Scale SD in Original Scale	S Statistics 2.369 3.269	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale	-1.917 3.283
1348 1349 1350 1351 1352 1353	Lognormal RO Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data)	S Statistics 2.369 3.269 4.558	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL	-1.917 3.283 4.289
1349 1350 1351 1352 1353 1354	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL	S Statistics (2.369 3.269 4.558 4.243	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL	-1.917 3.283 4.289 5.353
1349 1350 1351 1352 1353 1354 1355	Lognormal RO Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS)	S Statistics (2.369 3.269 4.558 4.243 6388852	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL	-1.917 3.283 4.289 5.353
1349 1350 1351 1352 1353 1354 1355 1356	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS)	S Statistics (2.369 3.269 4.558 4.243 6388852	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL	-1.917 3.283 4.289 5.353
1349 1350 1351 1352 1353 1354 1355 1356 1357	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates	S Statistics (2.369 3.269 4.558 4.243 6388852 on Logged [Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL	-1.917 3.283 4.289 5.353
1349 1350 1351 1352 1353 1354 1355 1356 1357 1358	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged)	S Statistics (2.369 3.269 4.558 4.243 6388852 on Logged [-2.393	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean	-1.917 3.283 4.289 5.353 0.0914
1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged)	S Statistics (2.369 3.269 4.558 4.243 6388852 on Logged (-2.393 3.403	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log)	-1.917 3.283 4.289 5.353 0.0914 10.18
1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged)	S Statistics (2.369 3.269 4.558 4.243 6388852 on Logged (-2.393 3.403 1.389	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log)	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316
1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1360 1351	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM SD (logged)	S Statistics (2.369 3.269 4.558 4.243 6388852 on Logged (-2.393 3.403 1.389 3.403	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log)	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18
1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged)	S Statistics (2.369 3.269 4.558 4.243 6388852 on Logged (-2.393 3.403 1.389 3.403 1.389	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log)	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18
1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361 1362 1363	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged)	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log)	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18
1349 1350 1351 1352 1353 1354 1355 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged)	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389 3.403 1.389 3.403	Jsing Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log)	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18
1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged)	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389 3.403 1.389 DL/2 St	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 1000	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18
1349 1350 1351 1352 1353 1354 1355 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1366	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged)	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389 3.403 1.389 2.361	Using Imputed Non-Detects Using Imputed Non-Detects Detects etects Detects Detects Detects Detects Detects Detects Detects Detects Detects Detects D	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18 10.18
1349 1350 1351 1352 1353 1354 1355 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1366 1367	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) CDL/2 Normal	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389 3.403 1.389 DL/2 St 2.361 3.275	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Cr	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18 -2.711 3.954
1349 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1364 1365 1364 1365 1366 1367 1368	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) SD in Original Scale 95% t UCL (Assumes normality)	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.275 4.555 3.55	Jsing Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% I-UCL (KM -Log) 95% DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18 14497316 10.18 -2.711 3.954 7.385E+9
1349 1349 1350 1351 1352 1353 1354 1355 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1366 1367 1368 1369	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) CDL/2 Normal Mean in Original Scale SD in Original Scale	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389 3.403 1.389 DL/2 St 2.361 3.275 4.555 ethod, provid	Jsing Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% I-UCL (KM -Log) 95% I-UCL (IM -Log) 100 II I I I I I I I I I I I I I I I I I	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18 10.18 -2.711 3.954 7.385E+9
1349 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1364 1365 1364 1365 1364 1365 1364 1365 1364 1365 1364 1365 1366 1367 1368 1369 1361	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) CL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389 3.403 1.389 DL/2 St 2.361 3.275 4.555 ethod, provid	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 05% DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL ded for comparisons and historical reasons	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18 -2.711 3.954 7.385E+9
1349 1349 1350 1351 1352 1353 1354 1355 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1364 1365 1366 1367 1368 1369 1370 1371	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) CL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended metal Nonparametal	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389 DL/2 St 2.361 3.275 4.555 ethod, provide otric Distribut	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL Data and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% H-Stat UCL SD in Log Scale 95% H-Stat UCL ded for comparisons and historical reasons tion Free UCL Statistics	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18 10.18 -2.711 3.954 7.385E+9
1349 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1357 1358 1359 1360 1361 1362 1363 1364 1365 1364 1365 1364 1365 1364 1365 1364 1365 1364 1365 1366 1367 1368 1370 1371 1372	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) CDL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me Nonparame	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389 3.403 1.389 DL/2 St 2.361 3.275 4.555 ethod, provid ptric Distribur r Normal Dis	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL 02ta and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% H-UCL (KM -Log) 95% H-Stat UCL 100 Scale 95% H-Stat UCL 100 Scale 100 Scale	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18 -2.711 3.954 7.385E+9
1349 1350 1351 1352 1353 1354 1355 1355 1354 1355 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1364 1365 1364 1365 1364 1365 1364 1365 1364 1365 1366 1367 1368 1369 1370 1371 1372 1373	Lognormal ROS Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) CL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me Nonparame	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389 DL/2 St 2.361 3.275 4.555 ethod, provide ptric Distribur r Normal Dis	Using Imputed Non-Detects Mean in Log Scale SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL 02ta and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% H-UCL (KM -Log) 95% H-UCL (KM -Log) 95% H-UCL (KM -Log) 100 Scale 95% H-Stat UCL 100 Jun Log Scale 95% H-Stat UCL 100 Jun Log Scale 95% H-Stat UCL 100 Jun Log Scale 95% H-Stat UCL 100 Jun Log Scale 100 Jun Log Scale 1	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18 10.18 -2.711 3.954 7.385E+9
1349 1349 1350 1351 1352 1353 1354 1355 1354 1355 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1366 1367 1368 1369 1370 1371 1372 1373 1374	Lognormal RO: Mean in Original Scale SD in Original Scale 95% t UCL (assumes normality of ROS data) 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estimates KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) CL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommended me Nonparame	S Statistics I 2.369 3.269 4.558 4.243 6388852 on Logged I -2.393 3.403 1.389 3.403 1.389 3.403 1.389 DL/2 St 2.361 3.275 4.555 ethod, provid stric Distribur r Normal Dist Suggested	Using Imputed Non-Detects SD in Log Scale 95% Percentile Bootstrap UCL 95% Bootstrap t UCL 95% Bootstrap t UCL 95% Critical H Value (KM-Log) 95% H-Stat UCL 100 for comparisons and historical reasons 100 Free UCL Statistics 100 Free UCL Statistics 100 Free UCL Statistics	-1.917 3.283 4.289 5.353 0.0914 10.18 14497316 10.18 -2.711 3.954 7.385E+9

	A	В	С	D	E	F	G	H		J	K	L
1376												
1377		Note: Sugge	stions regard	ing the selec	tion of a 95%	6 UCL are pr	ovided to hel	p the user to	select the m	ost appropria	ate 95% UCI	
1378			F	Recommenda	tions are ba	sed upon dat	a size, data o	distribution, a	and skewnes	S.		
1379		These reco	mmendations	are based u	pon the resu	Its of the sim	nulation studi	es summariz	zed in Singh,	Maichle, and	Lee (2006)	
1380		lowever, simu	lations result	s will not cov	er all Real V	/orld data se	ts; for additio	nal insight th	ne user may	want to consi	ult a statistic	ian.

	A		В	С		D	E		F	G		Н			J		K	L	
1381																			
1382	PCBs (Tot	al)																	
1383																			
1384									General	Statistics									
1385				Tota	al Num	nber of C	Observa	ations	8				Num	ber	of Distinct	Obse	ervations	5	
1386						Numbe	er of De	etects	2						Number of	Non-	-Detects	6	
1387				N	lumbe	er of Dist	tinct De	etects	2				Nun	nbe	r of Distinct	Non-	-Detects	3	
1388						Mini	imum D	Detect	0.0645						Minimun	n Nor	n-Detect	0.0017	77
1389						Maxi	imum D	Detect	0.102						Maximur	n Nor	n-Detect	0.0062	2
1390						Varia	ince De	etects	6.9522E-4						Percent	Non-	-Detects	75%	
1391						Μ	lean De	etects	0.0831							SD	Detects	0.026	4
1392						Me	dian De	etects	0.0831							CV	Detects	0.317	1
1393						Skewr	iess De	etects	N/A						Kur	tosis	Detects	N/A	
1394					Mea	an of Log	iged De	etects	-2.513						SD of Lo	gged	Detects	0.323	}
1395																			
1396							Warn	ing: D	ata set has	only 2 Det	tecte	ed Values.				-			
1397				Т	This is	s not end	ough to	o comp	oute meaning	gful or reli	iable	e statistics	and estin	nate	es.				
1398																			
1399																-			
1400				Note: Sam	nple s	ize is sr	nall (e.	g., <1	0), if data ar	e collecte	d us	sing ISM ap	oproach, y	you	should use	;			_
1401				guidance p	rovid	ed in ITF	RC Teo	ch Reg	g Guide on Is	SM (ITRC,	, 20	12) to com	pute stati	stic	s of interes	it.			
1402	-			For	exan	nple, you	u may v	want t	o use Cheby	shev UCL	L to	estimate E	PC (ITRO	C, 20	012).				
1403				Chebyshe	ev UC	L can be	e comp	outed u	using the No	nparamet	ric a	and All UCL	. Options	of	ProUCL 5.1	i			-
1404																			
1405	-							Norm	nal GOF Tes	t on Detec	cts (Only							
1406							N	lot End	ough Data to	Perform	GO	F Test							
1407																			
1408				Kaplan	-Meie	er (KM) S	Statistic	cs usiı	ng Normal C	ritical Val	ues	and other	Nonparar	meti	ric UCLs				
1400							KM	Mean	0.0221					ΚM	I Standard E	Error	of Mean	0.018	2
1410							K	M SD	0.0364						95% KM	M (BC	CA) UCL	N/A	
1411						95%	5 KM (t)) UCL	0.0566				95% KN	1 (Pe	ercentile Bo	otstra	ap) UCL	N/A	
1/12						95%	KM (z)) UCL	0.0521					ç	95% KM Bo	otstra	ap t UCL	N/A	_
1412					90%	KM Che	byshev	/ UCL	0.0768					9	5% KM Che	ebysł	nev UCL	0.102	2
1413				97	7.5%	KM Che	byshev	/ UCL	0.136					9	9% KM Che	ebysł	nev UCL	0.203	3
1415	-																		
1415						G	amma	GOF	Tests on De	etected Ob	bser	vations On	ly						
1410							N	lot End	ough Data to	Perform	GO	F Test	-						-
1417																			_
1410							Ga	amma	Statistics or	Detected	d Da	ta Only							
1419							k hat (MLE)	19.54					k s	tar (bias co	orrecte	ed MLE)	N/A	
1420						The	ta hat (MLE)	0.00425				The	eta s	tar (bias co	orrecte	ed MLE)	N/A	_
1421						r	nu hat (MLE)	78.15						nu star (bi	as co	orrected)	N/A	-
1422						Ме	an (de	tects)	0.0831								,		-
1423								,											
1424						Es	timate	s of G	amma Parai	meters usi	ina	KM Estima	tes						
1425							Mean	(KM)	0.0221								SD (KM)	0.036	4
1426						Va	ariance	(KM)	0.00133						SE	of Me	an (KM)	0.018	2
1427							k hat	(KM)	0.368						020	ks	tar (KM)	0.31:	3
1428							nu hat	(KM)	5 891							nu e	tar (KM)	5 01	5
1429						th	eta hat	(KM)	0.06						th	ieta s	tar (KM)	0.010	5
1430				200	% nar	nma ner	centile	(KM)	0.0343					90%		arcent	tile (KM)	0.070	9
1431				00	yai	mma ner	Centile	(KM)	0.0040					99.00 99.00/2			tile (KM)	0.004	5
1432				30	⁷⁰ yai	iiiia hei	condie	(1111)	0.0337					00/0	, gamma pe			0.19	
1433								Gamm	a Kanlan M	aiar (KM)	Stat	tietice							
1434								Janin	ים וזמאומוו-ואו		Jid		۸diua	ted	l aval of Ci	anific	anco (0)	0.010	5
1435													Adjus	sieŭ	Level of SI	JUIIC	ance (þ)	0.019	5

	А	В	С	D	E	F	G	Н		J	K	L
1436		A	pproximate Cl	ni Square Va	lue (5.02, α)	1.159			Adjusted C	hi Square Va	lue (5.02, β)	0.76
1437	95%	Gamma Ap	proximate KM	1-UCL (use w	/hen n>=50)	0.0957		95% Gamm	a Adjusted K	M-UCL (use	when n<50)	0.146
1438												
1439				Lo	gnormal GC	F Test on D	etected Obs	ervations O	nly			
1440					Not En	ough Data to	Perform G	OF Test				
1441												
1442				Loạ	gnormal RO	S Statistics	Jsing Impute	ed Non-Dete	ects			
1443				Mean in Or	riginal Scale	0.0333				Mean i	n Log Scale	-3.765
1444				SD in Or	riginal Scale	0.033				SD i	n Log Scale	0.878
1445		95% t l	UCL (assume	s normality o	f ROS data)	0.0553			95% I	Percentile Bo	otstrap UCL	0.0522
1446			ę	95% BCA Bo	otstrap UCL	0.0587				95% Boo	tstrap t UCL	0.116
1447				95% H-UCL	(Log ROS)	0.0962						
1448												
1449			Statis	tics using KI	V estimates	on Logged I	Data and As	suming Logi	normal Distri	bution		
1450				KM Me	ean (logged)	-5.38				KN	/I Geo Mean	0.00461
1451				KM	SD (logged)	1.659			95% (Critical H Valu	ue (KM-Log)	5.178
1452			KM Standar	d Error of Me	ean (logged)	0.829				95% H-UC	L (KM -Log)	0.469
1453				KM	SD (logged)	1.659			95% (Critical H Valu	ue (KM-Log)	5.178
1454			KM Standar	d Error of Me	ean (logged)	0.829						
1455												
1456						DL/2 S	tatistics					
1457			DL/2 N	Normal					DL/2 Log-T	ransformed		
1458				Mean in Or	riginal Scale	0.0225				Mean i	n Log Scale	-5.225
1459				SD in Or	riginal Scale	0.0387				SD i	n Log Scale	1.72
1460			95% t L	ICL (Assume	s normality)	0.0485				95%	H-Stat UCL	0.766
1461			DL/2 i	s not a recor	nmended m	ethod, provid	ded for comp	parisons and	l historical re	easons		
1462												
1463					Nonparame	etric Distribu	tion Free UC	CL Statistics				
1464				Data do no	ot follow a D	iscernible Di	stribution at	5% Signific	ance Level			
1465												
1466						Suggested	UCL to Use					
1467				95%	KM (t) UCL	0.0566					KM H-UCL	0.469
1468				95% KM	(BCA) UCL	N/A						
1469				Warni	ing: One or ı	nore Recom	mended UC	L(s) not ava	ilable!			
1470												
1471		Note: Sugge	estions regard	ing the selec	tion of a 95%	UCL are pr	ovided to hel	p the user to	select the m	lost appropria	ate 95% UCL	
1472			R	ecommenda	tions are bas	sed upon dat	a size, data (distribution,	and skewnes	S.		
1473		These reco	mmendations	are based u	pon the resu	Its of the sim	ulation studi	es summariz	zed in Singh,	Maichle, and	Lee (2006).	
1474	Ho	wever, simu	ulations result	s will not cov	er all Real W	/orld data se	ts; for additic	onal insight th	ne user may	want to consu	ult a statisticia	an.

	A	В	С	D	E	F	G	Н		J	K	L		
1475														
1476	TBT													
1477														
1478						General	Statistics					-		
1479			Total	Number of C	bservations	8			Numl	ber of Distinct	Observations	4		
1480				Numbe	r of Detects	3				Number o	f Non-Detects	5		
1481			N	umber of Dist	inct Detects	3			Num	nber of Distinc	t Non-Detects	1		
1482				Mini	mum Detect	9.9291E-4				Minimu	m Non-Detect	5.0000E-4		
1483				Maxi	mum Detect	0.0203				Maximu	m Non-Detect	5.0000E-4		
1484				Varia	nce Detects	1.1886E-4				Percen	t Non-Detects	62.5%		
1485				М	ean Detects	0.0136					SD Detects	0.0109		
1486				Med	lian Detects	0.0194					CV Detects	0.803		
1487				Skewn	ess Detects	-1.72				Ku	rtosis Detects	N/A		
1488				Mean of Log	ged Detects	-4.918				SD of Lo	gged Detects	1.73		
1489														
1490					Warning: D	ata set has	only 3 Dete	cted Values.						
1491			Т	his is not end	ough to comp	pute meaning	gful or reliat	ole statistics	and estim	nates.				
1492														
1493														
1494			Note: Sam	ple size is sn	nall (e.g., <1	0), if data ar	e collected	using ISM ap	oproach, y	ou should us	e			
1495			guidance pr	ovided in ITF	C Tech Reg	g Guide on IS	SM (ITRC, 2	2012) to com	pute statis	stics of interes	st.			
1496			For	example, you	i may want t	o use Cheby	shev UCL t	o estimate E	PC (ITRC	;, 2012).				
1497			Chebyshe	/ UCL can be	computed u	using the No	nparametric	and All UCI	_ Options	of ProUCL 5.	1			
1498	Normal GOF Test on Detects Only													
1499	Normal GOF Test on Detects Only													
1500			S	hapiro Wilk T	est Statistic	0.784			Shapiro	Wilk GOF Te	st			
1501			5% S	hapiro Wilk C	ritical Value	0.767	D	etected Data	appear No	ormal at 5% S	ignificance Le	vel		
1502				Lilliefors T	est Statistic	0.371			Lilliefo	ors GOF Test				
1503			5	% Lilliefors C	ritical Value	0.425	D	etected Data	appear No	ormal at 5% S	ignificance Le	vel		
1504				Det	ected Data	appear Norm	nal at 5% Si	gnificance Lo	evel					
1505			<u> </u>											
1506			Kaplan-	Meier (KM) S	statistics usi	ng Normal C	ritical Value	es and other	Nonparam	netric UCLs				
1507					KM Mean	0.0054				KM Standard	Error of Mean	0.00362		
1508				05%	KM SD	0.00835			050/ 1/14	95% K	M (BCA) UCL	N/A		
1509				95%	KM (t) UCL	0.0123			95% KM	(Percentile B	ootstrap) UCL	N/A		
1510				95%	KM (z) UCL	0.0114				95% KM Bo	otstrap t UCL	N/A		
1511				JU% KM Chel	byshev UCL	0.0163				95% KM Ch	ebysnev UCL	0.0212		
1512			97	.5% KW Che	Sysnev UCL	0.028				99% KM Ch	ebysnev UCL	0.0414		
1513						Tests on De	tested Obe	an ations Or						
1514						Tests on De		OF Teet	lly					
1515						ougn Data to	Periorini G	OFTest						
1516						Otatiatian an	Data ata d	Data Oaki						
1517								Data Only		la atau (bia a a		N1/A		
1518						0.941			The	K star (blas co		N/A		
1519					a nat (MLE)	0.0144			Inet	ta star (blas co		N/A		
1520				n		0.0100				nu star (b	las corrected)	IN/A		
1521	21 Mean (detects) 0.0136													
1522					amma DOO			d Non Date -	*0					
1523			0000							ot multiple DI				
1524		6800		when keter	when data s						$\frac{5}{(0.0.51\pm0.0)}$			
1525		GRUS IIIa				mothod mothod	viold incom				(c .y., <10-20)			
1526			Fo	such situati		method may	yieia incorre	ect values of		DIVS				
1527		F	mmo distuite	 		any true whe	une sampl	e size is sma	111.	bution on 1/14	ootimete -			
1528		⊢or gai	mma distribut	.ea aetected	Jata, BIVs a		y de compu	tea using gar	nma distri	Dution on KM	esumates	0.0110		
1529	1				Minimum	9.9291E-4					Mean	0.0113		

	A B C D E	F	G H I J K	L
1530	Maximum	0.0203	Median	0.01
1531	SD	0.00611	CV	0.539
1532	k hat (MLE)	2.21	k star (bias corrected MLE)	1.465
1533	Theta hat (MLE)	0.00513	Theta star (bias corrected MLE)	0.00774
1534	nu hat (MLE)	35.37	nu star (bias corrected)	23.44
1535	Adjusted Level of Significance (β)	0.0195		
1536	Approximate Chi Square Value (23.44, α)	13.42	Adjusted Chi Square Value (23.44, β)	11.55
1537	95% Gamma Approximate UCL (use when n>=50)	0.0198	95% Gamma Adjusted UCL (use when n<50)	N/A
1538		•		
1539	Estimates of G	iamma Para	meters using KM Estimates	
1540	Mean (KM)	0.0054	SD (KM)	0.00835
1541	Variance (KM)	6.9763E-5	SE of Mean (KM)	0.00362
1542	k hat (KM)	0.418	k star (KM)	0.345
1543	nu hat (KM)	6.693	nu star (KM)	5.516
1544	theta hat (KM)	0.0129	theta star (KM)	0.0157
1545	80% gamma percentile (KM)	0.00853	90% gamma percentile (KM)	0.0156
1546	95% gamma percentile (KM)	0.0236	99% gamma percentile (KM)	0.044
1547				
1548	Gamm	na Kaplan-M	eier (KM) Statistics	
1549	Approximate Chi Square Value (5.52, α)	1.398	Adjusted Chi Square Value (5.52, β)	0.942
1550	95% Gamma Approximate KM-UCL (use when n>=50)	0.0213	95% Gamma Adjusted KM-UCL (use when n<50)	0.0316
1551				
1552	Lognormal GC	OF Test on D	Detected Observations Only	
1553	Shapiro Wilk Test Statistic	0.761	Shapiro Wilk GOF Test	
1554	5% Shapiro Wilk Critical Value	0.767	Detected Data Not Lognormal at 5% Significance Level	
1555	Lilliefors Test Statistic	0.381	Lilliefors GOF Test	
1556	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Leve	rel
1557	Detected Data appear A	Approximate	Lognormal at 5% Significance Level	
1558				
1559	Lognormal RO	S Statistics	Using Imputed Non-Detects	0.100
1560	Mean in Original Scale	0.00514	Mean in Log Scale	-8.439
1561	SD in Original Scale	0.0091	SD in Log Scale	3.4
1562	95% t UCL (assumes normality of ROS data)	0.0112	95% Percentile Bootstrap UCL	0.0102
1563	95% BCA Bootstrap UCL	0.0124	95% Bootstrap t UCL	0.138
1564	95% H-UCL (Log ROS)	33148		
1565				
1566	Statistics using KM estimates			0.00107
1567	KM Mean (logged)	-0.595	KM Geo Mean	0.00137
1568	KM SD (logged)	1.001		4.907
1569		0.070		0.0035
1570	KM Standard Ever of Maan (larged)	0.676	55% Chucai n Value (KM-LOg)	4.907
1571	Kivi Stanuaru Error of Mean (logged)	0.070		
1572		0 0	tatistice	
1573	DI /2 Normal	00/2 5		
1574	DLZ INOTITIAL Moon in Original Socia	0 00525	DL/2 Log-HallSloffieu	-7 029
1575	Mean In Original Scale	0.00020		1 077
1576		0.00903		0.584
1577	DL/2 is not a recommanded m	ethod provide	ded for comparisons and historical reasons	0.004
1578		eniou, provi		
1579	Nonsora	atric Distribu	tion Free LICL Statistics	
1580			stributed at 5% Significance Level	
1581			Sandated at 570 Organicalite Level	
1582		Suggested		
1583		0.0122		
158/	95% KIVI (I) UCL	0.0123		

	A	В	С	D	E	F	G	H		J	K	L		
1585														
1586	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.													
1587		Recommendations are based upon data size, data distribution, and skewness.												
1588		These recor	mmendations	are based u	pon the resu	Its of the sim	nulation studi	es summariz	zed in Singh,	Maichle, and	Lee (2006)			
1589		However, simu	lations result	s will not cov	er all Real V	/orld data se	ts; for additic	nal insight th	ne user may	want to consu	ult a statistic	ian.		

	A	В	С		D		E		F	G		H			J			K		L
1590	C10-C36																			
1591	510-000																			
1592									General	Statistic	s									
1593			т	[otal	Numbe	r of O)hservati	one	8				Nu	Imhor	of Die	tinct (Ohee	rvations		6
1594				otai	N		or of Dete		5				INC		Numb		Non-			3
1595				Nı	mber o	of Dist	inct Dete		5				N	umhe	r of Dis	stinct	Non-		<u> </u>	1
1596						Minii		tect	5						Min	himum			-	י י
1597						Maxi		tect	650						Max	/imum		n-Detect	r	3
1598						Varia			70189						Poi	rcent	Non-		-	37.5%
1599						M			195.6										2	64.9
1600						Mer	tian Dete		88								CV	Detects		1 354
1601					S	kewn	ess Dete	ects	1 823							Kurt	tosis	Detects		3 358
1602					Mean o	flog			4 276						SD		hanr	Detects	<u> </u>	1 847
1603							geu Dell	5013	4.270						501		yyeu	Delecia		1.047
1604			Note: 9	Samr	محاء مار	ie en	nall (o a	<10	0) if data ar	a collect	tod u	eing ISM a	nnroach		ebould	d ueo				
1605					vided i	in ITE		, > I				(12) to com		i, you		toroct	•			
1606			guiuaric	E pro	vample						C, 20				-5 01 III	101031	ι.			
1607			Choby			, you			sing the No					r_{0}, z	Drol IC	151				
1608			Cheby	Silev			compu	leu u	Ising the NO	nparame				15 01	FIUUC	L 3. I				
1609							N	lorm		t on Dot	ooto	Only								
1610				C	aoniro V		oct Stati	istic		l on Dei	ICCIS .	Only	Shanir	ro \//i		Tost	•			
1611			5	0/ 04				suc	0.765		Det		Shaph	Norn			L anifia			
1612			5	70 31				atie	0.702		Dei						gninc	ance Le	ver	
1613				50				suc	0.291		Det			Norn			anifia			
1614				5	% Liller		nucal va		0.343	al at 50				NOIT	nai at o	୦% ତାତ୍	gninc	ance Le	ver	
1615						Del		ลเลล	appear Norri	iai at 5%	o Sigi	nincance L	evei							
1616			Kon	lon I	Anior (k		Statiation		a Normal C	ritical \/	aluaa	and other	Nonnor	omot						
1617			Кар	nan-r	vielei (r	(IVI) C		usii	122 /		alues		мопра	amer		LS	Fror	of Moon		00 70
1618								ean	200.2					r.w					2	02.72
1619						050/		50	209.3				050/ 1/		90 oroonti				2	.50.5
1620	-					95%			260.1				90% r				otetra		2	80.4
1621				0	00/ KM	90 %			209.0						95 /0 KI		bych		- 0	09.4 01
1622				9	5% KM	Chel			640								bysi		- 4	-04 M6 5
1623				97.	5 /6 KIVI	Cher	bysnev c	JCL	040					2	99 /0 KI		bysi		9	40.5
1624						6	amma (Tosts on Do	tootod (Oheo	nuations ()	alv							
1625									0 172		Juse		ndoroo		ding C(0.01			
1626					5% /			suc	0.172	Dot	octod	data anno	ar Comr				5% C	ignifica	200	
1627					J /0 F	ч-D С к с т	oct Stati	intic	0.703	Dell	ecieu				Smirne			nynnicai		Level
1628					5% k			suc	0.142	Dot	octod	data anno			stribute		אר 5% פ	ignifica	200	
1629					Doto			noor	Commo Die						SIIDUle		5/0 3	lynnica		Levei
1630					Dele	SCIEU	uala ap	pear	Gamina Di	sinduted	alo	% Significa								
1631							Gom		Statiation or	Dotoot		to Only								
1632										Delect	eu Da			I	stor /h:-	20.00	rroct		<u> </u>	0 270
1633						That			319				T	K S	star (bi		rrecte		F	0.379
1634						et			6 150					neld S		as COI				3 70/
1635						n 			105.6						nu sta		as C0	mected)	⊢	J.794
1636						we	an (uete	015)	0.661											
1637							amme r	000	Statiation	ing Im-	ام مؤر رو	Non Data	te							
1638			CPOS	movi	not ha	USON		103				null-Delec			multin					
1639		CPOS ~-	GRUS	may	NULDE I	usea	when aa					inly tied obs					, 	<15 00V		
1640		ыкор ma	IY HOLDE I	used	when k	siar o			mothed me	×1.∪, €	spec					nali (e	e.g.,	10-20)		
1641				FO	such s	intuati	ons, GR	05 r	nethod may		correc	i values of		na B	I VS					
1642		F	nove '' ·		od -!- '	 		pecia	ally true whe	n the sa	mple	size is sma	111.		Hor -	1/14				
1643		⊦or ga	mma dist	ribut	ea dete	cted (aata, B M	vsa	nd UCLs ma	y be cor	npute	ed using ga	mma dis	stribut	uon on	ĸMe	estima	ates		00.0
1644							Minim	num	0.01									Mean	1	22.3

	A B C	DE	F	G	Н		J	K	L
1645		Maximum	650					Median	19.17
1646		SD	224.4					CV	1.835
1647		k hat (MLE)	0.192				k star (bias co	orrected MLE)	0.203
1648		Theta hat (MLE)	637.4			The	ta star (bias co	orrected MLE)	601.7
1649		nu hat (MLE)	3.069				nu star (b	ias corrected)	3.252
1650	Adjusted	Level of Significance (β)	0.0195						
1651	Approximate Cl	ni Square Value (3.25, α)	0.451			Adjusted	I Chi Square \	/alue (3.25, β)	0.262
1652	95% Gamma Approximate	e UCL (use when n>=50)	882.2		95% Ga	amma Adji	usted UCL (us	e when n<50)	1518
1653									
1654		Estimates of G	amma Para	meters using	KM Estima	ites			
1655		Mean (KM)	123.4					SD (KM)	209.3
1656		Variance (KM)	43793				SE	of Mean (KM)	82.72
1657		k hat (KM)	0.348					k star (KM)	0.301
1658		nu hat (KM)	5.564					nu star (KM)	4.811
1659		theta hat (KM)	354.9				ti	neta star (KM)	410.4
1660	80%	b gamma percentile (KM)	189.4				90% gamma p	ercentile (KM)	363.9
1661	95%	a gamma percentile (KM)	564.1			L.	99% gamma p	ercentile (KM)	1084
1662		0	a Kanlan M						
1663	Annrovimete Cl		1 066	eler (KM) Sta	atistics	Adjustos		(alua (1.91.0)	0.60
1664		The square value (4.81, α)	1.000		050/ 000000	Adjusted		/alue (4.81, β)	0.69
1665	95% Gamma Approximate Kiv	I-UCL (use when h>=50)	557		95% Gamm	la Adjuste		e when h<50)	800
1666		Lognormal GO	E Toot on D	atacted Oba	an/ationa O	nhv			
1667		Lognormal GO			ervations O	Chapiro		-+	
1668	50/ 24	napiro Wilk Test Statistic	0.960	Doto	otod Doto o	Shapiro	normal at 5%	Significance	ovol
1669	5 % 31		0.702	Dele					evei
1670	E		0.143	Detr	atad Data a			<u> Cignificanca I</u>	aval
1671	5			mal at 5% S			jiiuiiiai at 5 %		evei
1672			pear Logilo		nymincance	Level			
1673		l ognormal ROS	S Statistics	Ising Impute	d Non-Dete	orts			
1674		Mean in Original Scale	122 5				Mea	n in Log Scale	2 343
1675		SD in Original Scale	224.3				S) in Log Scale	3.09
16/6	95% t UCL (assume	s normality of ROS data)	272.7			95	% Percentile F	Bootstrap UCI	259.8
16//		35% BCA Bootstrap UCL	316.9				95% Bo	ootstrap t UCI	861.8
1678		95% H-UCL (Log ROS)	61950364						
1679		()							
1680	Statis	tics using KM estimates	on Logged [Data and Ass	suming Logi	normal Dis	stribution		
1681		KM Mean (logged)	3.084					KM Geo Mean	21.85
1602		KM SD (logged)	2.018			959	% Critical H Va	alue (KM-Log)	6.186
1603	KM Standar	d Error of Mean (logged)	0.798				95% H-U	ICL (KM -Log)	18738
1695		KM SD (logged)	2.018			959	% Critical H Va	alue (KM-Log)	6.186
1696	KM Standar	d Error of Mean (logged)	0.798						
1627		,							
1688			DL/2 S	tatistics					
1689	DL/2 N	lormal				DL/2 Log	g-Transforme	d	
1690		Mean in Original Scale	122.8				Mear	n in Log Scale	2.824
1691		SD in Original Scale	224.1				SE) in Log Scale	2.442
1692	95% t U	ICL (Assumes normality)	272.9				95	% H-Stat UCL	305752
1693	DL/2 i	s not a recommended me	ethod, provid	ded for comp	arisons and	l historica	l reasons		
1694									
1695		Nonparame	etric Distribu	tion Free UC	L Statistics				
1696		Detected Data appea	r Normal Dis	stributed at 5	i% Significa	nce Level			
1697									
1698			Suggested	UCL to Use					
1699		95% KM (t) UCL	280.1						
				0					

	A	В	C	D	E	F	G	Н		J	K	L
1700												
1701		Note: Sugge	stions regard	ling the sele	ction of a 95%	% UCL are p	rovided to hel	p the user to	select the m	nost appropri	ate 95% UC	CL.
1702			F	Recommenda	ations are ba	sed upon da	ta size, data	distribution,	and skewnes	S.		
1703		These record	mmendation	s are based	upon the resi	ults of the sin	nulation studi	es summariz	zed in Singh,	Maichle, and	d Lee (2006).
1704		However, simu	lations result	s will not co	ver all Real V	Vorld data se	ets; for addition	onal insight tl	he user may	want to cons	ult a statisti	cian.
1705												

Appendix E - Laboratory certificates

ي. 19 التاني الم
No 👝 🕅 A
No N/A
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(BCL)-
Hold
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1

Z = Zinc Acetato Preserved Bottle; E = EDTA Preserved Bottles; ST = Stenle Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

24-14 1. 4. 5 I	CHAIN OF CUSTODY ALS Laboratory. ploase tick →	CADELA 10 Ph: 05 8369 DHRIGHAM Ph: 07 3245 DGLADSTC Ph: 07 7474	21 Burnta Road Poi 0890 F: adelaide@al F 32 Shand Straet St 7222 E: samplos bits NE 46 Cellemotidah 5500 E: gladslone@	prava SA 2005 Itajiolati.com Itafioni QLD 4053 sopreggiologiobal.com Drive Chrish QLD 4580 alsguobal.com	EMACKAY 78 Hartxie Pix 07 4944 0177 El mi EMELEOURNE 2-4 W Ph: 03 6519 6600 E1 co EMUDGEE 27 Sydney Ph: 07 6172 6735 f., mi	Road Mackay OLI ackay@asguebal o estall Road Sering amplestite pournal Road Mudgee NS angee mail@alsg to	D 4740 orn Mole VIC 317 @alsglobal o W 2850 Ibal.com	DNFWCAST Ph; 02 4908 /1 DNOWRU 000 Ph; 02442 Citiffi Ph; 0	(LE 5 Rose Gum) 9433 Et samples, 4443 Geery Pler 13 2063 Et now at RTH 10 Hod Way 6 9209 7855 Et s	Road Warabroo newcastio@fais w North Nriwin @elsglobal com Mataga WA û amptes.perita@	ik NSW 2304 globa' com NSW 2541 - 950 950 950 com		US ^V Ph. (UTC Pho Pho Pho Pho	(DNEY 2 02 8764 (02 8764 (02 8764 (04 876 (01 6 876 (02 4225 (77-289 V 8656 Et: LLE 14 1 9600 Et CONG 99 3125 Et	Woodpart samples: 16 Desma rownes/16 9 Kenny (portkern)	k Road S: sydney@; a Court B: lo.chvironik Street Wio bla@atigt	nithfield N alsglobal t the QLD 4 tental@to's tongong f total.com	ISW 2164 tom 4818 9-061 com NSW 2501	і и
CLIENT:	GHD Pty Ltd		TURNAROUN		Standard TAT (List	due date):					FÖR	ABORAT	XRY US	E ÓNI	LY (C	ircle)				
OFFICE:	level 15, 133 Castlereagh St, Sydney		(Standard TAT n some tosts e.g.	nay be longer for	Non Standard or ur	gent TAT (List	t due date):			Custo	dy Seal Intect	7				Yes		No	(N/A)
PROJECT	: 12517048		ALS QUOTE	ND.: S	SY-552-19			COC SEQ(JENCE NUMB	ER (Circle)	F100 1	2 / frozen ice	bneks (orasent	uponin	eceipt	Yes		No	N/A
ORDER N	UMBER:						{	* 1 (2)	34	56	7 Rando	m Sample Te	emperati	ire on R	(eccipt:		29	1	C	
PROJECT	MANAGER: Carmen Yi	CONTACT P	'H: 0451 962 98	8			OF	. 1 2	34	5 6	7 Solher	comment.	10 an 19 19 an 19			<u></u>	ا ہ ھے	<u> </u>		
SAMPLER	: Sarah Eccleshali	SAMPLER N	AOBILE: 0459 5	546 332 RE	ELINQUISHED BY:		REC	CEIVED BY:			RELINQUIS	HED BY:				RECE	State	#Y: •0		
COC emai	led to ALS? (YES / NO)	EDD FORM/	AT (or default):	S.	Eccleshall		5	op M.									0,0	ት።		
Email Rep	orts to: sarah.eccleshall@ghd.com; carmen	.yi@ghd.com; labreprots(Bghd.com	DA	ATE/TIME:		DAT	FE/TIME:			DATE/TIME	:				DATE	TIME:	L a	. 7	
Email Invo	pice to (will default to PM if no other addresse	as are listed):														3		<u>s icq</u>	<u> </u>	.47
COMMEN	TS/SPECIAL HANDLING/STORAGE OR DIS	POSAL: Please inform	GHD contacts (of any possible holdir	ng time issues that a	are pecieved	with thea	ie samples												
ALS USE	SAMPLE DETAILS	LID (Ŝ) WATER (W)		CONTAINER I	NEORMATION			ANALY Where Metals	SIS REQUIRE are required, s	D including pecify Total	SUITES (NB. Su unfiltered bottle	ite Codes m required) or l	ist be lis Dissolve	ted to a ad (field	ittract si i filterer	uite pric 5 bottle r	:e) required) .		
LABID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVA (refer to c below)	TOTAL AAL	ASS Field Screen (pH field ad pHfox)	Phenols	TRH	BTEXN	100	TCN	OCIOPIPCB	РАН	Total Fluoride	vocs	Particle Size distribution	ICMPS Metals (15 metals + Iow level Hg)			Hold
13	VC03_0.0-0.1	30/10/2019 22:15	S	ASS	1	×										ļ				ļ
14	VC03_0.5-0.6	30/10/2019 22:1 5	s	ASS	1	x												ľ		i
15	VC03_10-1.1	30/10/2019 22:15	S	ASS	1	x						, 								
116	VC01_0.0-0.1	30/10/2019 23:45	S	ASS	ĩ	×				-			ł						ļ	
17	vc01_0.5-0.8	30/10/2019 23:45	S S	ASS	1	×								T					j	
12	VC01_1.0-1.1	30/10/2019 23:45	s	ASS	1 _	x)			\ \ \						
(9	VC02_0.0-0.1	30/10/2019 23:45	s	ASS	1	x			ļ											
20	VC02_0.5-0.6	30/10/2019 23:45	5	ASS	1	x		ا) l											
21	VC02_0.9-1.0	30/10/2019 23:45	s	ASS	1	×						[i								
22	VC02_1.5-1.6	30/10/2019 23:45	S	ASS	1	x]		ļ
23	VC10_0.0-0.1	31/10/2019 0;45	S	ASS	1	x				l I										
. 2	VC10_0.5-0.6	31/10/2019 0:45	S	ASS	1	x														
					TOTAL	12	_												į	
Water Con V = VOA Vi Z = Zinc Ac	isiner Codes: P = Unpreserved Plastic; N = Nitri al HCI Preserved; VB = VOA Vial Sodium Bisulphal state Preserved Bottle; E = EDTA Preserved Bottle	c Preserved Plastic; ORC = le Preserved; VS = VOA Vial es; ST = Sterile Bottle; ASS =	Nítric Preserved (Sulfuric Preserve - Plastic Bag for A	DRC; SH = Sodium Hydro ad; AV = Airfreight Unpresi Add Sulphate Soils; B = Ui	oxide/Cd Preserved; S erved Vial SG = Sulfuri npreserved Bag.	= Sodium Hydro c Preserved An	xide Prese nber Glass	rved Plastic; A0 ; H = HCl pres	3 = Amber Gla erved Plastic;	ss Unpreserv HS = HCI pre	ed; AP - Alrfreig served Speciati	ht Unpreserv on bottle; SP	ed Plast = Sulfur	ic ic Prese	erved P	'lastic; i	F = Form	aldehyd	le Presé	rved Glass;

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197 P. L.	C C	HAIN OF CUSTODY ALS Laboratory: please tick ->	LIADELA DI, Ph. 08 6559 I UBRISBANE Ph. 07 2243 UGLADSTO Ph. 07 7471	21 Brieffa Road Por 1820 Er arfelakte@yal 192 Shand Street St 2222 Lr samples.ons NE 46 Collemondoh 5600 El gladstona@r	praka SA 3085 Isglobal com Isflord QLD 4053 stane@alsglobal com Drive Ginton QLD 4680 Islaglobal.com	LIMACKAY 78 Herber Pol 07 4944 0177 F : DMELBOURNE 2-4 Ph: 03 8649 9000 € DMUDGEE 27 Synhe Ph: 02 6372 6735 b : 1	nr Road Mackey C mackay@elsp obo Westali Road Spri samples melbourn y Road Mudgee I- nudgee mal@also	() D 4740 (con) ngvale VIC 3 nggalsglobal 46W 2850 gkoal 46m	UNEWCAS Ph-16:4998 3171 ON096 100-11 Ph:0244 DP5 Ph:	ME 5 Rose Gun 194321,1 skmale: A 4/15 Gesky Fo 23 2003 8 mows 28 TH 10 Hod Wa 98 9209 7655 F:	n Road Waraboo s.newcastie(gals aus North Nowna a@alsg15b31.com ay Mologa WA 6 samples.penh@	ok NSVV 2304 glopal.com NSVV 2541 1 080 a sglobal.com		ԱՏ՝ Բո ՄՈ Քի ԱԿԿ Քո	(ONEY 277- 02 6764 855 0WA SVILLE 07 4786 660 011 ONGON 02 4225 312	289 Woor 5 El somo 14-15 De 6 El towno 6 El towno 6 El towno 6 El towno	park Road Iostsydney sona Conri svitetartvo svitetartv	l Smithfield /@alsgroos I Horke Ol onnestel@i Wollongonj Wollongonj splotal.cor	LNSW 21 al com D 4658 Bisglotiato G NSW 20 Th	154 2017 560
CLIENT:	GHD Pty Ltd			TURNAROUN	ND REQUIREMENT (Standard TAT (Lis	st due date):					FOR	LABORAT	ORY US	E ONLY	(Circle	r us j			
OFFICE:	ievel 15, 133 Castlereagh §	St, Sydney		(Standard TAT m some tests e.g.	nay be longer for Ulira Trace	Non Standard or u	irgent TAT (Li	st due dat	te):			Cust	ody Seal Inter	t?			Yés	() (1997) (1997)	No	(W)
PROJECT	: 12517048			ALS QUOTE	NO.:	SY-552-19			COC SEQ		BER (Circle)	Free	ice/ frozen io	e bricks j	present up	on receir	r Yes)	No	N/A
ORDER N	UMBER:			1					DC: 1 2	3 4	56	7 Rand	iom Sample T	emperati	ire on Rec	âipt:			°C	
PROJECT	MANAGER: Carmen Yî		CONTACT P	H: 0451 962 98	8			c	0F: 1 2	34	56	7 Other	r comment:				<u> </u>	<u> </u>	<u></u>	_
SAMPLE	t: Sarah Eccleshall		SAMPLER M	OBILE: 0459 5	i46 332 R	ELINQUISHED BY:		R	ECEIVED BY:			RELINQUI	SHED BY:			RE	CEIVER) BY:		
COC ema	iled to ALS? (YES / NO)		EDD FORMA	T (or default):	s	. Eccleshall			Oep M.							-	- 20	- A.	£	
Email Rej	oorts to: sarah.eccleshall@gl	hd.com; carmen.yi@ghd.c	com; labreprots@)ghd.com	P	ATE/TIME:		DA	ATE/TIME:			DATE/TIM	E:			DA	TE/TIM	E: La la	4 /	925
Email Inv	oice to (will default to PM if n	o other addresses are liste	ed):														<u>`\$!</u> {	(0)	<u> </u>	<u>د</u> ۲۵
COMMEN	TS/SPECIAL HANDLING/ST	ORAGE OR DISPOSAL:	Please inform 0	SHD contacts of	of any possible holdi	ing time issues that	are pecieved	d with the	se samples											
ALS USE	SAMPLE DETAILS	MATRIX SOLID (S) W	ATER (Ŵ)		CONTAINER 1				ANALY Where Metals	SIS REQUIRE are required,	ED Including specify Total	SUITES (NB. S (unfiltered bottle	uite Codes m s required) or	ust be lis Dissolve	ted to attra d (field filt	ct suite p ered bott	rice) le requir	ed).		
LAB ID	SAMPLE ID	DA DA	TE / TIME	MATRIX	TYPE & PRESERVA (refer to below)	CONTAINERS	ASS Field Screen (pH field ad pHfox)	Phenols	Har	BTEXN	20	N	OC(OP/PCB	AH	Total Fluoride	Particle Size	distribution CMPS Metals (15			plot
25	VC11 0.0-0.1	30/10)/2019 20:00	s	ASS					-						<u> </u>				
26	VC11_0.5-0.6	30/10)/2019 20:00	s	AŝS	1	×					- +- L			+ <u>1</u> 					
27	VC11_1.0-1.1	30/10	/2019 20:00	s	ASS	1	x													
B	VC09_0.0-0.1	30/1D)/2019 20:45	5	ASS	[; 1	x) .)								
29	VC09_0.5-0.6	30/10)/2019 20:45	s	A55	1	×					1								
30	VC09_0.9-1.0	30/10)/2019 20:45	s	ASS	1	x													
31	VC07_0.0-0.1	30/10	0/2019 21:00	s	ASS	1	x													
32	VC07_0.5-0.8	30/10)/2019 21: 0 0	s	ASS	1	x								l +				L	
_ 33	VC07_1.0-1.1	30/10)/2019 21:00	s	ASS	1	×													
34	VC05_0.0-0.1	30/10)/2019 21:45	s	ASS	1	×								۱ ۱				└──┤	
- 35	lvc05_0.5-0.6 t	30/10	0/2019 21:45	_ s	ASS	1	x) ' +				<u> </u>	
- 36	VC05_0.8-1.0	30/10)/2019 21:45	s	ASS	1	×													
*					5	TOTAL	12													

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Ainfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

enu	CHAIN OF CUSTODY CALFECT FERENCE 1974.3 CALFECT FERENCE 1974.3 CHAIN OF CUSTODY ALS Laboratory: please tick -> CHAIN OF CUSTODY ALS Laboratory: please tick -> CHAIN OF CUSTODY ALS Laboratory: please tick -> CHAIN OF CUSTODY CHAIN OF CUSTODY CUSTON					EIMAC Pitt C7 Ph. 03 Ph. 03 Ph. 02 Ph. 02	CKAY 78 Farbour 7 4944 0177 Filmse 1 KOURNE 2-4 Wi 3 8549 8500 Fillsa 8 549 8500 Fillsa DGEE 27 Sydney 2 5372 6735 Ellmu	Rrad Markay C ickay®eloglobal estali Road Sym mpics moloourn Road Mudgee N idgee.mail@jalsg	() (D 4740 com com co@alsglobalic SW 2850 jlobal.com	UNEWCA8 Ph. 62 4968 11 UNOWP 6n3 Phy 0244 UP5 Phy Phy	TLE 5 Rose Gum 9433 Et camples A 4/13 Geary Pla 23 2063 E rowed RTH 10 Hod Wa 93 9209 A655 T	Road Worabrod newcostic@ofs ice Norib Nowra ລີເວລີຍຽງໄປເອ ¹ com ທູ Malogal WA ຍີ samplex.cw1ຄຜູ້	k NSW 2304 giobal com NSW 2541 090 silegiobal com		שטי דה: Ph: שעים Ph:	(DNHY 2 52 8784 (DWNSV4 07 4790 (OLTONG 02 4225 (977-2()9 8555 F LLF 14- 0600 E SONG 9 3125 E	Worktpar seropies to Desno townesti S Kenny (portkem)	ж Road S .sydney@ a Court a teteroironr Street Wit Dia@elsgi	m thread NS etsglobel.co onle QLD 4 nentalgialsg stongong N bbal.com	SW 2164 om 816 Jobal com ISVY 2500	
CLIËNT:	GHD Pty Ltd			TURNAROUN	ID REQUIREMENT	🗍 Stand	lard TAT (List	due date):	•				FØR	LABORAT	ORY US	EONL	LY (C	ircle)	÷.			
OFFICE:	level 15, 133 Castlere:	agh St, Sydney		(Slandard TAT n some tests e.g.	nay be longer for Utira Trace	🗆 Non S	Stendard or urg	ent TAT (Li	st due date):			Ċusić	dy Seal Hiat	17				Yes		No	(NA
PROJECT	: 12517046			ALS QUOTE	NO.:	SY-552-1	19			COC SEQ	UENCE NUMB	ER (Circle)	Rec	Frozen la	e bricks j	vresent	upon n	ecelp	Yes	1	No	NA
ORDER N	UMBER:			1					coc	. 1 2	3 A)) 5 6	7 Rand	om Sample T	emperal	ire on R	eceipt		d and a	۲ ،		
PROJECT	MANAGER: Carmen	Yi	CONTACT P	H: 0451 962 98	8				OF:	1 2	3 4	56	7 Other	comment.					3-9		N. H. S. Santa	
SAMPLER	t: Sarah Eccleshali		SAMPLER N	OBILE: 0459 5	46 332	RELINQUI	ISHED BY:		REC	EIVED BY:			RELINQUI	SHED BY:				RECE	SIVED	ay: J.		
COC ema	led to ALS? (YES /	NO)	EDD FORM	AT (or default):		S. Ecclesh	hall		5	pM.			Į						Sor	SH A	, FS	
Email Rep	orts to: sarah.ecclesha	all@ghd.com; carmen.	yi@ghd.com; labreprots(@ghd.com		DATE/TIM	IE:		ГАО ⁽	e/TIME;			DATE/TIM	E:				DATE	STIME:			
Email Inve	bice to (will default to Pf	M if no other addresse	s are listed):															-	31 (1	0 19	1849	5
ALS USE	SAMPLE DETAILS	MATRIX: SO	LID (S) WATER (W)		CONTAINE	R INFORM	ATION			ANAL 1 Where Metals	SIS REQUIRE are required, a	D including specify Total (SUITES (NB. S	ulte Codes m e required) or	ust be lis Dissolvé	ted to at koi (ficio)	ttract s filterec	uite pric I bottle i	:e) required	().		
LAB IO	SAMPI	LE ID	DATE / TIME	MATRIX	TYPE & PRESER (refer below)	VATIVE to codes	TOTAL	ASS Field Screen (pH field ad pHfox)	Phenols	TRH	BTEXN	Toc	TCN	OC(OP/PCB	РАН	Total Fiuoride	VOCs	Particle Size distribution	ICMPS Metals (15 metals + Iow level Hg)		 	Hold
27	VC04_0.0-0.1		31/10/2019 1:00	s	ASS		1	x													ļ	
38	VC04_0.9-1.0	l	31/10/2019 1:00	S	ASS		1	x		+				+ 							- 4	
39	VC11_0.0-0.2		30/10/2019 20:0D		JAR		1							↓ ┿╌╸								
40	VG11_0.5-0.7		30/10/2019 20:00	s	JAR		1	_ ·		 X	×	×		x	×	x	x		×		<u> </u>	*
ù	VC11_1.0-1.2		30/10/2019 20:00	s	JAR											+			┿╼╼┤		<u> </u>	+
42	VC11 0.0-0.5		3D/10/2019 20:00		JAR		3				+	↓	- +		+				$\left \right $		<u> </u>	- x -
1.2	VC11 0.5-1.0		38/10/2019 20:00	s			3					1 							$\left \right $			x
4	VC07 02-04			5	JAR		1						_		-			<u> </u>	i			<u>x</u>
								_		-		<u> </u>	+		+	-		-	+		+	 ×
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-												-	+				, i	<u> </u>	1 			
s;						TOTAL	-			1							1					

Z - Zinc Acetale Preserved Bottle; E = EDTA Preserved Bottles; ST = Starile Bottle; ASS = Plastic Bag for Add Sulphate Soils; B = Unpreserved Bag.

***F116.2	ALS.	CHAIN OF CUSTODY ALS Laboratory: please lick ->	UADELAID Philos da International OBRISSAN Philos 244 OGLADSTO Philos 7471	E 21 Buima Roed Pe (1994) F: acteratie@ (1994) F: acteratie@ (1994) F: Samples br 2022 E: samples br 2015 46 Gallemondal (19600 F: gladstore §	corava 3A 5005 xr%gintext error 5ta/fund QLD 4053 isbana@alsglobal.com h Drive C.ktion QLD 4680 @alsglobal.com	ບMAC ການເປັ Ph 0 ຜິທນ Ph: 02	CKAY 70 Harbour 2 4944 0177 Linn 3 8549 8500 Fills 13 8549 8500 Fills 15 6549 8500 Fills 15 6572 6735 Birm	Road Mackay QL 8 Key@alagintratio estall Road Spring Mplesimethourned Road Modgae NS Xigoolimata@alsgic	0 4740 om Vale VSC 31. Balsglobal.c W 2850 bal.com	CNEWCAST Ph: 02 4968 : 71 CNOWR 201 Ph: 02442 CIPE Ph: 0	FLE 5 Ruse Gum 9433 E: samples, A-M13 Geary Plac 33 2063 E: nowing FCTH 10 Hort Way 9 9209 7655 E: s	Road Warabror newcasile@als te North Nowra @alsg obal.com / Malaga - WA 6 antoles perth@	x NSW 2304 q(95a) com NSW 2541 1 1 0 1901 olsg(95a) com		US Pir UN Pir UW (Pir	YONEY : n2 8784 DWNSV ID 4798 (OLLON) 02 4225	877-289 V 8555 E () ILLE 14-1 0600 F () GONG 90 3125 F ()	Woodpark samplet.6 15 Desma 16wnesvile) Korwy S podkembi	: Roarl Snt ydney@al Courl Bc/ Senvionax troet Wok la@alsg.ol	itht eid NS/⊍ isglobal.com n'e QLD 451; antal@alsg.oc ongorig NSV ba.com	(2164) 8 .aleem V 2500
CLIENT:	GHD Pty Ltd			TURNAROU	ND REQUIREMENT	T 🗆 Stand	dard TAT (List	due date):					FOR	LABORAT	ÖRY U	SE ON	LY (CI	ircle)			
OFFICE:	level 15, 133 Castlero	agh St, Sydney		(Standard 1A f i some tests e.g.,	may be longer for . Ultra Trace	🗆 Non S	Slandard or ur	gent TAT (List	due date	s):			Custo	idy Seal Intac	49				Y e 5	No	
PROJECT	r: 12517046			ALS QUOTE	NO.:	SY-552-1	19			COC SEQL	JENCE NUMB	ER (Circle)	Free	Ze / frozen ic	e bricks	present	ирол ге	eccipt?	Yes	No	N
ORDER N	IUMBER:								000	: 1 2	34	5 6	7 Rand	ora Sample T	emperat	ure on l	Receipt:			.с	
PROJECT	MANAGER: Carmen	Yi	CONTACT F	PH: 0451 962 98	88				OF	: 12	34	56	7 Other	comment:					ટ્રે કે		
SAMPLER	R: Sarah Eccleshall		SAMPLER N	MOBILE: 0459 (546 332	RELINQU	ISHED BY:		REC	CEIVED BY:			RELINQUIS	SHED BY:				RECE	IVED B	¥:	
COC ema	illed to ALS? (YES /	NO)	EDD FORM	AT (or default):	:	S. Ecclesi	hali			Sep M.								30%	346 n	A-J	
Email Rep	ports to: sarah.ecclesha	all@ghd.com; carmen.y	yi@ghd.com; labreprots(@ghd.com			1E:		DAT	fe/time;			DATE/TIME	E:				DATE/	TIME:	-	
Email Inv	oice to (will default to Pl	M if no other addresses	are listed):															`	<u> 31 1</u>	0 114	1845
COMMEN	ITS/SPECIAL HANDLIN	G/STORAGE OR DIS	POSAL:																		
ALS USE	SAMPLE DETAILS	MATRIX: SOL	ID.(S) WATER.(W)		CONTAINE	R INFORM	ATION 1			ANALY: Where Metals	SIS REQUIRE are required, s	D including pecily Total (SUITES (NB. Si (unfiltered bottle	uite Codes m required) or	ust be lis Dissolv	ited to a ad (field	ittract su d filtered	uite price I bottle re	}) equired}.		
LAB ID	SAMP	LE ID	DATE / TIME	MATRIX	TYPE & PRESER (refer below)	VATIVE to codes	TOTAL	ASS Field Screen (pH field ad pHfox)	Phenols	TRH	BTEXN	20		OC/OP/PCB	РАН	Fotal Fluoride	vocs	Particle Size distribution	CMPS Metals (15 1 metals + Iow level Hg)		막대
45	VC05_0.0-0.1		30/10/2019 21:45	\$	jar		1	i					í · t								×
hb	VC05_0.5-0.7		30/10/2019 21:45	s	jar		1	i					l								x
47	VC05_0.8-0.9		30/10/2019 21:45	8	jar		1	[x	×	×	×	l x	×	×	x	x	,	×		
48	VC05_0.0-0.5		30/10/2019 21:45	8	jar		3	l					i 1						-		x
49	VC05_0.5-0.9	.	30/10/2019 21:45	ŝ	jar		3	l 													×
50	VC03_0.0-0.2		30/10/2019 22:15	s	jar		1	ا ا				 									x
51	VC03_0.3-0.4	 	30/10/2019 22:15	s	Jar		1	ر ا ا	×	×	x	x	×	x	x	x	×	, ,	×		× ×
52	VC03_0.4-0.6	= -+	30/10/2019 22:15	s	Jar		1					1									 x
53	VC03_0.6-0.7		30/10/2019 22:15	s	Jat		1			-											, x'
_54	VC03_1.0-1.2		30/10/2019 22:15	s	Jar		1														x
55	VC03_0.0-0.5	ו 	30/10/2019 22:15	s	jar & B		4		x	×	×	x	×	×	x _	<u> </u>		x ;	×		
- 54	VC03_0.5-1.0		30/10/2019 22:15	s	jar		3									<u> </u>					×
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V = VOA Vial HCI Preserved, VB = VOA Vial Sodium Bisulphate Preserved; AV = VOA Vial Sulfuric Preserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag

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: En las	ALS varmenter	CHAIN OF CUSTODY ALS Laboratory: please tick →	DADELAIDE Phr. 06.8359 UBRISBAN Ph. 07.3243 UGLADSTO Phr. 07.7471	: 21 Burna Road Poo 0890 F: Helaite@al E 32 Shend Street St 7222 F semples.brs XE 46 Calcmondon 5800 F gladstore@	oraka SA 5095 Isglebat.com Isglebat.com Isglebat.gol Isbane@galsglobat.com Drive Ginton QLD 4080 Isrieg skal.com	LIMAC Ph. 07 DMEL Ph' 00 Ciraus Phy 02	26AY 76 Parbour 14944 D177 Firm LBOURNE 2-1 W 3 6549 9500 Elis 3 6549 9500 Elis 3 6549 9500 Elis 3 6549 9500 Elis 3 6549 9500 Elis	Road Markey OLL ackoy@ofsgfobalicc estall Road Symrys mpfes.metbourneg Road Mudgee NSt udges.mail@alsgtol) 4740 oni vale VIC 313 galsglobal c W 2850 bateoin	UNEWEAST Ph. 02 4988 : 71 UNOWRA cm Ph. 02442 OPEL Ph. 0	LE 5 Rose Gura 9433 El semples 44/13 Geary Pla 3 2063 E: marre 8 9209 7655 El s	Knarf Waraproo newcastle@alw © Norin Nowra @aleglopat.com Malaga WA 6 amples perfu@	k NSW 2304 global.com NSW 2541 SU0 asglobal.com		LLS: LPs: LLR Ph LLW Ph:	YDNEY 2 02 8784 0WNSV:1 07 4796 1 01LONC 02 4225	77-289 8555 L. LUE 14-1 0600 F: SONG 05 3125 F:	Woodpari samples a 15 Desmo townerval 5 Konny 7 portkenst	k Road Sm sydney(@a 3 Court Bol Ie.eav/topm Stroet Wol 5 st@alsglo	nifikiaid NS Isglobal co NS QLD 41 Shtal@alogi Iongong Ni Dal.com	9W 2164 pm 818 Nocalcom 18W 2500	
CLIENT:	GHD Pty Ltd			TURNAROUN	D REQUIREMEN	T 🗆 Stand	lard TAT (Lisi	due date):			·		FOR	LABORAT	ORY US	IE ONI	Y (C	(rcle)				200
OFFICE:	level 15, 133 Castlerea	igh St, Sydney		(Standard TAT n some tests e.g.,	nay be longer for Ultra Trace	🛛 Non S	Standard or ur	gent TA'l (List	due date	ı):			Cust	xly Seal Inter	7				Yes	- 	10	(NA)
PROJECT	12517046			ALS QUOTE	NO.:	SY-552-1	9		ĺ	COC SEQU	SENCE NUMB	ER (Circle)	Pree	ice / trozen ic	e bricke (present	uponin	eccipt?	\bigcirc	- 18 · . N	10	N/A
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Email Rep	orts to: sarah.ecclesha	l@ghd.com; carmen	.yi@ghd.com; labreprots@	@ghd.com			E:		DAT	TE/TIME:			DATE/TIM	E;				DATE	7TIME:			
Email Invo	ice to (will default to P N	l if no other addresse	es are listed):																311	(0)(9 18	sec 5
COMMEN	S/SPECIAL HANDLIN	G/STORAGE OR DIS	POSAL																			
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57	VC04_0.0-0.1		31/10/2019 1:00	s	jar		1	ĺ								{						,×
58	VC04_0.4-0.5		31/10/2019 1:00	s	jar		1		x	x	x	x	x	x	x) ; 			x			
59	VC04_0.5-0.6		31/10/2019 1:0D	s	jar		1]]						x
60	VC04_0.7-0.8	<u>.</u>	31/10/2019 1:DD	\$	jar		1									1						×
61	VC04_0.9-1.0		31/10/2019 1:00	s	jar		1	Í		1					•		1					×
62	VC04_0.0-0.5		31/10/2019 1:00	s	jar		3								_							
63	VC04_0.5-1.0		31/10/2019 1:00	s	jar and t	0ag	4		×	×	x	×	x	×	x			×	×			
64	VC02_0.0-0.2		30/10/2019 23:45	S	jar		1					` }	_									×
65	VC02_0.5-0.6		30/10/2019 23:45	S	jar		1			_		1										×
66	VC02_1.0-1.2		30/10/2019 23:45	s	jar		1				ļ	 		\								×
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Water Cont V = VOA Via Z = Zine Ace	ainer Codes: P = Unpres I HCI Preserved; VB = VO. Nate Preserved Bottle, E =	erved Plastic; N = Nitri A Vial Sodium Bisulphal EDTA Preserved Bottle	c Preserved Plastic; ORC = I te Preserved; VS = VOA Vial es: ST = Sterile Bottle; ASS =	Nitric Preserved C Sulfuric Preserve Plastic Bag for A	DRC; SH = Sodium H d; AV = Airfreight Ung cid Sulphate Soils; B	lydroxide/Cd F preserved Vial = Unpreserve	Preserved; S * SG = Sulfunic ed Bao.	Sodium Hydrox Preserved Am	cide Presè ber Glass;	rved Plastic; AC ; H = HCl prese	i = Amber Gla erved Plastic;	is Unpreserv HS = HCl pre	ed; AP - Airfrei served Special	ht Unpresention bottle; SP	red Plast = Sulfuri	ic Prese	rved Pl	lastic; F	= Forma	aldehydo	Preserv	ed Glass;

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ಚಾರ್ವ	ALS.	CHAIN OF CUSTODY ALS Laboratory: please lick →	□ADELADE Ph. 08 8036 (2) □BRISBANE Ph. 07 3243 □CI AL(310) Ph: 07 7471 (21 Burne Road Poo 3890 E: ede a de(ijia) 32 Shand Street St 7222 E: samples bus NE 46 Callemoniah 5600 E: gladstone (ijia)	oraita SA 5096 feglobal.com alford QLD 4053 sbano@alsplobal.com Drive Clinton QLD 468(: alsglobal.com	ШМАСК Ph. 07-4 QMRL8 Ph. 03-6 Ph. 02-6	AY /8 Harbour 944 0177 F im 80URNE 2-4 W 5549 5600 F is 955 27 Symmetry 1372 6735 E: m	- Roart Mackay (2) I sekay@a'sgkbbl.c lestal, Road Spring amples, melbournet (Road Mudgee NS udgee, mail@a'sgk	5 4740 vini vale VIC 317 Balsgiobalic M 2850 bal.com	UNEWCASI Philo2 4964 71 EINÓWR 973 Philo2442 EIN Philo Philo	ILE 5 Rose Gum I 9433 /·· sampha A 4/13 Ceary Plac 33 2063 E: nowra, RTH 16 Nod Way IB 9209 7855 F: s	Road Watabroo newcastle@e'w co Noth Nowre @a sglobal com / Mologa - WA % amples.porth@	k NSW 2304 Jiotal (com NSW 2541 280 afsglobal com		US Phr Phr Phr UW Phr	YONEY 2 02 0784 1 07WNSVII 07 4798 1 10LEONG 02 4225 1	77-209 W 8565 E. s LLE 14 15 0600 Fr o 30NG 59 3125 Fr p	Voodpark I Rampies sy 5 Doshaa (pwnoovlig, I Kenny Si Rockemb (Road Sm /dney(@al Court Bol covinom/ Incet Wolf a@alsglol	v(h(leidi NSV Isploba) čon nto OLD 48° ontoi@alsgio longong NS toistiom	N 2164 n 18 Walcom W 2500	
CLIENT:	GHD Pty Ltd			TURNAROUN	ID REQUIREMENT	🗋 Standa	rd TAT (List	t due date):					FOR	LABORAT	ORY US	SË ONL	.¥ {Gli	rcle)				
OFFICE:	level 15, 133 Castlerea	gh St, Sydney		(Standard TAT m some tests e.g.,	nay be longer for Ultra Trace	Non Sta	andard or ur	gent TAT (List	due date):			Custo	ly Seal Intec	1 9 (17.5			Y	/e8	N	o 1	N/A
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ORDER N	UMBER:								cod	:: 1 2	34	56	(7) Renda	m Sample T	emperati	ure on R	tecelpt		20	ìċ		
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Email Ren	norta to: sarah ecclesha	i@abd.com:_carmeo.y	vi@obd.com: labrenrots@	and com		DATE/TIME			DAT	FUTIME			DATE/TIME					DATE	TIME	UA	-5	
Email Inve	pice to (will default to PN	A if no other addresses	are listed):	sgriaroom			•											1	311	10/19	18	45
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ALS	SAMPLE DETAILS	MATRIX SQL	ID (S) WATER (W)		CONTAINE	R INFORMA	TION			ANALY Where Metals	SIS REQUIRE are required, s	D including specify Total (BUITES (NB. Su Junfiltered bottle	lte Codes m required) or	ust be lis Dissolv	ted to a ad (field	tirect su i filtered	ite price) bottle re) squiređ).			
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69	VC01_0.0-0.2		30/10/2019 23:45	s	jar		1				1		1		1						1	x
-10	vc01_0.4-0.6		30/10/2019 23:45	s	jar		1							ł			1	- · ·	•	•		×
71	VC01_1.0-1.1		30/10/2019 23:45	5	jar		1			x	x	x		 x	x			,	к	.		
72	VC01_0.0-0.5		30/10/2019 23:45	s	jar		3			-		-										
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74	VC10_0	.0-0.2	31/10/2019 0:45	S	jar		1											}				x
75	VC10_0	.5-0.6	31/10/2019 0:45	s	jar		1	-				1							↓			×
76	VC10_0	.7-0.8	31/10/2019 0:45	s	jar	1 	1		x	x	×	×	×	x	x				c			j
77	VC10_0	.8-0.5	31/10/2019 0:45	5	jar ad t	•	4		x	x	×	x	x	×	×			××	•			
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79	VC02_0.0-0.5		30/10/2019 23:45	S	j	jar and b	4		x	x	x	×	x	x	×			x)	ĸ		ļ	
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V = VOA Viel HCI Preserved; VB = VOA Viel Sodium Bisulphate Preserved; VS = VOA Viel Sulfuric Preserved Viel France Viel SC = Sulfuric Preserved Viel SC = Sulfuric Preserved Viel SC = Sulfuric Preserved Plastic; H = HCI preserved Plastic

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CLIENT:	GHD Pty Ltd			TURNAROUN		T 🔲 Star	ndard TAT (Lisi	t due date):					FOR	ABORAT	ORY U	SE ON	LY (C	ircle)			4		
OFFICE:	level 15, 133 Castlerea	gh St, Sydney		(Standard TAT n some tests e.g.,	may be longer for Ultra Trace	🗋 Non	Slandard or ur	gent TAT (List	due date	:):			Custor	ly Seal Inlac	R				Yes		No	1992 - 1993 1993 - 1995 1995 - 1995 - 1995	(N/A)
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SAMPLE	R: Sarah Eccleshall		SAMPLER N	OBILE: 0459 5	546 332	RELINQI	UISHED BY;		REC	CEIVED BY:			RELINQUIS	HED BY:				RECE	EIVED	BY:/	~		
COC ema	iled to ALS? (YES /	NO)	EDD FORM	AT (or default):		S. Eccles	shali		8	PM.								50	YS	for the	gut .		
Email Re	ports to: sarah.eccleshal	l@ghd.com; carmen	.yi@ghd.com; labreprots@	@ghd.com		DATE/TI	ME:		DAT	TE/TIME:			DATE/TIME	:				DATE	E/TIME	÷.,	i		
Email Inv	oice to (will default to PN	if no other addresse	s are listed):																311	1/0	19	ાદ્વેત	2
COMMEN	TS/SPECIAL HANDLING	S/STORAGE OR DIS	POSAL:																				
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LAB ID	SAMPL	EID	date / Time	MATRIX	TYPE & PRESER (refer below)	RVATIVE to codes	TOTAL CONTAINERS	A55 Field Screen (pH field ad pHfox)	Phenals	ТКН	BTEXN	TOC	TCN	OC/OP/PCB	PAH	Total Fluoride	VOCs	Particle Size distribution	ICMPS Metals (15 metals + Iow level Hg)	8 metais	TRH C6-C10	BTEX	Hold
31	FD01		30/10/2019	s	JAR		1		x	x	x	x	x	×	x		<u> </u>		×				
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82	FD03		30/10/2019	s	JAR	·				1			-							· ·			×
953	FD05		31/10/2019	\$	Jar		1		x	x	x	×	×	×	×	:		1	×				
84	RIN_01		30/10/2019 0:00	w			4	_		x	×				x					×			
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Z = Zinc Ac	etate Preserved Bottle; E =	EDTA Preserved Bolties	s; ST = Sterile Bottle; ASS =	Plastic Bag for A	c; AV = Ainreight unp cid Sulphate Solls; B :	= Unpreserved vi	ved Bag.	Preserved Am	ber Gløss;	; H = HCI prese	rved Plastic; I	HS = HCI pro	served Specialic	n bottle; SP	= Sullur	c Prese	erved Pl	astic; F	= Form	naldehy	de Pre	served	Glass

Allig TBT/ SVOC

Kim Phan

From:Loren SchiavonSent:Thursday, 7 November 2019 10:26 AMTo:Kim PhanSubject:FW: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:Attachments:image001.png; image002.png; image003.png; image004.png

Hi Kim,

Can I get you to assist with this one?

We need to add in the testing requested below to two active work orders. Please leave the current due dates and email CS to send a prelim - we then need to create the separate batches for the dioxins. Vanessa has confirmed 10 days from receipt for the TBT.

Thanks.

Kind Regards Loren Schiavon Sample Administration Coordinator, Environmental

See how ALS is making sampling easier! Register your interest here.

Subcon / Forward Lab / Split WO Lab / Analysis: <u>B(15banc</u>) Organised By / Date: <u>EBT : 11,63</u>,73. Relinquished By / Date: Connote / Courier: WO No: <u>ESI93607</u> Attach By PO / Internal Sheet:

Anc 7.11.10



Environmental Division

Right Solutions • Right Partner

https://aus01.safelinks.protection.outlook.com/?url=www.alsglobal.com&data=02%7C01%7CKim.Phan%40alsglobal.com%7C822e6d0d1a2e415fdefc08d76310b269%7C485ca04e6f7440509764cdb4bfa89c25%7C0%7C0%7C637086795685299636&sdata=Eyqaw0cQknLkqagzwxAPSDeCzRtw1wXYtpWrHbo9C1E%3D&reserved=0

-----Original Message-----From: Grace White Sent: Thursday, 7 November 2019 8:52 AM To: Loren Schiavon <loren.schiavon@alsglobal.com> Subject: FW: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:

Hey Loren,

.

Can you please organise making the below amendments?

Thank you!

Grace White Client Services Officer, Environmental Sydney

T +61 2 8784 8555 D +61 2 8784 8531 F +61 2 8784 8500 grace.white@alsglobal.com 277-289 Woodpark Road Smithfield, NSW, 2164

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-----Original Message-----

From: Carmen Yi [mailto:Carmen.Yi@ghd.com] Sent: Wednesday, 6 November 2019 11:07 PM To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com> Cc: Sarah.Eccleshall@ghd.com; Brenda Hong <Brenda.Hong@alsglobal.com> Subject: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi ALS team,

We have now received approval to go ahead with the TBT, dioxin and SVOC tests for ES1936183 and ES1936029. Would you please test the following samples on standard turnaround time please?

ES1936183

VC08_1.0-1.5

VC12_0.0-0.5

ES1936029

VC01_0.5-1.0 (7b) VC04_0.5-1.0 (b) VC07_0.0-0.5 (ii)

Kind regards

Carmen Yi

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Vishal Patel

From:	Angus Harding
Sent:	Tuesday, 3 December 2019 2:21 PM
То:	Vishal Patel
Če:	Loren Schiavon
Subject:	FW: [EXTERNAL] - RE: ES1938004

Hey Vishal,

Could you get down sample 055 from ES1936029 (S685-S690) if we still have the jar we will need to send to EB for TBT.

Cheers.

Kind Regards,

Angus Harding

Client Services Officer, Environmental Sydney



<u>T</u> +61 2 8784 8555 <u>F</u> +61 2 8784 8500 <u>D</u> +61 2 8784 8503 <u>angus.harding@alsglobal.com</u> 277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA

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SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	ES1936029								
Client Contact Address	: GHD PTY LTD : Jessica Watson : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Laboratory Contact Address	 Environmental Division Sydney Customer Services ES 277-289 Woodpark Road Smithfield NSW Australia 2164 						
E-mail Telephone Facsimile	: jessica.watson@ghd.com : :	E-mail Telephone Facsimile	: ALSEnviro : +61-2-878 : +61-2-878	viro.Sydney@ALSGlobal.com 8784 8555 8784 8500					
Project Order number C-O-C number Site Sampler	: 12517046 : : : : Sarah Eccleshall	Page Quote number QC Level	: 1 of 6 : ES2019GHDSER0030 (SY/522/19) : NEPM 2013 B3 & ALS QC Standard						
Dates Date Samples Received Client Requested Due Date	2 : 31-Oct-2019 17:15 : 07-Nov-2019	Issue Date Scheduled Reporting	Date	: 07-Nov-2019 : 07-Nov-2019					
Delivery Details Mode of Delivery No. of coolers/boxes Receipt Detail	: Client Drop Off : 4 : ESKIES	Security Seal Temperature No. of samples receiv	ved / analysed	: Not Available : 3.9'C - Ice present : 87 / 47					

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- 1/11/19: This is an updated SRN which indicates the updated analysis as discussed wih Sarah.
- 4/11/19: This is an updated SRN which indicates the updated code for phenol analysis.
- 6/11/19: This is an updated SRN which indicates total metals for the sample RIN_01.
- FD02 forward to Eurofins.
- Sample with ID VC04_0.4-0.5 not received but was labelled with ID VC04_0.3-0.4.
- 07/11/19: This is an updated SRA which indicates TBT and SVOC for the samples VC07_0.0-0.5 (#11), VC04_0.5-1.0 (#63), VC01_0.5-1.0 (#73).
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- ASS Field Screen and TOC analysis will be conducted by ALS Brisbane.
- Fluoride and PSD analysis will be conducted by ALS Newcastle.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Preliminary results will be available on the scheduled reporting date listed in this report. However the final report with TBT and SVOC analysis will be complete on 21/11/19.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical
 analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this
 temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS
 recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

segmented Flow Analyser

Solids)

on (TOC) in Soil

Sediments

ultra trace

sediments

15 metals + low level Hg)

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

component			103 ant	н С	Cart	in S	SD N	AH	NS
Matrix: SOIL			EA055-	EK026S yanide f	EP003 organic C	EP071 - tra trace	EP080-()/BTEXN	SD-02 //PCB/P/	SD-03 by ICPN
Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - Moistur	SOIL - Total C	SOIL - Total C	SOIL - TRH uI	SOIL - TRH(V	SOIL - OC/OP	SOIL - Metals
ES1936029-001	30-Oct-2019 00:00	VC09_0.0-0.2	√	✓	1	1	✓	✓	✓
ES1936029-007	30-Oct-2019 00:00	VC07_0.0-0.2	✓	✓	✓	✓	✓	✓	✓
ES1936029-011	30-Oct-2019 00:00	VC07_0.0-0.5	✓	✓	✓	✓	✓	✓	✓
ES1936029-040	30-Oct-2019 00:00	VC11_0.5-0.7	✓	✓	✓	✓	✓	✓	✓
ES1936029-047	30-Oct-2019 00:00	VC05_0.8-0.9	 ✓ 	✓	✓	✓	✓	✓	✓
ES1936029-051	30-Oct-2019 00:00	VC03_0.3-0.4	 ✓ 	✓	1	1	✓	✓	✓
ES1936029-055	30-Oct-2019 00:00	VC03_0.0-0.5	 ✓ 	✓	1	1	✓	✓	✓
ES1936029-058	30-Oct-2019 00:00	VC04_0.3-0.4	 ✓ 	✓	1	1	✓	✓	✓
ES1936029-063	30-Oct-2019 00:00	VC04_0.5-1.0	 ✓ 	✓	1	1	✓	✓	✓
ES1936029-067	30-Oct-2019 00:00	VC02_1.5-1.6	 ✓ 	✓	1	1	✓	✓	✓
ES1936029-071	30-Oct-2019 00:00	VC01_1.0-1.1	 ✓ 	✓	1	1	✓	✓	✓
ES1936029-073	30-Oct-2019 00:00	VC01_0.5-1.0	1	✓	✓	1	✓	✓	✓
ES1936029-076	30-Oct-2019 00:00	VC10_0.7-0.8	✓	✓	1	1	✓	✓	✓
ES1936029-077	31-Oct-2019 00:00	VC10_0.0-0.5	 ✓ 	✓	1	1	✓	✓	✓
ES1936029-079	31-Oct-2019 00:00	VC02_0.0-0.5	✓	✓	1	1	✓	✓	✓
ES1936029-081	30-Oct-2019 00:00	FD01	 ✓ 	✓	1	1	✓	✓	1
ES1936029-083	31-Oct-2019 00:00	FD05	√	✓	✓	✓	✓	✓	✓
Matrix: SOIL Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA150H Particle Size Analysis by Hydrometer: AS1289	SOIL - EK040T Total Fluoride	SOIL - EP074 (solids) Volatile Organic Compounds	SOIL - EP075 (solids) Semivolatile Organic Compounds	SOIL - EP075 SIM Phenols only SIM - Phenols only	SOIL - EP090 (solids) Organotins
ES1936029-001	30-Oct-2019 00:00	VC09_0.0-0.2						✓	
ES1936029-002	30-Oct-2019 00:00	VC09_0.4-0.6	1						
ES1936029-003	30-Oct-2019 00:00	VC09_07-0.8	1						
ES1936029-004	30-Oct-2019 00:00	VC09_0.8-1.0	✓						
ES1936029-005	30-Oct-2019 00:00	VC09_0.0-0.5	✓						
ES1936029-006	30-Oct-2019 00:00	VC09_0.5-1.0	1						
E04000000007									

Issue Date	: 07-Nov-2019
Page	: 3 of 6
Work Order	ES1936029 Amendment 0
Client	: GHD PTY LTD



Page Work Order Client	3 of 6 ES1936029 Amend GHD PTY LTD	lment 0								
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			ested	lysis t		lids) Comp	lids) anic C	d Phe ly	lids)	
			OIL	50H e Ana	to T de	74 (sc anic (75 (sc Orga	75 SIN	90 (sc	
			old) S alysis	- EA1	- EKO	e Org	- EP0	- EPO	- EPO	
			On H Vo an	SOIL -	SOIL - Total I	SOIL -	Soll	SOIL -	SOIL - Organ	
ES1936029-008	30-Oct-2019 00:00	VC07_0.5-0.6	✓	•/ =						
ES1936029-009	30-Oct-2019 00:00	VC07_0.7-0.8	✓							
ES1936029-010	30-Oct-2019 00:00	VC07_1.0-1.2	✓							
ES1936029-011	30-Oct-2019 00:00	VC07_0.0-0.5		✓			✓	1	✓	
ES1936029-012	30-Oct-2019 00:00	VC07_0.5-1.0	✓							
ES1936029-039	30-Oct-2019 00:00	VC11_0.0-0.2	✓							
ES1936029-040	30-Oct-2019 00:00	VC11_0.5-0.7			✓	✓		✓		
ES1936029-041	30-Oct-2019 00:00	VC11_1.0-1.2	 ✓ 							
ES1936029-042	30-Oct-2019 00:00	VC11_0.0-0.5	✓ ✓							
ES1936029-043	30-Oct-2019 00:00	VC11_0.5-1.0	✓ ✓							
ES1936029-044	30-Oct-2019 00:00	VC07_0.2-0.4	v							
ES1936029-045	30-Oct-2019 00:00	VC05_0.0-0.1	▼ √							
ES1936029-047	30-Oct-2019 00:00	VC05_0.8-0.9	•		1	1		1		
ES1936029-048	30-Oct-2019 00:00	VC05_0.0-0.5	1		•	•		•		
ES1936029-049	30-Oct-2019 00:00	VC03 0.5-0.9	1							
ES1936029-050	30-Oct-2019 00:00	VC03_0.0-0.2	✓							
ES1936029-051	30-Oct-2019 00:00	VC03_0.3-0.4			✓	✓		✓		
ES1936029-052	30-Oct-2019 00:00	VC03_0.4-0.6	✓							
ES1936029-053	30-Oct-2019 00:00	VC03_0.6-0.7	✓							
ES1936029-054	30-Oct-2019 00:00	VC03_1.0-1.2	✓							
ES1936029-055	30-Oct-2019 00:00	VC03_0.0-0.5		✓				✓		
ES1936029-056	30-Oct-2019 00:00	VC03_0.5-1.0	✓							
ES1936029-057	30-Oct-2019 00:00	VC04_0.0-0.1	✓							
ES1936029-058	30-Oct-2019 00:00	VC04_0.3-0.4						✓		
ES1936029-059	30-Oct-2019 00:00	VC04_0.5-0.6	✓							
ES1936029-060	30-Oct-2019 00:00	VC04_0.7-0.8	 ✓ 							
ES1936029-061	30-Oct-2019 00:00	VC04_0.9-1.0	✓ ✓							
ES1936029-062	30-Oct-2019 00:00	VC04_0.0-0.5	✓							
ES1036029-063	30-Oct-2019 00:00	VC04_0.5-1.0	./	v			v	v	v	
ES1936029-065	30-Oct-2019 00:00	VC02_0.5-0.6	•							
ES1936029-066	30-Oct-2019 00:00	VC02_1.0-1.2	•							
ES1936029-067	30-Oct-2019 00:00	VC02 1.5-1.6						1		
ES1936029-068	30-Oct-2019 00:00	VC02_1.0-1.5	✓							
ES1936029-069	30-Oct-2019 00:00	VC01_0.0-0.2	✓							
ES1936029-070	30-Oct-2019 00:00	VC01_0.4-0.6	✓							
ES1936029-071	30-Oct-2019 00:00	VC01_1.0-1.1						✓		
ES1936029-072	30-Oct-2019 00:00	VC01_0.0-0.5	✓							
ES1936029-073	30-Oct-2019 00:00	VC01_0.5-1.0		✓			✓	✓	✓	
ES1936029-074	31-Oct-2019 00:00	VC10_0.0-0.2	✓							

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: GHD PTY LTD



			(On Hold) SOIL No analysis requested	SOIL - EA150H Particle Size Analysis by Hydrometer: AS1289	SOIL - EK040T Total Fluoride	SOIL - EP074 (solids) Volatile Organic Compounds	SOIL - EP075 (solids) Semivolatile Organic Compounds	SOIL - EP075 SIM Phenols only SIM - Phenols only	SOIL - EP090 (solids) Organotins
ES1936029-075	31-Oct-2019 00:00	VC10_0.5-0.6	✓						
ES1936029-076	30-Oct-2019 00:00	VC10_0.7-0.8						✓	
ES1936029-077	31-Oct-2019 00:00	VC10_0.0-0.5		✓				1	
ES1936029-078	31-Oct-2019 00:00	VC10_0.5-1.0	✓						
ES1936029-079	31-Oct-2019 00:00	VC02_0.0-0.5		✓				✓	
ES1936029-080	31-Oct-2019 00:00	VC02_0.5-1.0	✓						
ES1936029-081	30-Oct-2019 00:00	FD01						1	
ES1936029-082	30-Oct-2019 00:00	FD03	✓						
ES1936029-083	31-Oct-2019 00:00	FD05						✓	
				e for TBs					

Matrix: SOIL Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA037 ASS Field Screening Analysis	SOIL - S-18 (NO MOIST) TRH(C6-C9)/BTEXN with No Moisture
ES1936029-013	30-Oct-2019 00:00	VC03_0.0-0.1	✓	
ES1936029-014	30-Oct-2019 00:00	VC03_0.5-0.6	✓	
ES1936029-015	30-Oct-2019 00:00	VC03_1.0-1.1	✓	
ES1936029-016	30-Oct-2019 00:00	VC01_0.0-0.1	✓	
ES1936029-017	30-Oct-2019 00:00	VC01_0.5-0.6	✓	
ES1936029-018	30-Oct-2019 00:00	VC01_1.0-1.1	✓	
ES1936029-019	30-Oct-2019 00:00	VC02_0.0-0.1	✓	
ES1936029-020	30-Oct-2019 00:00	VC02_0.5-0.6	✓	
ES1936029-021	30-Oct-2019 00:00	VC02_0.9-1.0	✓	
ES1936029-022	30-Oct-2019 00:00	VC02_1.5-1.6	✓	
ES1936029-023	31-Oct-2019 00:00	VC10_0.0-0.1	✓	
ES1936029-024	31-Oct-2019 00:00	VC10_0.5-0.6	✓	
ES1936029-025	30-Oct-2019 00:00	VC11_0.0-0.1	✓	
ES1936029-026	30-Oct-2019 00:00	VC11_0.5-0.6	✓	
ES1936029-027	30-Oct-2019 00:00	VC11_1.0-1.1	✓	
ES1936029-028	30-Oct-2019 00:00	VC09_0.0-0.1	✓	
ES1936029-029	30-Oct-2019 00:00	VC09_0.5-0.6	✓	
ES1936029-030	30-Oct-2019 00:00	VC09_0.9-1.0	✓	
ES1936029-031	30-Oct-2019 00:00	VC07_0.0-0.1	1	
ES1936029-032	30-Oct-2019 00:00	VC07_0.5-0.6	✓	
ES1936029-033	30-Oct-2019 00:00	VC07_1.0-1.1	1	


			SOIL - EA037 ASS Field Screening Analysis	SOIL - S-18 (NO MOIST) TRH(C6-C9)/BTEXN with No Moisture for TBs
ES1936029-034	30-Oct-2019 00:00	VC05_0.0-0.1	✓	
ES1936029-035	30-Oct-2019 00:00	VC05_0.5-0.6	1	
ES1936029-036	30-Oct-2019 00:00	VC05_0.8-1.0	1	
ES1936029-037	31-Oct-2019 00:00	VC04_0.0-0.1	✓	
ES1936029-038	31-Oct-2019 00:00	VC04_0.9-1.0	✓	
ES1936029-085	31-Oct-2019 00:00	TS1		✓
ES1936029-086	30-Oct-2019 00:00	TB1		✓
ES1936029-087	31-Oct-2019 00:00	TSC		✓
Matrix: WATER Laboratory sample	<i>Client sampling</i>	Client sample ID	ATER - W-02T netals (Total)	ATER - W-26 RH/BTEXN/PAH/8 Metals
ID	date / time		× 20	Ž₽ Ž
ES1936029-084	30-Oct-2019 00:00	RIN 01	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables



ACCOUNTS PAYABLE (Hobart)		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
CARMEN YI		
 *AU Certificate of Analysis - NATA (COA) 	Email	carmen.yi@ghd.com
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	carmen.yi@ghd.com
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	carmen.yi@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	carmen.yi@ghd.com
- A4 - AU Tax Invoice (INV)	Email	carmen.yi@ghd.com
- Chain of Custody (CoC) (COC)	Email	carmen.yi@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	carmen.yi@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	carmen.yi@ghd.com
 Electronic SRN for ESdat (ESRN_ESDAT) 	Email	carmen.yi@ghd.com
GHD LAB REPORTS		
 *AU Certificate of Analysis - NATA (COA) 	Email	ghdlabreports@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ghdlabreports@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ghdlabreports@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ghdlabreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	ghdlabreports@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	ghdlabreports@ghd.com
SARAH ECCLESHALL		
 *AU Certificate of Analysis - NATA (COA) 	Email	sarah.eccleshall@ghd.com
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	sarah.eccleshall@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	sarah.eccleshall@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sarah.eccleshall@ghd.com
- Chain of Custody (CoC) (COC)	Email	sarah.eccleshall@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	sarah.eccleshall@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	sarah.eccleshall@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	sarah.eccleshall@ghd.com



CERTIFICATE OF ANALYSIS

Work Order	ES1936029	Page	: 1 of 60
Amendment	:1		
Client	: GHD PTY LTD	Laboratory	Environmental Division Sydney
Contact	: Jessica Watson	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	SYDNEY NSW, AUSTRALIA 2000		
Telephone	:	Telephone	: +61-2-8784 8555
Project	: 12517046	Date Samples Received	: 31-Oct-2019 17:15
Order number	:	Date Analysis Commenced	: 01-Nov-2019
C-O-C number	:	Issue Date	: 10-Dec-2019 16:51
Sampler	: Sarah Eccleshall		Hac-MRA NAIA
Site	:		
Quote number	: SY/522/19		Accordition No. 235
No. of samples received	: 87		Accredited for compliance with
No. of samples analysed	: 47		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category	
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW	
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD	
Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD	
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW	
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW	
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW	
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW	
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, NSW	



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP075(SIM) : LOR has been raised due to high amount of moisture present.
- EA150H: Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1 2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently NATA endorsement does not apply to hydrometer results.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP131B : Positive PCB result for particular sample ES1936029_011 is confirmed by re-extraction and re-analysis.
- EP132B-SD and EP131B : Particular sample raised LOR due to high amount of moistures is present.
- EG020: Poor precision was obtained for some Copper, Lead and Zinc on sample EM1918213-#002. Results have been confirmed by re-extraction and reanalysis.
- EP075: LOR for sample raised due to high amount of moisture present.
- EG035: Positive Hg results for ES1936029 #7,11,79 have been confirmed by reanalysis.
- EP074: Poor matrix spike recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- EP080: The trip spike and its control have been analysed for volatile TPH and BTEX only. The trip spike and control were prepared in the lab using reagent grade sand spiked with petrol. The spike was dispatched from the lab and the control retained.
- EP132B-SD : Particular samples required dilution due to sample matrix . LOR values have been adjusted accordingly.
- EP090 Organotin: Particular sample shows poor matrix spike recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- EP090 Organotin: Particular sample shows poor matrix spike recovery for MBT due to matrix interference.
- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 Slight; 2 Moderate; 3 Strong; 4 Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.
- EP075: 'Sum of PAH' is the sum of the USEPA 16 priority PAHs

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Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

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	Client sampling date / time		30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014	
				Result	Result	Result	Result	Result	
EA037: Ass Field Screening Analysis									
ø pH (F)		0.1	pH Unit				7.9	7.5	
øpH (Fox)		0.1	pH Unit				6.2	5.7	
ø Reaction Rate		1	-				2	3	
EA055: Moisture Content (Dried @ 105-11	0°C)								
Moisture Content		1.0	%	34.5	1.5	31.3			
EA150: Particle Sizing									
+75μm		1	%			68			
+150μm		1	%			63			
+300µm		1	%			47			
+425µm		1	%			31			
+600µm		1	%			16			
+1180µm		1	%			8			
+2.36mm		1	%			4			
+4.75mm		1	%			2			
+9.5mm		1	%			<1			
+19.0mm		1	%			<1			
+37.5mm		1	%			<1			
+75.0mm		1	%			<1			
EA150: Soil Classification based on Partic	cle Size								
Clay (<2 μm)		1	%			22			
Silt (2-60 µm)		1	%			9			
Sand (0.06-2.00 mm)		1	%			64			
Gravel (>2mm)		1	%			5			
Cobbles (>6cm)		1	%			<1			
EG005(ED093)-SD: Total Metals in Sedime	ents by ICP-AES	3							
Aluminium	7429-90-5	50	mg/kg	8120	3930	5550			
Iron	7439-89-6	50	mg/kg	4720	11800	15600			
EG020-SD: Total Metals in Sediments by I	CPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50			
Arsenic	7440-38-2	1.00	mg/kg	1.74	6.28	9.04			
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1			
Chromium	7440-47-3	1.0	mg/kg	10.3	12.5	16.6			
Copper	7440-50-8	1.0	mg/kg	<1.0	38.2	189			
Cobalt	7440-48-4	0.5	mg/kg	0.8	1.4	2.4			

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC09_0.0-0.2	VC07_0.0-0.2	VC07_0.0-0.5	VC03_0.0-0.1	VC03_0.5-0.6		
	Client sampling date / time		30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00			
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014		
				Result	Result	Result	Result	Result		
EG020-SD: Total Metals in Sediments by ICPMS - Continued										
Lead	7439-92-1	1.0	mg/kg	10.7	67.7	110				
Manganese	7439-96-5	10	mg/kg	20	34	37				
Nickel	7440-02-0	1.0	mg/kg	1.8	3.0	4.4				
Selenium	7782-49-2	0.1	mg/kg	0.2	0.2	0.3				
Silver	7440-22-4	0.1	mg/kg	0.1	0.3	1.5				
Vanadium	7440-62-2	2.0	mg/kg	15.4	11.9	16.2				
Zinc	7440-66-6	1.0	mg/kg	2.9	96.6	158				
EG035T: Total Recoverable Mercur	ry by FIMS									
Mercury	7439-97-6	0.01	mg/kg	0.02	0.84	1.61				
EK026SF: Total CN by Segmented	Flow Analyser									
Total Cyanide	57-12-5	1	mg/kg	<1	<1	<1				
EK040T: Fluoride Total										
Fluoride	16984-48-8	40	mg/kg		80					
EP003: Total Organic Carbon (TOC)) in Soil									
Total Organic Carbon		0.02	%	0.08	1.28	1.05				
EP074A: Monocyclic Aromatic Hyd	rocarbons									
Benzene	71-43-2	0.2	mg/kg		<0.2					
Toluene	108-88-3	0.5	mg/kg		<0.5					
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5					
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5					
Styrene	100-42-5	0.5	mg/kg		<0.5					
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5					
lsopropylbenzene	98-82-8	0.5	mg/kg		<0.5					
n-Propylbenzene	103-65-1	0.5	mg/kg		<0.5					
1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg		<0.5					
sec-Butylbenzene	135-98-8	0.5	mg/kg		<0.5					
1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg		<0.5					
tert-Butylbenzene	98-06-6	0.5	mg/kg		<0.5					
p-lsopropyltoluene	99-87-6	0.5	mg/kg		<0.5					
n-Butylbenzene	104-51-8	0.5	mg/kg		<0.5					
EP074B: Oxygenated Compounds										
Vinyl Acetate	108-05-4	5	mg/kg		<5					
2-Butanone (MEK)	78-93-3	5	mg/kg		<5					
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg		<5					

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC09_0.0-0.2	VC07_0.0-0.2	VC07_0.0-0.5	VC03_0.0-0.1	VC03_0.5-0.6	
	Client sampling date / time		30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014	
				Result	Result	Result	Result	Result	
EP074B: Oxygenated Compounds - Continued									
2-Hexanone (MBK)	591-78-6	5	mg/kg		<5				
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	0.5	mg/kg		<0.5				
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	0.5	mg/kg		<0.5				
1.2-Dichloropropane	78-87-5	0.5	mg/kg		<0.5				
cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg		<0.5				
trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg		<0.5				
1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg		<0.5				
EP074E: Halogenated Aliphatic Compo	ounds								
Dichlorodifluoromethane	75-71-8	5	mg/kg		<5				
Chloromethane	74-87-3	5	mg/kg		<5				
Vinyl chloride	75-01-4	5	mg/kg		<5				
Bromomethane	74-83-9	5	mg/kg		<5				
Chloroethane	75-00-3	5	mg/kg		<5				
Trichlorofluoromethane	75-69-4	5	mg/kg		<5				
1.1-Dichloroethene	75-35-4	0.5	mg/kg		<0.5				
lodomethane	74-88-4	0.5	mg/kg		<0.5				
trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg		<0.5				
1.1-Dichloroethane	75-34-3	0.5	mg/kg		<0.5				
cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg		<0.5				
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg		<0.5				
1.1-Dichloropropylene	563-58-6	0.5	mg/kg		<0.5				
Carbon Tetrachloride	56-23-5	0.5	mg/kg		<0.5				
1.2-Dichloroethane	107-06-2	0.5	mg/kg		<0.5				
Trichloroethene	79-01-6	0.5	mg/kg		<0.5				
Dibromomethane	74-95-3	0.5	mg/kg		<0.5				
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg		<0.5				
1.3-Dichloropropane	142-28-9	0.5	mg/kg		<0.5				
Tetrachloroethene	127-18-4	0.5	mg/kg		<0.5				
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg		<0.5				
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg		<0.5				
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg		<0.5				
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg		<0.5				

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	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014	
				Result	Result	Result	Result	Result	
EP074E: Halogenated Aliphatic Compounds - Continued									
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg		<0.5				
Pentachloroethane	76-01-7	0.5	mg/kg		<0.5				
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg		<0.5				
Hexachlorobutadiene	87-68-3	0.5	mg/kg		<0.5				
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	0.5	mg/kg		<0.5				
Bromobenzene	108-86-1	0.5	mg/kg		<0.5				
2-Chlorotoluene	95-49-8	0.5	mg/kg		<0.5				
4-Chlorotoluene	106-43-4	0.5	mg/kg		<0.5				
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg		<0.5				
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg		<0.5				
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg		<0.5				
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg		<0.5				
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg		<0.5				
EP074G: Trihalomethanes									
Chloroform	67-66-3	0.5	mg/kg		<0.5				
Bromodichloromethane	75-27-4	0.5	mg/kg		<0.5				
Dibromochloromethane	124-48-1	0.5	mg/kg		<0.5				
Bromoform	75-25-2	0.5	mg/kg		<0.5				
EP074H: Naphthalene									
Naphthalene	91-20-3	1	mg/kg		<1				
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5			
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	<0.5			
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5			
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1			
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	<0.5			
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	<0.5			
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	<0.5			
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5			
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5			
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5			
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5			
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2			

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	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014
				Result	Result	Result	Result	Result
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg			<0.5		
2-Chlorophenol	95-57-8	0.5	mg/kg			<0.5		
2-Methylphenol	95-48-7	0.5	mg/kg			<0.5		
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg			<0.5		
2-Nitrophenol	88-75-5	0.5	mg/kg			<0.5		
2.4-Dimethylphenol	105-67-9	0.5	mg/kg			<0.5		
2.4-Dichlorophenol	120-83-2	0.5	mg/kg			<0.5		
2.6-Dichlorophenol	87-65-0	0.5	mg/kg			<0.5		
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg			<0.5		
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg			<0.5		
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg			<0.5		
Pentachlorophenol	87-86-5	1	mg/kg			<1		
EP075B: Polynuclear Aromatic Hydro	ocarbons							
Naphthalene	91-20-3	0.5	mg/kg			<0.5		
2-Methylnaphthalene	91-57-6	0.5	mg/kg			<0.5		
2-Chloronaphthalene	91-58-7	0.5	mg/kg			<0.5		
Acenaphthylene	208-96-8	0.5	mg/kg			<0.5		
Acenaphthene	83-32-9	0.5	mg/kg			<0.5		
Fluorene	86-73-7	0.5	mg/kg			<0.5		
Phenanthrene	85-01-8	0.5	mg/kg			0.7		
Anthracene	120-12-7	0.5	mg/kg			<0.5		
Fluoranthene	206-44-0	0.5	mg/kg			1.5		
Pyrene	129-00-0	0.5	mg/kg			1.5		
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg			<0.5		
Benz(a)anthracene	56-55-3	0.5	mg/kg			0.8		
Chrysene	218-01-9	0.5	mg/kg			0.7		
Benzo(b+j) &	205-99-2 207-08-9	1	mg/kg			1		
Benzo(k)fluoranthene								
7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg			<0.5		
Benzo(a)pyrene	50-32-8	0.5	mg/kg			0.8		
3-Methylcholanthrene	56-49-5	0.5	mg/kg			<0.5		
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg			<0.5		
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg			<0.5		
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg			0.5		
^ Sum of PAHs		0.5	mg/kg			7.5		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC09_0.0-0.2	VC07_0.0-0.2	VC07_0.0-0.5	VC03_0.0-0.1	VC03_0.5-0.6
	Cli	Client sampling date / time		30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014
				Result	Result	Result	Result	Result
EP075B: Polynuclear Aromatic Hydro	carbons - Continued							
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg			1.0		
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg			1.3		
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg			1.5		
EP075C: Phthalate Esters								
Dimethyl phthalate	131-11-3	0.5	mg/kg			<0.5		
Diethyl phthalate	84-66-2	0.5	mg/kg			<0.5		
Di-n-butyl phthalate	84-74-2	0.5	mg/kg			<0.5		
Butyl benzyl phthalate	85-68-7	0.5	mg/kg			<0.5		
bis(2-ethylhexyl) phthalate	117-81-7	5.0	mg/kg			<5.0		
Di-n-octylphthalate	117-84-0	0.5	mg/kg			<0.5		
EP075D: Nitrosamines								
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg			<0.5		
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg			<0.5		
N-Nitrosopyrrolidine	930-55-2	1.0	mg/kg			<1.0		
N-Nitrosomorpholine	59-89-2	0.5	mg/kg			<0.5		
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg			<0.5		
N-Nitrosopiperidine	100-75-4	0.5	mg/kg			<0.5		
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg			<0.5		
N-Nitrosodiphenyl &	86-30-6 122-39-4	1.0	mg/kg			<1.0		
Diphenylamine								
Methapyrilene	91-80-5	0.5	mg/kg			<0.5		
EP075E: Nitroaromatics and Ketones								
2-Picoline	109-06-8	0.5	mg/kg			<0.5		
Acetophenone	98-86-2	0.5	mg/kg			<0.5		
Nitrobenzene	98-95-3	0.5	mg/kg			<0.5		
Isophorone	78-59-1	0.5	mg/kg			<0.5		
2.6-Dinitrotoluene	606-20-2	1.0	mg/kg			<1.0		
2.4-Dinitrotoluene	121-14-2	1.0	mg/kg			<1.0		
1-Naphthylamine	134-32-7	0.5	mg/kg			<0.5		
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg			<0.5		
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg			<0.5		
Azobenzene	103-33-3	1	mg/kg			<1		
1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg			<0.5		
Phenacetin	62-44-2	0.5	mg/kg			<0.5		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC09_0.0-0.2	VC07_0.0-0.2	VC07_0.0-0.5	VC03_0.0-0.1	VC03_0.5-0.6
	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014
				Result	Result	Result	Result	Result
EP075E: Nitroaromatics and Ketones - 0	Continued							
4-Aminobiphenyl	92-67-1	0.5	mg/kg			<0.5		
Pentachloronitrobenzene	82-68-8	0.5	mg/kg			<0.5		
Pronamide	23950-58-5	0.5	mg/kg			<0.5		
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg			<0.5		
Chlorobenzilate	510-15-6	0.5	mg/kg			<0.5		
EP075F: Haloethers								
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg			<0.5		
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg			<0.5		
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg			<0.5		
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg			<0.5		
EP075G: Chlorinated Hydrocarbons								
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg			<0.5		
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg			<0.5		
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg			<0.5		
Hexachloroethane	67-72-1	0.5	mg/kg			<0.5		
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg			<0.5		
Hexachloropropylene	1888-71-7	0.5	mg/kg			<0.5		
Hexachlorobutadiene	87-68-3	0.5	mg/kg			<0.5		
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg			<2.5		
Pentachlorobenzene	608-93-5	0.5	mg/kg			<0.5		
Hexachlorobenzene (HCB)	118-74-1	1.0	mg/kg			<1.0		
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg			<0.5		
4-Chloroaniline	106-47-8	0.5	mg/kg			<0.5		
2-Nitroaniline	88-74-4	1.0	mg/kg			<1.0		
3-Nitroaniline	99-09-2	1.0	mg/kg			<1.0		
Dibenzofuran	132-64-9	0.5	mg/kg			<0.5		
4-Nitroaniline	100-01-6	0.5	mg/kg			<0.5		
Carbazole	86-74-8	0.5	mg/kg			<0.5		
3.3`-Dichlorobenzidine	91-94-1	0.5	mg/kg			<0.5		
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg			<0.5		
beta-BHC	319-85-7	0.5	mg/kg			<0.5		
gamma-BHC	58-89-9	0.5	mg/kg			<0.5		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC09_0.0-0.2	VC07_0.0-0.2	VC07_0.0-0.5	VC03_0.0-0.1	VC03_0.5-0.6
	Client sampling date / time		30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014
				Result	Result	Result	Result	Result
EP075I: Organochlorine Pesticides - C	ontinued							
delta-BHC	319-86-8	0.5	mg/kg			<0.5		
Heptachlor	76-44-8	0.5	mg/kg			<0.5		
Aldrin	309-00-2	0.5	mg/kg			<0.5		
Heptachlor epoxide	1024-57-3	0.5	mg/kg			<0.5		
alpha-Endosulfan	959-98-8	0.5	mg/kg			<0.5		
4.4`-DDE	72-55-9	0.5	mg/kg			<0.5		
Dieldrin	60-57-1	0.5	mg/kg			<0.5		
Endrin	72-20-8	0.5	mg/kg			<0.5		
beta-Endosulfan	33213-65-9	0.5	mg/kg			<0.5		
4.4`-DDD	72-54-8	0.5	mg/kg			<0.5		
Endosulfan sulfate	1031-07-8	0.5	mg/kg			<0.5		
4.4`-DDT	50-29-3	1.0	mg/kg			<1.0		
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.5	mg/kg			<0.5		
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	mg/kg			<0.5		
EP075J: Organophosphorus Pesticide	es							
Dichlorvos	62-73-7	0.5	mg/kg			<0.5		
Dimethoate	60-51-5	0.5	mg/kg			<0.5		
Diazinon	333-41-5	0.5	mg/kg			<0.5		
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg			<0.5		
Malathion	121-75-5	0.5	mg/kg			<0.5		
Fenthion	55-38-9	0.5	mg/kg			<0.5		
Chlorpyrifos	2921-88-2	0.5	mg/kg			<0.5		
Pirimphos-ethyl	23505-41-1	0.5	mg/kg			<0.5		
Chlorfenvinphos	470-90-6	0.5	mg/kg			<0.5		
Prothiofos	34643-46-4	0.5	mg/kg			<0.5		
Ethion	563-12-2	0.5	mg/kg			<0.5		
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3 Fractio	าร					
>C10 - C16 Fraction		3	mg/kg	<3	4	7		
>C16 - C34 Fraction		3	mg/kg	<3	122	176		
>C34 - C40 Fraction		5	mg/kg	<5	49	69		
>C10 - C40 Fraction (sum)		3	mg/kg	<3	175	252		
>C10 - C16 Fraction minus Naphthalene		3	mg/kg	<3	4	7		
(F2)								
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC09_0.0-0.2	VC07_0.0-0.2	VC07_0.0-0.5	VC03_0.0-0.1	VC03_0.5-0.6
	Cli	ent sampliı	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014
				Result	Result	Result	Result	Result
EP080-SD / EP071-SD: Total Petroleu	ım Hydrocarbons - C	ontinued						
C6 - C9 Fraction		3	mg/kg	<3	<3	<3		
C10 - C14 Fraction		3	mg/kg	<3	<3	<3		
C15 - C28 Fraction		3	mg/kg	<3	68	101		
C29 - C36 Fraction		5	mg/kg	<5	79	111		
^ C10 - C36 Fraction (sum)		3	mg/kg	<3	147	212		
EP080-SD / EP071-SD: Total Recover	able Hydrocarbons							
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3		
C6 - C10 Fraction minus BTEX	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0		
(F1)								
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2		
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2		
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2		
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	<0.2		
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2		
^ Total Xylenes		0.5	mg/kg	<0.5	<0.5	<0.5		
^ Sum of BTEX		0.2	mg/kg	<0.2	<0.2	<0.2		
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2		
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg			20.4		
EP130A: Organophosphorus Pesticio	des (Ultra-trace)							
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10		
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10		
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0		
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10		
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10		
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10		
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10		
Diazinon	333-41-5	10	µg/kg	<10	<10	<10		
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10		
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10		
Ethion	563-12-2	10	µg/kg	<10	<10	<10		
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10		
Fenthion	55-38-9	10	µg/kg	<10	<10	<10		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC09_0.0-0.2	VC07_0.0-0.2	VC07_0.0-0.5	VC03_0.0-0.1	VC03_0.5-0.6		
	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014		
				Result	Result	Result	Result	Result		
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued										
Malathion	121-75-5	10	µg/kg	<10	<10	<10				
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10				
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10				
Parathion	56-38-2	10	µg/kg	<10	<10	<10				
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10				
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10				
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10				
EP131A: Organochlorine Pesticides										
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50				
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50				
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50				
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50				
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50				
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50				
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50				
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5	0.50	µg/kg	<0.50	<0.50	<0.50				
	0-2									
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50				
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50				
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50				
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50				
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50				
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50				
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50				
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50				
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50				
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50				
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50				
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25				
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50				
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	<0.25				
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25				
^ Total Chlordane (sum)		0.25	µg/kg	<0.25	<0.25	<0.25				
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50				
EP131B: Polychlorinated Biphenyls (a	as Aroclors)									

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC09_0.0-0.2	VC07_0.0-0.2	VC07_0.0-0.5	VC03_0.0-0.1	VC03_0.5-0.6	
	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014	
				Result	Result	Result	Result	Result	
EP131B: Polychlorinated Biphenyls (as Aroclors) - Continued									
^ Total Polychlorinated biphenyls		5.0	µg/kg	<5.0	<5.0	67.7			
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0			
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0			
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0			
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0			
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0			
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	67.7			
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0			
EP132B: Polynuclear Aromatic Hydr	ocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	46	60			
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<25	<25			
Acenaphthylene	208-96-8	4	µg/kg	<4	132	202			
Acenaphthene	83-32-9	4	µg/kg	<4	<25	<25			
Fluorene	86-73-7	4	µg/kg	<4	<25	41			
Phenanthrene	85-01-8	4	µg/kg	<4	226	243			
Anthracene	120-12-7	4	µg/kg	<4	103	116			
Fluoranthene	206-44-0	4	µg/kg	<4	595	594			
Pyrene	129-00-0	4	µg/kg	<4	639	646			
Benz(a)anthracene	56-55-3	4	µg/kg	<4	417	542			
Chrysene	218-01-9	4	µg/kg	<4	378	473			
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	606	799			
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	304	375			
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	307	373			
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	627	872			
Perylene	198-55-0	4	µg/kg	<4	136	174			
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	483	663			
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	89	127			
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	375	517			
Coronene	191-07-1	5	µg/kg	<5	256	250			
^ Sum of PAHs		4	µg/kg	<4	5720	7070			
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.5	%		95.2				
Toluene-D8	2037-26-5	0.5	%		102				
4-Bromofluorobenzene	460-00-4	0.5	%		97.1				

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC09_0.0-0.2	VC07_0.0-0.2	VC07_0.0-0.5	VC03_0.0-0.1	VC03_0.5-0.6	
	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936029-001	ES1936029-007	ES1936029-011	ES1936029-013	ES1936029-014	
				Result	Result	Result	Result	Result	
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%	86.1	82.5	82.9			
2-Chlorophenol-D4	93951-73-6	0.5	%	96.0	92.4	92.6			
2.4.6-Tribromophenol	118-79-6	0.5	%	66.6	71.8	73.3			
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%	116	111	111			
Anthracene-d10	1719-06-8	0.5	%	101	99.2	99.3			
4-Terphenyl-d14	1718-51-0	0.5	%	105	95.6	95.8			
EP075S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.5	%			121			
Phenol-d6	13127-88-3	0.5	%			106			
2-Chlorophenol-D4	93951-73-6	0.5	%			111			
2.4.6-Tribromophenol	118-79-6	0.5	%			68.6			
EP075T: Base/Neutral Extractable Surrogates									
Nitrobenzene-D5	4165-60-0	0.5	%			88.6			
1.2-Dichlorobenzene-D4	2199-69-1	0.5	%			83.1			
2-Fluorobiphenyl	321-60-8	0.5	%			91.3			
Anthracene-d10	1719-06-8	0.5	%			84.8			
4-Terphenyl-d14	1718-51-0	0.5	%			90.0			
EP080-SD: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%	112	109	105			
Toluene-D8	2037-26-5	0.2	%	125	98.4	93.0			
4-Bromofluorobenzene	460-00-4	0.2	%	116	103	100			
EP090S: Organotin Surrogate									
Tripropyltin		0.5	%			44.5			
EP130S: Organophosphorus Pesticide Su	urrogate								
DEF	78-48-8	10	%	51.4	71.9	60.2			
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.50	%	68.3	52.3	48.7			
EP131T: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.5	%	65.4	81.6	76.8			
EP132T: Base/Neutral Extractable Surrog	ates								
2-Fluorobiphenyl	321-60-8	10	%	108	103	84.6			
Anthracene-d10	1719-06-8	10	%	116	107	81.2			
4-Terphenyl-d14	1718-51-0	10	%	110	112	85.4			

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC03_1.0-1.1	VC01_0.0-0.1	VC01_0.5-0.6	VC01_1.0-1.1	VC02_0.0-0.1
	C	lient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-015	ES1936029-016	ES1936029-017	ES1936029-018	ES1936029-019
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	7.4	8.5	7.7	7.3	8.8
øpH (Fox)		0.1	pH Unit	5.4	6.2	5.7	5.2	6.0
Ø Reaction Rate		1	-	3	3	3	3	3

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC02_0.5-0.6	VC02_0.9-1.0	VC02_1.5-1.6	VC10_0.0-0.1	VC10_0.5-0.6
	C	lient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-020	ES1936029-021	ES1936029-022	ES1936029-023	ES1936029-024
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	8.8	7.8	7.4	7.7	7.5
øpH (Fox)		0.1	pH Unit	6.3	6.3	5.9	6.4	5.8
Ø Reaction Rate		1	-	3	3	3	3	3

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC11_0.0-0.1	VC11_0.5-0.6	VC11_1.0-1.1	VC09_0.0-0.1	VC09_0.5-0.6
	CI	lient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	CAS Number LOR Unit		ES1936029-025	ES1936029-026	ES1936029-027	ES1936029-028	ES1936029-029
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	8.8	8.8	8.9	8.8	8.0
øpH (Fox)		0.1	pH Unit	6.2	6.4	6.3	6.4	6.0
Ø Reaction Rate		1	-	3	3	3	3	3

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC09_0.9-1.0	VC07_0.0-0.1	VC07_0.5-0.6	VC07_1.0-1.1	VC05_0.0-0.1
	CI	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number LOR Unit		ES1936029-030	ES1936029-031	ES1936029-032	ES1936029-033	ES1936029-034	
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	8.1	8.6	8.3	7.9	8.3
ø pH (Fox)		0.1	pH Unit	5.6	6.3	6.2	5.9	6.2
Ø Reaction Rate		1	-	3	3	3	3	3

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.5-0.6	VC05_0.8-1.0	VC04_0.0-0.1	VC04_0.9-1.0	VC11_0.5-0.7
	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-035	ES1936029-036	ES1936029-037	ES1936029-038	ES1936029-040
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	8.0	7.4	7.5	7.4	
ø pH (Fox)		0.1	pH Unit	6.0	5.3	5.8	5.6	
Ø Reaction Rate		1	-	3	3	3	3	
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content		1.0	%					28.4
EG005(ED093)-SD: Total Metals in Sedim	ents by ICP-AES	5						
Aluminium	7429-90-5	50	mg/kg					6760
Iron	7439-89-6	50	mg/kg					17800
EG020-SD: Total Metals in Sediments by	ICPMS							
Antimony	7440-36-0	0.50	mg/kg					<0.50
Arsenic	7440-38-2	1.00	mg/kg					8.73
Cadmium	7440-43-9	0.1	mg/kg					<0.1
Chromium	7440-47-3	1.0	mg/kg					12.2
Copper	7440-50-8	1.0	mg/kg					3.2
Cobalt	7440-48-4	0.5	mg/kg					1.4
Lead	7439-92-1	1.0	mg/kg					7.0
Manganese	7439-96-5	10	mg/kg					28
Nickel	7440-02-0	1.0	mg/kg					4.3
Selenium	7782-49-2	0.1	mg/kg					0.4
Silver	7440-22-4	0.1	mg/kg					0.4
Vanadium	7440-62-2	2.0	mg/kg					13.6
Zinc	7440-66-6	1.0	mg/kg					14.0
EG035T: Total Recoverable Mercury by F	IMS							
Mercury	7439-97-6	0.01	mg/kg					0.03
EK026SF: Total CN by Segmented Flow	Analyser							
Total Cyanide	57-12-5	1	mg/kg					<1
EK040T: Fluoride Total								
Fluoride	16984-48-8	40	mg/kg					150
EP003: Total Organic Carbon (TOC) in So	bil							
Total Organic Carbon		0.02	%					0.53
EP074A: Monocyclic Aromatic Hydrocart	oons							
Benzene	71-43-2	0.2	mg/kg					<0.2
Toluene	108-88-3	0.5	mg/kg					<0.5
Ethylbenzene	100-41-4	0.5	mg/kg					<0.5

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC05_0.5-0.6	VC05_0.8-1.0	VC04_0.0-0.1	VC04_0.9-1.0	VC11_0.5-0.7
	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-035	ES1936029-036	ES1936029-037	ES1936029-038	ES1936029-040
				Result	Result	Result	Result	Result
EP074A: Monocyclic Aromatic Hydro	carbons - Continued							
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg					<0.5
Styrene	100-42-5	0.5	mg/kg					<0.5
ortho-Xylene	95-47-6	0.5	mg/kg					<0.5
Isopropylbenzene	98-82-8	0.5	mg/kg					<0.5
n-Propylbenzene	103-65-1	0.5	mg/kg					<0.5
1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg					<0.5
sec-Butylbenzene	135-98-8	0.5	mg/kg					<0.5
1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg					<0.5
tert-Butylbenzene	98-06-6	0.5	mg/kg					<0.5
p-lsopropyltoluene	99-87-6	0.5	mg/kg					<0.5
n-Butylbenzene	104-51-8	0.5	mg/kg					<0.5
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	5	mg/kg					<5
2-Butanone (MEK)	78-93-3	5	mg/kg					<5
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg					<5
2-Hexanone (MBK)	591-78-6	5	mg/kg					<5
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	0.5	mg/kg					<0.5
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	0.5	mg/kg					<0.5
1.2-Dichloropropane	78-87-5	0.5	mg/kg					<0.5
cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg					<0.5
trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg					<0.5
1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg					<0.5
EP074E: Halogenated Aliphatic Com	pounds							
Dichlorodifluoromethane	75-71-8	5	mg/kg					<5
Chloromethane	74-87-3	5	mg/kg					<5
Vinyl chloride	75-01-4	5	mg/kg					<5
Bromomethane	74-83-9	5	mg/kg					<5
Chloroethane	75-00-3	5	mg/kg					<5
Trichlorofluoromethane	75-69-4	5	mg/kg					<5
1.1-Dichloroethene	75-35-4	0.5	mg/kg					<0.5
lodomethane	74-88-4	0.5	mg/kg					<0.5
trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg					<0.5

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.5-0.6	VC05_0.8-1.0	VC04_0.0-0.1	VC04_0.9-1.0	VC11_0.5-0.7
	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-035	ES1936029-036	ES1936029-037	ES1936029-038	ES1936029-040
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compo	ounds - Continued							
1.1-Dichloroethane	75-34-3	0.5	mg/kg					<0.5
cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg					<0.5
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg					<0.5
1.1-Dichloropropylene	563-58-6	0.5	mg/kg					<0.5
Carbon Tetrachloride	56-23-5	0.5	mg/kg					<0.5
1.2-Dichloroethane	107-06-2	0.5	mg/kg					<0.5
Trichloroethene	79-01-6	0.5	mg/kg					<0.5
Dibromomethane	74-95-3	0.5	mg/kg					<0.5
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg					<0.5
1.3-Dichloropropane	142-28-9	0.5	mg/kg					<0.5
Tetrachloroethene	127-18-4	0.5	mg/kg					<0.5
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg					<0.5
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg					<0.5
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg					<0.5
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg					<0.5
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg					<0.5
Pentachloroethane	76-01-7	0.5	mg/kg					<0.5
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg					<0.5
Hexachlorobutadiene	87-68-3	0.5	mg/kg					<0.5
EP074F: Halogenated Aromatic Compo	ounds							
Chlorobenzene	108-90-7	0.5	mg/kg					<0.5
Bromobenzene	108-86-1	0.5	mg/kg					<0.5
2-Chlorotoluene	95-49-8	0.5	mg/kg					<0.5
4-Chlorotoluene	106-43-4	0.5	mg/kg					<0.5
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg					<0.5
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg					<0.5
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg					<0.5
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg					<0.5
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg					<0.5
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg					<0.5
Bromodichloromethane	75-27-4	0.5	mg/kg					<0.5
Dibromochloromethane	124-48-1	0.5	mg/kg					<0.5
Bromoform	75-25-2	0.5	mg/kg					<0.5

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC05_0.5-0.6	VC05_0.8-1.0	VC04_0.0-0.1	VC04_0.9-1.0	VC11_0.5-0.7
	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-035	ES1936029-036	ES1936029-037	ES1936029-038	ES1936029-040
				Result	Result	Result	Result	Result
EP074H: Naphthalene								
Naphthalene	91-20-3	1	mg/kg					<1
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg					<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg					<0.5
2-Methylphenol	95-48-7	0.5	mg/kg					<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg					<1
2-Nitrophenol	88-75-5	0.5	mg/kg					<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg					<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg					<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg					<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg					<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg					<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg					<0.5
Pentachlorophenol	87-86-5	2	mg/kg					<2
EP080/071: Total Recoverable Hydrocarl	bons - NEPM 201	3 Fractio	ns					
>C10 - C16 Fraction		3	mg/kg					<3
>C16 - C34 Fraction		3	mg/kg					6
>C34 - C40 Fraction		5	mg/kg					<5
>C10 - C40 Fraction (sum)		3	mg/kg					6
>C10 - C16 Fraction minus Naphthalene		3	mg/kg					<3
(F2)								
EP080-SD / EP071-SD: Total Petroleum H	Hydrocarbons							
C6 - C9 Fraction		3	mg/kg					<3
C10 - C14 Fraction		3	mg/kg					<3
C15 - C28 Fraction		3	mg/kg					4
C29 - C36 Fraction		5	mg/kg					<5
^ C10 - C36 Fraction (sum)		3	mg/kg					4
EP080-SD / EP071-SD: Total Recoverable	e Hydrocarbons							
C6 - C10 Fraction	C6_C10	3	mg/kg					<3
C6 - C10 Fraction minus BTEX	C6_C10-BTEX	3.0	mg/kg					<3.0
(F1)								
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg					<0.2
Toluene	108-88-3	0.2	mg/kg					<0.2

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.5-0.6	VC05_0.8-1.0	VC04_0.0-0.1	VC04_0.9-1.0	VC11_0.5-0.7
	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-035	ES1936029-036	ES1936029-037	ES1936029-038	ES1936029-040
				Result	Result	Result	Result	Result
EP080-SD: BTEXN - Continued								
Ethylbenzene	100-41-4	0.2	mg/kg					<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg					<0.2
ortho-Xylene	95-47-6	0.2	mg/kg					<0.2
^ Total Xylenes		0.5	mg/kg					<0.5
^ Sum of BTEX		0.2	mg/kg					<0.2
Naphthalene	91-20-3	0.2	mg/kg					<0.2
EP130A: Organophosphorus Pestic	cides (Ultra-trace)							
Bromophos-ethyl	4824-78-6	10	µg/kg					<10
Carbophenothion	786-19-6	10	µg/kg					<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg					<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg					<10
Chlorpyrifos	2921-88-2	10	µg/kg					<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg					<10
Demeton-S-methyl	919-86-8	10	µg/kg					<10
Diazinon	333-41-5	10	µg/kg					<10
Dichlorvos	62-73-7	10	µg/kg					<10
Dimethoate	60-51-5	10	µg/kg					<10
Ethion	563-12-2	10	µg/kg					<10
Fenamiphos	22224-92-6	10	µg/kg					<10
Fenthion	55-38-9	10	µg/kg					<10
Malathion	121-75-5	10	µg/kg					<10
Azinphos Methyl	86-50-0	10	µg/kg					<10
Monocrotophos	6923-22-4	10	µg/kg					<10
Parathion	56-38-2	10	µg/kg					<10
Parathion-methyl	298-00-0	10	µg/kg					<10
Pirimphos-ethyl	23505-41-1	10	µg/kg					<10
Prothiofos	34643-46-4	10	µg/kg					<10
EP131A: Organochlorine Pesticides	s							
Aldrin	309-00-2	0.50	µg/kg					<0.50
alpha-BHC	319-84-6	0.50	µg/kg					<0.50
beta-BHC	319-85-7	0.50	µg/kg					<0.50
delta-BHC	319-86-8	0.50	µg/kg					<0.50
4.4`-DDD	72-54-8	0.50	µg/kg					<0.50
4.4`-DDE	72-55-9	0.50	µg/kg					<0.50

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC05_0.5-0.6	VC05_0.8-1.0	VC04_0.0-0.1	VC04_0.9-1.0	VC11_0.5-0.7
	Cli	ient samplii	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-035	ES1936029-036	ES1936029-037	ES1936029-038	ES1936029-040
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides	- Continued							
4.4`-DDT	50-29-3	0.50	µg/kg					<0.50
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5	0.50	µg/kg					<0.50
Dioldrin	0-2	0.50	ua/ka					<0.50
alnha-Endosulfan	00-57-1	0.50	µg/kg					<0.50
bota Endosulfan	909-90-0 22212 CE 0	0.50	µg/kg					<0.50
Endocultan sulfato	33213-05-9	0.50	µg/kg					<0.50
	1031-07-8	0.50	µg/kg					<0.50
Endosunan (sum)	115-29-7	0.50	µg/kg					<0.50
Enarin Endein eldekede	72-20-8	0.50	µg/kg					<0.50
Endrin aldenyde	7421-93-4	0.50	µg/kg					<0.50
Endrin ketone	53494-70-5	0.50	µg/kg					<0.50
Heptachlor	76-44-8	0.50	µg/kg					<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg					<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg					<0.50
gamma-BHC	58-89-9	0.25	µg/kg					<0.25
Methoxychlor	72-43-5	0.50	µg/kg					<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg					<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg					<0.25
^ Total Chlordane (sum)		0.25	µg/kg					<0.25
Oxychlordane	27304-13-8	0.50	µg/kg					<0.50
EP131B: Polychlorinated Biphenyls	(as Aroclors)							
^ Total Polychlorinated biphenyls		5.0	µg/kg					<5.0
Aroclor 1016	12674-11-2	5.0	µg/kg					<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg					<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg					<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg					<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg					<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg					<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg					<5.0
EP132B: Polynuclear Aromatic Hydro	ocarbons							
Naphthalene	91-20-3	5	µg/kg					<5
2-Methylnaphthalene	91-57-6	5	µg/kg					<5
Acenaphthylene	208-96-8	4	µg/kg					<4
Acenaphthene	83-32-9	4	µg/kg					<4
Fluorene	86-73-7	4	µg/kg					<4

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC05_0.5-0.6	VC05_0.8-1.0	VC04_0.0-0.1	VC04_0.9-1.0	VC11_0.5-0.7
	Cli	ient samplii	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-035	ES1936029-036	ES1936029-037	ES1936029-038	ES1936029-040
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hyd	drocarbons - Continued							
Phenanthrene	85-01-8	4	µg/kg					<4
Anthracene	120-12-7	4	µg/kg					<4
Fluoranthene	206-44-0	4	µg/kg					<4
Pyrene	129-00-0	4	µg/kg					<4
Benz(a)anthracene	56-55-3	4	µg/kg					<4
Chrysene	218-01-9	4	µg/kg					<4
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg					<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg					<4
Benzo(e)pyrene	192-97-2	4	µg/kg					<4
Benzo(a)pyrene	50-32-8	4	µg/kg					<4
Perylene	198-55-0	4	µg/kg					<4
Benzo(g.h.i)perylene	191-24-2	4	µg/kg					<4
Dibenz(a.h)anthracene	53-70-3	4	µg/kg					<4
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg					<4
Coronene	191-07-1	5	µg/kg					<5
^ Sum of PAHs		4	µg/kg					<4
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%					90.8
Toluene-D8	2037-26-5	0.5	%					93.9
4-Bromofluorobenzene	460-00-4	0.5	%					87.2
EP075(SIM)S: Phenolic Compound	Surrogates							
Phenol-d6	13127-88-3	0.5	%					83.5
2-Chlorophenol-D4	93951-73-6	0.5	%					92.3
2.4.6-Tribromophenol	118-79-6	0.5	%					64.3
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%					113
Anthracene-d10	1719-06-8	0.5	%					102
4-Terphenyl-d14	1718-51-0	0.5	%					104
EP080-SD: TPH(V)/BTEX Surrogate	s							
1.2-Dichloroethane-D4	17060-07-0	0.2	%					110
Toluene-D8	2037-26-5	0.2	%					99.6
4-Bromofluorobenzene	460-00-4	0.2	%					109
EP130S: Organophosphorus Pestic	cide Surrogate							
DEF	78-48-8	10	%					46.4

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	Cli	ent sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-035	ES1936029-036	ES1936029-037	ES1936029-038	ES1936029-040
				Result	Result	Result	Result	Result
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%					46.9
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%					86.6
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%					108
Anthracene-d10	1719-06-8	10	%					113
4-Terphenyl-d14	1718-51-0	10	%					112

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.8-0.9	VC03_0.3-0.4	VC03_0.0-0.5	VC04_0.3-0.4	VC04_0.5-1.0		
	Cl	ient samplii	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063		
				Result	Result	Result	Result	Result		
EA055: Moisture Content (Dried @ 105-110°C)										
Moisture Content		1.0	%	4.3	12.1	13.1	17.1	64.3		
EA150: Particle Sizing										
+75µm		1	%			48		80		
+150μm		1	%			42		72		
+300µm		1	%			27		36		
+425μm		1	%			14		16		
+600µm		1	%			4		3		
+1180µm		1	%			<1		<1		
+2.36mm		1	%			<1		<1		
+4.75mm		1	%			<1		<1		
+9.5mm		1	%			<1		<1		
+19.0mm		1	%			<1		<1		
+37.5mm		1	%			<1		<1		
+75.0mm		1	%			<1		<1		
EA150: Soil Classification based on Part	icle Size									
Clay (<2 μm)		1	%			37		16		
Silt (2-60 μm)		1	%			12		4		
Sand (0.06-2.00 mm)		1	%			51		80		
Gravel (>2mm)		1	%			<1		<1		
Cobbles (>6cm)		1	%			<1		<1		
EG005(ED093)-SD: Total Metals in Sedim	ents by ICP-AES	5								
Aluminium	7429-90-5	50	mg/kg	4150	11800	11300	14800	14600		
Iron	7439-89-6	50	mg/kg	3840	1240	1290	2510	3080		
EG020-SD: Total Metals in Sediments by	ICPMS									
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Arsenic	7440-38-2	1.00	mg/kg	3.22	<1.00	<1.00	<1.00	<1.00		
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1		
Chromium	7440-47-3	1.0	mg/kg	4.3	12.5	10.7	13.2	12.0		
Copper	7440-50-8	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0		
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	0.5	<0.5	<0.5		
Lead	7439-92-1	1.0	mg/kg	1.6	13.5	33.6	28.0	4.9		
Manganese	7439-96-5	10	mg/kg	<10	<10	<10	<10	<10		
Nickel	7440-02-0	1.0	mg/kg	<1.0	1.9	2.0	2.0	1.6		
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.1	0.2	0.1		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.8-0.9	VC03_0.3-0.4	VC03_0.0-0.5	VC04_0.3-0.4	VC04_0.5-1.0
	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063
				Result	Result	Result	Result	Result
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
Silver	7440-22-4	0.1	mg/kg	0.1	0.1	<0.1	0.1	0.3
Vanadium	7440-62-2	2.0	mg/kg	15.6	5.1	5.5	10.4	8.9
Zinc	7440-66-6	1.0	mg/kg	1.5	6.2	16.7	3.4	2.3
EG035T: Total Recoverable Mercury	/ by FIMS							
Mercury	7439-97-6	0.01	mg/kg	<0.01	0.04	0.05	<0.01	<0.01
EK026SF: Total CN by Segmented F	low Analyser							
Total Cyanide	57-12-5	1	mg/kg	<1	<1	<1	<1	<1
EK040T: Fluoride Total								
Fluoride	16984-48-8	40	mg/kg	<40	40			
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon		0.02	%	0.11	0.16	0.15	0.10	0.05
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2			
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5			
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5			
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5			
Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5			
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5			
Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	<0.5			
n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	<0.5			
1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	<0.5			
sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	<0.5			
1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	<0.5			
tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	<0.5			
p-lsopropyltoluene	99-87-6	0.5	mg/kg	<0.5	<0.5			
n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	<0.5			
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	5	mg/kg	<5	<5			
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5			
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	<5			
2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	<5			
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	<0.5			
EP074D: Fumigants								

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	Cli	ient sampliı	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063
				Result	Result	Result	Result	Result
EP074D: Fumigants - Continued								
2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	<0.5			
1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	<0.5			
cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	<0.5			
trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	<0.5			
1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	<0.5			
EP074E: Halogenated Aliphatic Compo	ounds							
Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	<5			
Chloromethane	74-87-3	5	mg/kg	<5	<5			
Vinyl chloride	75-01-4	5	mg/kg	<5	<5			
Bromomethane	74-83-9	5	mg/kg	<5	<5			
Chloroethane	75-00-3	5	mg/kg	<5	<5			
Trichlorofluoromethane	75-69-4	5	mg/kg	<5	<5			
1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5			
lodomethane	74-88-4	0.5	mg/kg	<0.5	<0.5			
trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	<0.5			
1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	<0.5			
cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	<0.5			
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5			
1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	<0.5			
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5			
1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5			
Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5			
Dibromomethane	74-95-3	0.5	mg/kg	<0.5	<0.5			
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5			
1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	<0.5			
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5			
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5			
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	<0.5			
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	<0.5			
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5			
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	<0.5			
Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	<0.5			
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	<0.5			
Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5			

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	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063	
				Result	Result	Result	Result	Result	
EP074F: Halogenated Aromatic Compou	inds								
Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5				
Bromobenzene	108-86-1	0.5	mg/kg	<0.5	<0.5				
2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	<0.5				
4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	<0.5				
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5				
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5				
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5				
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5				
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	<0.5				
EP074G: Trihalomethanes									
Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5				
Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	<0.5				
Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	<0.5				
Bromoform	75-25-2	0.5	mg/kg	<0.5	<0.5				
EP074H: Naphthalene									
Naphthalene	91-20-3	1	mg/kg	<1	<1				
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.8	
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.8	
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.8	
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1	<1	<2	
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.8	
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.8	
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.8	
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.8	
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.8	
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.8	
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.8	
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2	<2	<2	
EP075A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg					<0.6	
2-Chlorophenol	95-57-8	0.5	mg/kg					<0.6	
2-Methylphenol	95-48-7	0.5	mg/kg					<0.6	
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg					<0.6	

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	Cl	Client sampling date / time		30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063
				Result	Result	Result	Result	Result
EP075A: Phenolic Compounds - Con	tinued							
2-Nitrophenol	88-75-5	0.5	mg/kg					<0.6
2.4-Dimethylphenol	105-67-9	0.5	mg/kg					<0.6
2.4-Dichlorophenol	120-83-2	0.5	mg/kg					<0.6
2.6-Dichlorophenol	87-65-0	0.5	mg/kg					<0.6
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg					<0.6
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg					<0.6
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg					<0.6
Pentachlorophenol	87-86-5	1	mg/kg					<1
EP075B: Polynuclear Aromatic Hydr	ocarbons							
Naphthalene	91-20-3	0.5	mg/kg					<0.6
2-Methylnaphthalene	91-57-6	0.5	mg/kg					<0.6
2-Chloronaphthalene	91-58-7	0.5	mg/kg					<0.6
Acenaphthylene	208-96-8	0.5	mg/kg					<0.6
Acenaphthene	83-32-9	0.5	mg/kg					<0.6
Fluorene	86-73-7	0.5	mg/kg					<0.6
Phenanthrene	85-01-8	0.5	mg/kg					<0.6
Anthracene	120-12-7	0.5	mg/kg					<0.6
Fluoranthene	206-44-0	0.5	mg/kg					<0.6
Pyrene	129-00-0	0.5	mg/kg					<0.6
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg					<0.6
Benz(a)anthracene	56-55-3	0.5	mg/kg					<0.6
Chrysene	218-01-9	0.5	mg/kg					<0.6
Benzo(b+j) &	205-99-2 207-08-9	1	mg/kg					<1
Benzo(k)fluoranthene								
7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg					<0.6
Benzo(a)pyrene	50-32-8	0.5	mg/kg					<0.6
3-Methylcholanthrene	56-49-5	0.5	mg/kg					<0.6
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg					<0.6
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg					<0.6
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg					<0.6
^ Sum of PAHs		0.5	mg/kg					<0.5
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg					<0.5
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg					0.7
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg					1.4
EP075C: Phthalate Esters								

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.8-0.9	VC03_0.3-0.4	VC03_0.0-0.5	VC04_0.3-0.4	VC04_0.5-1.0
	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063
				Result	Result	Result	Result	Result
EP075C: Phthalate Esters - Continued								
Dimethyl phthalate	131-11-3	0.5	mg/kg					<0.6
Diethyl phthalate	84-66-2	0.5	mg/kg					<0.6
Di-n-butyl phthalate	84-74-2	0.5	mg/kg					<0.6
Butyl benzyl phthalate	85-68-7	0.5	mg/kg					<0.6
bis(2-ethylhexyl) phthalate	117-81-7	5.0	mg/kg					<5.0
Di-n-octylphthalate	117-84-0	0.5	mg/kg					<0.6
EP075D: Nitrosamines								
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg					<0.6
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg					<0.6
N-Nitrosopyrrolidine	930-55-2	1.0	mg/kg					<1.0
N-Nitrosomorpholine	59-89-2	0.5	mg/kg					<0.6
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg					<0.6
N-Nitrosopiperidine	100-75-4	0.5	mg/kg					<0.6
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg					<0.6
N-Nitrosodiphenyl &	86-30-6 122-39-4	1.0	mg/kg					<1.2
Diphenylamine								
Methapyrilene	91-80-5	0.5	mg/kg					<0.6
EP075E: Nitroaromatics and Ketones	;							
2-Picoline	109-06-8	0.5	mg/kg					<0.6
Acetophenone	98-86-2	0.5	mg/kg					<0.6
Nitrobenzene	98-95-3	0.5	mg/kg					<0.6
Isophorone	78-59-1	0.5	mg/kg					<0.6
2.6-Dinitrotoluene	606-20-2	1.0	mg/kg					<1.0
2.4-Dinitrotoluene	121-14-2	1.0	mg/kg					<1.0
1-Naphthylamine	134-32-7	0.5	mg/kg					<0.6
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg					<0.6
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg					<0.6
Azobenzene	103-33-3	1	mg/kg					<1
1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg					<0.6
Phenacetin	62-44-2	0.5	mg/kg					<0.6
4-Aminobiphenyl	92-67-1	0.5	mg/kg					<0.6
Pentachloronitrobenzene	82-68-8	0.5	mg/kg					<0.6
Pronamide	23950-58-5	0.5	mg/kg					<0.6
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg					<0.6
Chlorobenzilate	510-15-6	0.5	mg/kg					<0.6

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	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063
				Result	Result	Result	Result	Result
EP075E: Nitroaromatics and Ketones - C	Continued							
EP075F: Haloethers								
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg					<0.6
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg					<0.6
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg					<0.6
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg					<0.6
EP075G: Chlorinated Hydrocarbons								
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg					<0.6
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg					<0.6
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg					<0.6
Hexachloroethane	67-72-1	0.5	mg/kg					<0.6
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg					<0.6
Hexachloropropylene	1888-71-7	0.5	mg/kg					<0.6
Hexachlorobutadiene	87-68-3	0.5	mg/kg					<0.6
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg					<2.5
Pentachlorobenzene	608-93-5	0.5	mg/kg					<0.6
Hexachlorobenzene (HCB)	118-74-1	1.0	mg/kg					<1.0
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg					<0.6
4-Chloroaniline	106-47-8	0.5	mg/kg					<0.6
2-Nitroaniline	88-74-4	1.0	mg/kg					<1.0
3-Nitroaniline	99-09-2	1.0	mg/kg					<1.0
Dibenzofuran	132-64-9	0.5	mg/kg					<0.6
4-Nitroaniline	100-01-6	0.5	mg/kg					<0.6
Carbazole	86-74-8	0.5	mg/kg					<0.6
3.3`-Dichlorobenzidine	91-94-1	0.5	mg/kg					<0.6
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg					<0.6
beta-BHC	319-85-7	0.5	mg/kg					<0.6
gamma-BHC	58-89-9	0.5	mg/kg					<0.6
delta-BHC	319-86-8	0.5	mg/kg					<0.6
Heptachlor	76-44-8	0.5	mg/kg					<0.6
Aldrin	309-00-2	0.5	mg/kg					<0.6
Heptachlor epoxide	1024-57-3	0.5	mg/kg					<0.6
alpha-Endosulfan	959-98-8	0.5	mg/kg					<0.6
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Work Order	ES1936029 Amendment 1							
Client	: GHD PTY LTD							
Project	12517046							



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.8-0.9	VC03_0.3-0.4	VC03_0.0-0.5	VC04_0.3-0.4	VC04_0.5-1.0
	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063
				Result	Result	Result	Result	Result
EP075I: Organochlorine Pesticides - Co	ontinued							
4.4`-DDE	72-55-9	0.5	mg/kg					<0.6
Dieldrin	60-57-1	0.5	mg/kg					<0.6
Endrin	72-20-8	0.5	mg/kg					<0.6
beta-Endosulfan	33213-65-9	0.5	mg/kg					<0.6
4.4`-DDD	72-54-8	0.5	mg/kg					<0.6
Endosulfan sulfate	1031-07-8	0.5	mg/kg					<0.6
4.4`-DDT	50-29-3	1.0	mg/kg					<1.0
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5	0.5	mg/kg					<0.5
∧ Sum of Aldrin + Dioldrin	0-2	0.5	ma/ka					<0.5
	309-00-2/60-57-1	0.5	ilig/kg					~0.0
EP075J: Organophosphorus Pesticide	S	0.5	malka					<0.6
Diciliorvos	62-73-7	0.5	mg/kg					<0.0
Dimethoate	60-51-5	0.5	mg/kg					<0.0
	333-41-5	0.5	mg/kg					<0.6
Chiorpyritos-metnyi	5598-13-0	0.5	mg/kg					<0.0
	121-75-5	0.5	mg/kg					<0.6
Fentnion	55-38-9	0.5	mg/kg					<0.6
Chiorpyritos	2921-88-2	0.5	mg/kg					<0.6
Pirimpnos-etnyi	23505-41-1	0.5	mg/kg					<0.6
Chiorfenvinphos	470-90-6	0.5	mg/kg					<0.6
Prothiofos	34643-46-4	0.5	mg/kg					<0.6
Ethion	563-12-2	0.5	mg/kg					<0.6
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3 Fractio	ns					
>C10 - C16 Fraction		3	mg/kg	<3	<3	<3	<3	<3
>C16 - C34 Fraction		3	mg/kg	<3	<3	<3	<3	4
>C34 - C40 Fraction		5	mg/kg	<5	<5	<5	<5	<5
>C10 - C40 Fraction (sum)		3	mg/kg	<3	<3	<3	<3	4
>C10 - C16 Fraction minus Naphthalene		3	mg/kg	<3	<3	<3	<3	<3
(F2)								
EP080-SD / EP071-SD: Total Petroleum	n Hydrocarbons	_	-		-	-	-	-
C6 - C9 Fraction		3	mg/kg	<3	<3	<3	<3	<3
C10 - C14 Fraction		3	mg/kg	<3	<3	<3	<3	<3
C15 - C28 Fraction		3	mg/kg	<3	<3	<3	<3	5
C29 - C36 Fraction		5	mg/kg	<5	<5	<5	<5	<5
^ C10 - C36 Fraction (sum)		3	mg/kg	<3	<3	<3	<3	5

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.8-0.9	VC03_0.3-0.4	VC03_0.0-0.5	VC04_0.3-0.4	VC04_0.5-1.0		
	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063		
				Result	Result	Result	Result	Result		
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons - Continued										
EP080-SD / EP071-SD: Total Recover	rable Hydrocarbons									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3		
C6 - C10 Fraction minus BTEX	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0		
(F1)										
EP080-SD: BTEXN										
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2		
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2		
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2		
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2		
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2		
^ Total Xylenes		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5		
^ Sum of BTEX		0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2		
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2		
EP090: Organotin Compounds										
Monobutyltin	78763-54-9	1	µgSn/kg			<1				
Dibutyltin	1002-53-5	1	µgSn/kg			<1				
Tributyltin	56573-85-4	0.5	µgSn/kg			<0.5		<0.5		
EP130A: Organophosphorus Pestici	des (Ultra-trace)									
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10		
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10		
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0		
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10	<10	<10		
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10		
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10		
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10		
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10		
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10		
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10		
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10		
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10		
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10		
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10		
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10		
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.8-0.9	VC03_0.3-0.4	VC03_0.0-0.5	VC04_0.3-0.4	VC04_0.5-1.0		
	Cli	ient sampliı	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063		
				Result	Result	Result	Result	Result		
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued										
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10		
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10		
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10		
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10		
EP131A: Organochlorine Pesticides										
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
	0-2									
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25		
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25		
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25		
^ Total Chlordane (sum)		0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25		
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
EP131B: Polychlorinated Biphenyls (as Aroclors)									
^ Total Polychlorinated biphenyls		5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2		
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2		
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.8-0.9	VC03_0.3-0.4	VC03_0.0-0.5	VC04_0.3-0.4	VC04_0.5-1.0		
	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063		
				Result	Result	Result	Result	Result		
EP131B: Polychlorinated Biphenyls (as Aroclors) - Continued										
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2		
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2		
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2		
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2		
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<6.2		
EP132B: Polynuclear Aromatic Hyd	rocarbons									
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5		
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5		
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<5		
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<5		
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<5		
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<5		
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<5		
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<5		
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<5		
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<5		
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<5		
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	<4	<4	<4	<5		
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<5		
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<5		
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<5		
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<5		
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<5		
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<5		
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<5		
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5		
^ Sum of PAHs		4	µg/kg	<4	<4	<4	<4	<5		
EP074S: VOC Surrogates										
1.2-Dichloroethane-D4	17060-07-0	0.5	%	109	107					
Toluene-D8	2037-26-5	0.5	%	113	112					
4-Bromofluorobenzene	460-00-4	0.5	%	105	104					
EP075(SIM)S: Phenolic Compound	Surrogates									
Phenol-d6	13127-88-3	0.5	%	83.7	85.4	84.1	84.2	86.6		
2-Chlorophenol-D4	93951-73-6	0.5	%	91.9	95.7	92.8	93.7	94.7		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.8-0.9	VC03_0.3-0.4	VC03_0.0-0.5	VC04_0.3-0.4	VC04_0.5-1.0
	Cl	ient sampli	ing date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-047	ES1936029-051	ES1936029-055	ES1936029-058	ES1936029-063
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound S	Surrogates - Continued	ł						
2.4.6-Tribromophenol	118-79-6	0.5	%	59.3	62.6	61.8	60.6	60.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	113	114	114	114	116
Anthracene-d10	1719-06-8	0.5	%	98.4	101	100	101	102
4-Terphenyl-d14	1718-51-0	0.5	%	101	103	103	104	105
EP075S: Acid Extractable Surrogates	s							
2-Fluorophenol	367-12-4	0.5	%					98.0
Phenol-d6	13127-88-3	0.5	%					90.8
2-Chlorophenol-D4	93951-73-6	0.5	%					96.2
2.4.6-Tribromophenol	118-79-6	0.5	%					55.5
EP075T: Base/Neutral Extractable Su	urrogates							
Nitrobenzene-D5	4165-60-0	0.5	%					87.5
1.2-Dichlorobenzene-D4	2199-69-1	0.5	%					85.6
2-Fluorobiphenyl	321-60-8	0.5	%					83.3
Anthracene-d10	1719-06-8	0.5	%					92.3
4-Terphenyl-d14	1718-51-0	0.5	%					97.5
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	101	106	118	109	116
Toluene-D8	2037-26-5	0.2	%	107	114	126	98.0	126
4-Bromofluorobenzene	460-00-4	0.2	%	105	119	129	107	122
EP090S: Organotin Surrogate								
Tripropyltin		0.5	%			59.0		90.4
EP130S: Organophosphorus Pestici	de Surrogate							
DEF	78-48-8	10	%	48.8	39.6	41.8	48.4	39.3
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	47.5	57.7	50.6	65.6	45.7
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	59.2	65.8	60.2	74.9	67.8
EP132T: Base/Neutral Extractable Su	urrogates							
2-Fluorobiphenyl	321-60-8	10	%	87.1	85.6	113	73.2	72.8
Anthracene-d10	1719-06-8	10	%	99.9	117	120	101	91.8
4-Terphenyl-d14	1718-51-0	10	%	90.3	113	96.8	109	79.2

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Client	: GHD PTY LTD
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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_1.5-1.6	VC01_1.0-1.1	VC01_0.5-1.0	VC10_0.7-0.8	VC10_0.0-0.5	
	Cl	ient samplii	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936029-067	ES1936029-071	ES1936029-073	ES1936029-076	ES1936029-077	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105	-110°C)								
Moisture Content		1.0	%	13.0	14.5	13.5	18.8	15.4	
EA150: Particle Sizing									
+75μm		1	%			70		51	
+150μm		1	%			64		40	
+300μm		1	%			43		19	
+425µm		1	%			26		10	
+600μm		1	%			9		3	
+1180μm		1	%			<1		<1	
+2.36mm		1	%			<1		<1	
+4.75mm		1	%			<1		<1	
+9.5mm		1	%			<1		<1	
+19.0mm		1	%			<1		<1	
+37.5mm		1	%			<1		<1	
+75.0mm		1	%			<1		<1	
EA150: Soil Classification based on Pa	rticle Size								
Clay (<2 μm)		1	%			20		32	
Silt (2-60 µm)		1	%			8		12	
Sand (0.06-2.00 mm)		1	%			72		56	
Gravel (>2mm)		1	%			<1		<1	
Cobbles (>6cm)		1	%			<1		<1	
EG005(ED093)-SD: Total Metals in Sedi	iments by ICP-AES	3							
Aluminium	7429-90-5	50	mg/kg	8610	2820	3870	14600	9760	
Iron	7439-89-6	50	mg/kg	5400	1020	1470	1230	1360	
EG020-SD: Total Metals in Sediments b	by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	
Arsenic	7440-38-2	1.00	mg/kg	1.22	<1.00	<1.00	<1.00	<1.00	
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	
Chromium	7440-47-3	1.0	mg/kg	8.9	2.5	3.0	11.9	6.9	
Copper	7440-50-8	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Lead	7439-92-1	1.0	mg/kg	3.1	1.1	1.4	24.5	4.6	
Manganese	7439-96-5	10	mg/kg	<10	<10	<10	<10	<10	
Nickel	7440-02-0	1.0	mg/kg	1.0	<1.0	<1.0	2.0	1.3	
Selenium	7782-49-2	0.1	mg/kg	0.2	<0.1	<0.1	<0.1	0.1	

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	Cli	ent sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-067	ES1936029-071	ES1936029-073	ES1936029-076	ES1936029-077
				Result	Result	Result	Result	Result
EG020-SD: Total Metals in Sediments	by ICPMS - Continue	ed						
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	14.8	2.5	3.8	4.7	6.3
Zinc	7440-66-6	1.0	mg/kg	1.9	<1.0	<1.0	4.2	2.1
EG035T: Total Recoverable Mercury	by FIMS							
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	0.01	<0.01
EK026SF: Total CN by Segmented Fi	ow Analyser							
Total Cyanide	57-12-5	1	mg/kg	<1	<1	<1	<1	<1
EP003: Total Organic Carbon (TOC) i	n Soil							
Total Organic Carbon		0.02	%	0.07	0.04	0.06	0.12	0.06
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2	<2	<2
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg			<0.5		
2-Chlorophenol	95-57-8	0.5	mg/kg			<0.5		
2-Methylphenol	95-48-7	0.5	mg/kg			<0.5		
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg			<0.5		
2-Nitrophenol	88-75-5	0.5	mg/kg			<0.5		
2.4-Dimethylphenol	105-67-9	0.5	mg/kg			<0.5		
2.4-Dichlorophenol	120-83-2	0.5	mg/kg			<0.5		
2.6-Dichlorophenol	87-65-0	0.5	mg/kg			<0.5		
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg			<0.5		
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg			<0.5		
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg			<0.5		

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	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936029-067	ES1936029-071	ES1936029-073	ES1936029-076	ES1936029-077		
				Result	Result	Result	Result	Result		
EP075A: Phenolic Compounds - Continued										
Pentachlorophenol	87-86-5	1	mg/kg			<1				
EP075B: Polynuclear Aromatic Hydrocarbons										
Naphthalene	91-20-3	0.5	mg/kg			<0.5				
2-Methylnaphthalene	91-57-6	0.5	mg/kg			<0.5				
2-Chloronaphthalene	91-58-7	0.5	mg/kg			<0.5				
Acenaphthylene	208-96-8	0.5	mg/kg			<0.5				
Acenaphthene	83-32-9	0.5	mg/kg			<0.5				
Fluorene	86-73-7	0.5	mg/kg			<0.5				
Phenanthrene	85-01-8	0.5	mg/kg			<0.5				
Anthracene	120-12-7	0.5	mg/kg			<0.5				
Fluoranthene	206-44-0	0.5	mg/kg			<0.5				
Pyrene	129-00-0	0.5	mg/kg			<0.5				
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg			<0.5				
Benz(a)anthracene	56-55-3	0.5	mg/kg			<0.5				
Chrysene	218-01-9	0.5	mg/kg			<0.5				
Benzo(b+j) &	205-99-2 207-08-9	1	mg/kg			<1				
Benzo(k)fluoranthene										
7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg			<0.5				
Benzo(a)pyrene	50-32-8	0.5	mg/kg			<0.5				
3-Methylcholanthrene	56-49-5	0.5	mg/kg			<0.5				
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg			<0.5				
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg			<0.5				
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg			<0.5				
^ Sum of PAHs		0.5	mg/kg			<0.5				
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg			<0.5				
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg			0.6				
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg			1.2				
EP075C: Phthalate Esters										
Dimethyl phthalate	131-11-3	0.5	mg/kg			<0.5				
Diethyl phthalate	84-66-2	0.5	mg/kg			<0.5				
Di-n-butyl phthalate	84-74-2	0.5	mg/kg			<0.5				
Butyl benzyl phthalate	85-68-7	0.5	mg/kg			<0.5				
bis(2-ethylhexyl) phthalate	117-81-7	5.0	mg/kg			<5.0				
Di-n-octylphthalate	117-84-0	0.5	mg/kg			<0.5				

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	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-067	ES1936029-071	ES1936029-073	ES1936029-076	ES1936029-077
				Result	Result	Result	Result	Result
EP075D: Nitrosamines								
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg			<0.5		
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg			<0.5		
N-Nitrosopyrrolidine	930-55-2	1.0	mg/kg			<1.0		
N-Nitrosomorpholine	59-89-2	0.5	mg/kg			<0.5		
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg			<0.5		
N-Nitrosopiperidine	100-75-4	0.5	mg/kg			<0.5		
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg			<0.5		
N-Nitrosodiphenyl &	86-30-6 122-39-4	1.0	mg/kg			<1.0		
Diphenylamine								
Methapyrilene	91-80-5	0.5	mg/kg			<0.5		
EP075E: Nitroaromatics and Ketones								
2-Picoline	109-06-8	0.5	mg/kg			<0.5		
Acetophenone	98-86-2	0.5	mg/kg			<0.5		
Nitrobenzene	98-95-3	0.5	mg/kg			<0.5		
Isophorone	78-59-1	0.5	mg/kg			<0.5		
2.6-Dinitrotoluene	606-20-2	1.0	mg/kg			<1.0		
2.4-Dinitrotoluene	121-14-2	1.0	mg/kg			<1.0		
1-Naphthylamine	134-32-7	0.5	mg/kg			<0.5		
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg			<0.5		
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg			<0.5		
Azobenzene	103-33-3	1	mg/kg			<1		
1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg			<0.5		
Phenacetin	62-44-2	0.5	mg/kg			<0.5		
4-Aminobiphenyl	92-67-1	0.5	mg/kg			<0.5		
Pentachloronitrobenzene	82-68-8	0.5	mg/kg			<0.5		
Pronamide	23950-58-5	0.5	mg/kg			<0.5		
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg			<0.5		
Chlorobenzilate	510-15-6	0.5	mg/kg			<0.5		
EP075F: Haloethers								
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg			<0.5		
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg			<0.5		
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg			<0.5		
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg			<0.5		
EP075G: Chlorinated Hydrocarbons								

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	Cli	ent samplii	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-067	ES1936029-071	ES1936029-073	ES1936029-076	ES1936029-077
				Result	Result	Result	Result	Result
EP075G: Chlorinated Hydrocarbons - C	ontinued							
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg			<0.5		
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg			<0.5		
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg			<0.5		
Hexachloroethane	67-72-1	0.5	mg/kg			<0.5		
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg			<0.5		
Hexachloropropylene	1888-71-7	0.5	mg/kg			<0.5		
Hexachlorobutadiene	87-68-3	0.5	mg/kg			<0.5		
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg			<2.5		
Pentachlorobenzene	608-93-5	0.5	mg/kg			<0.5		
Hexachlorobenzene (HCB)	118-74-1	1.0	mg/kg			<1.0		
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg			<0.5		
4-Chloroaniline	106-47-8	0.5	mg/kg			<0.5		
2-Nitroaniline	88-74-4	1.0	mg/kg			<1.0		
3-Nitroaniline	99-09-2	1.0	mg/kg			<1.0		
Dibenzofuran	132-64-9	0.5	mg/kg			<0.5		
4-Nitroaniline	100-01-6	0.5	mg/kg			<0.5		
Carbazole	86-74-8	0.5	mg/kg			<0.5		
3.3`-Dichlorobenzidine	91-94-1	0.5	mg/kg			<0.5		
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg			<0.5		
beta-BHC	319-85-7	0.5	mg/kg			<0.5		
gamma-BHC	58-89-9	0.5	mg/kg			<0.5		
delta-BHC	319-86-8	0.5	mg/kg			<0.5		
Heptachlor	76-44-8	0.5	mg/kg			<0.5		
Aldrin	309-00-2	0.5	mg/kg			<0.5		
Heptachlor epoxide	1024-57-3	0.5	mg/kg			<0.5		
alpha-Endosulfan	959-98-8	0.5	mg/kg			<0.5		
4.4`-DDE	72-55-9	0.5	mg/kg			<0.5		
Dieldrin	60-57-1	0.5	mg/kg			<0.5		
Endrin	72-20-8	0.5	mg/kg			<0.5		
beta-Endosulfan	33213-65-9	0.5	mg/kg			<0.5		
4.4`-DDD	72-54-8	0.5	mg/kg			<0.5		
Endosulfan sulfate	1031-07-8	0.5	mg/kg			<0.5		

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	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-067	ES1936029-071	ES1936029-073	ES1936029-076	ES1936029-077
				Result	Result	Result	Result	Result
EP075I: Organochlorine Pesticides - Co	ontinued							
4.4`-DDT	50-29-3	1.0	mg/kg			<1.0		
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5	0.5	mg/kg			<0.5		
	0-2							
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	mg/kg			<0.5		
EP075J: Organophosphorus Pesticides	5							
Dichlorvos	62-73-7	0.5	mg/kg			<0.5		
Dimethoate	60-51-5	0.5	mg/kg			<0.5		
Diazinon	333-41-5	0.5	mg/kg			<0.5		
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg			<0.5		
Malathion	121-75-5	0.5	mg/kg			<0.5		
Fenthion	55-38-9	0.5	mg/kg			<0.5		
Chlorpyrifos	2921-88-2	0.5	mg/kg			<0.5		
Pirimphos-ethyl	23505-41-1	0.5	mg/kg			<0.5		
Chlorfenvinphos	470-90-6	0.5	mg/kg			<0.5		
Prothiofos	34643-46-4	0.5	mg/kg			<0.5		
Ethion	563-12-2	0.5	mg/kg			<0.5		
EP080/071: Total Recoverable Hydroca	rbons - NEPM 201	3 Fractio	าร					
>C10 - C16 Fraction		3	mg/kg	<3	<3	<3	<3	<3
>C16 - C34 Fraction		3	mg/kg	<3	<3	<3	<3	<3
>C34 - C40 Fraction		5	mg/kg	<5	<5	<5	<5	<5
>C10 - C40 Fraction (sum)		3	mg/kg	<3	<3	<3	<3	<3
>C10 - C16 Fraction minus Naphthalene		3	mg/kg	<3	<3	<3	<3	<3
(F2)								
EP080-SD / EP071-SD: Total Petroleum	Hydrocarbons							
C6 - C9 Fraction		3	mg/kg	<3	<3	<3	<3	<3
C10 - C14 Fraction		3	mg/kg	<3	<3	<3	<3	<3
C15 - C28 Fraction		3	mg/kg	<3	<3	<3	<3	<3
C29 - C36 Fraction		5	mg/kg	<5	<5	<5	<5	<5
^ C10 - C36 Fraction (sum)		3	mg/kg	<3	<3	<3	<3	<3
EP080-SD / EP071-SD: Total Recoverat	ole Hydrocarbons							
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3	<3	<3
C6 - C10 Fraction minus BTEX	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0
(F1)								
EP080-SD: BTEXN								

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	Cl	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-067	ES1936029-071	ES1936029-073	ES1936029-076	ES1936029-077
				Result	Result	Result	Result	Result
EP080-SD: BTEXN - Continued								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX		0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg			<0.5		
EP130A: Organophosphorus Pesti	cides (Ultra-trace)							
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticide	s							
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_1.5-1.6	VC01_1.0-1.1	VC01_0.5-1.0	VC10_0.7-0.8	VC10_0.0-0.5		
	Cli	ent sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936029-067	ES1936029-071	ES1936029-073	ES1936029-076	ES1936029-077		
				Result	Result	Result	Result	Result		
EP131A: Organochlorine Pesticides - Continued										
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
	0-2									
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25		
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25		
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25		
^ Total Chlordane (sum)		0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25		
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50		
EP131B: Polychlorinated Biphenyls	(as Aroclors)									
^ Total Polychlorinated biphenyls		5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0		
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0		
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0		
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0		
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0		
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0		
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0		
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0		
EP132B: Polynuclear Aromatic Hydr	ocarbons									
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5		

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC02_1.5-1.6	VC01_1.0-1.1	VC01_0.5-1.0	VC10_0.7-0.8	VC10_0.0-0.5
	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-067	ES1936029-071	ES1936029-073	ES1936029-076	ES1936029-077
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hyd	rocarbons - Continued							
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	4	<4	<4	8	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	11	<4	<4	16	<4
Pyrene	129-00-0	4	µg/kg	10	<4	<4	17	<4
Benz(a)anthracene	56-55-3	4	µg/kg	5	<4	<4	12	<4
Chrysene	218-01-9	4	µg/kg	5	<4	<4	8	<4
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	<4	<4	10	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	7	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	6	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	4	<4	<4	13	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	<4	<4	8	<4
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	8	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5
^ Sum of PAHs		4	µg/kg	39	<4	<4	113	<4
EP075(SIM)S: Phenolic Compound	Surrogates							
Phenol-d6	13127-88-3	0.5	%	82.9	85.2	83.7	84.6	83.4
2-Chlorophenol-D4	93951-73-6	0.5	%	91.8	95.0	93.5	94.3	92.6
2.4.6-Tribromophenol	118-79-6	0.5	%	59.2	58.1	60.4	60.3	57.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	113	115	114	116	113
Anthracene-d10	1719-06-8	0.5	%	98.9	100	100	101	98.9
4-Terphenyl-d14	1718-51-0	0.5	%	102	104	103	104	101
EP075S: Acid Extractable Surrogate	es							
2-Fluorophenol	367-12-4	0.5	%			102		
Phenol-d6	13127-88-3	0.5	%			95.9		
2-Chlorophenol-D4	93951-73-6	0.5	%			97.6		
2.4.6-Tribromophenol	118-79-6	0.5	%			52.8		
EP075T: Base/Neutral Extractable S	Surrogates							

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_1.5-1.6	VC01_1.0-1.1	VC01_0.5-1.0	VC10_0.7-0.8	VC10_0.0-0.5	
	Client sampling date / time			30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936029-067	ES1936029-071	ES1936029-073	ES1936029-076	ES1936029-077	
				Result	Result	Result	Result	Result	
EP075T: Base/Neutral Extractable Surro	gates - Continued								
Nitrobenzene-D5	4165-60-0	0.5	%			91.8			
1.2-Dichlorobenzene-D4	2199-69-1	0.5	%			90.6			
2-Fluorobiphenyl	321-60-8	0.5	%			100			
Anthracene-d10	1719-06-8	0.5	%			94.3			
4-Terphenyl-d14	1718-51-0	0.5	%			103			
EP080-SD: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%	116	99.7	99.2	98.6	124	
Toluene-D8	2037-26-5	0.2	%	123	96.6	105	98.3	129	
4-Bromofluorobenzene	460-00-4	0.2	%	119	109	99.5	105	126	
EP090S: Organotin Surrogate									
Tripropyltin		0.5	%			68.9			
EP130S: Organophosphorus Pesticide S	Surrogate								
DEF	78-48-8	10	%	40.7	48.6	52.2	37.8	41.6	
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.50	%	52.2	79.9	74.9	52.9	55.5	
EP131T: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.5	%	60.9	64.0	72.8	57.5	67.0	
EP132T: Base/Neutral Extractable Surro	gates								
2-Fluorobiphenyl	321-60-8	10	%	81.6	91.8	95.0	79.3	81.3	
Anthracene-d10	1719-06-8	10	%	105	117	106	95.1	113	
4-Terphenyl-d14	1718-51-0	10	%	96.6	106	103	92.4	95.8	

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_0.0-0.5	FD01	FD05	TS1	TB1
	Cli	ient samplii	ng date / time	31-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-079	ES1936029-081	ES1936029-083	ES1936029-085	ES1936029-086
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-1	10°C)							
Moisture Content		1.0	%	49.1	28.8	15.1		
EA150: Particle Sizing								
+75µm		1	%	10				
+150µm		1	%	4				
+300µm		1	%	2				
+425µm		1	%	<1				
+600µm		1	%	<1				
+1180µm		1	%	<1				
+2.36mm		1	%	<1				
+4.75mm		1	%	<1				
+9.5mm		1	%	<1				
+19.0mm		1	%	<1				
+37.5mm		1	%	<1				
+75.0mm		1	%	<1				
EA150: Soil Classification based on Part	icle Size							
Clay (<2 μm)		1	%	26				
Silt (2-60 μm)		1	%	52				
Sand (0.06-2.00 mm)		1	%	22				
Gravel (>2mm)		1	%	<1				
Cobbles (>6cm)		1	%	<1				
EG005(ED093)-SD: Total Metals in Sedim	ents by ICP-AES	5						
Aluminium	7429-90-5	50	mg/kg	12200	6720	10700		
Iron	7439-89-6	50	mg/kg	34900	17000	2060		
EG020-SD: Total Metals in Sediments by	ICPMS							
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50		
Arsenic	7440-38-2	1.00	mg/kg	16.1	7.74	<1.00		
Cadmium	7440-43-9	0.1	mg/kg	0.5	<0.1	<0.1		
Chromium	7440-47-3	1.0	mg/kg	42.0	11.4	7.6		
Copper	7440-50-8	1.0	mg/kg	120	2.1	<1.0		
Cobalt	7440-48-4	0.5	mg/kg	4.2	1.3	<0.5		
Lead	7439-92-1	1.0	mg/kg	318	5.7	3.0		
Manganese	7439-96-5	10	mg/kg	88	27	<10		
Nickel	7440-02-0	1.0	mg/kg	10.4	3.8	1.9		
Selenium	7782-49-2	0.1	mg/kg	0.6	0.3	0.1		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_0.0-0.5	FD01	FD05	TS1	TB1	
	Cli	ient samplii	ng date / time	31-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936029-079	ES1936029-081	ES1936029-083	ES1936029-085	ES1936029-086	
				Result	Result	Result	Result	Result	
EG020-SD: Total Metals in Sediments by	ICPMS - Continue	ed							
Silver	7440-22-4	0.1	mg/kg	3.0	0.5	0.2			
Vanadium	7440-62-2	2.0	mg/kg	32.6	14.2	13.4			
Zinc	7440-66-6	1.0	mg/kg	445	11.8	2.9			
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.01	mg/kg	4.25	0.02	<0.01			
EK026SF: Total CN by Segmented Flow	Analyser								
Total Cyanide	57-12-5	1	mg/kg	<1	<1	<1			
EP003: Total Organic Carbon (TOC) in S	oil								
Total Organic Carbon		0.02	%	2.82	0.39	0.09			
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5			
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	<0.5			
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5			
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1			
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	<0.5			
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	<0.5			
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	<0.5			
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5			
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5			
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5			
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5			
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2			
EP080/071: Total Petroleum Hydrocarbo	ns								
C6 - C9 Fraction		10	mg/kg				35	<10	
EP080/071: Total Recoverable Hydrocart	oons - NEPM 201	3 Fractio	າຣ						
C6 - C10 Fraction	C6_C10	10	mg/kg				44	<10	
>C10 - C16 Fraction		3	mg/kg	4	<3	<3			
[^] C6 - C10 Fraction minus BTEX	C6_C10-BTEX	10	mg/kg				22	<10	
(F1)									
>C16 - C34 Fraction		3	mg/kg	78	<3	<3			
>C34 - C40 Fraction		5	mg/kg	28	<5	<5			
>C10 - C40 Fraction (sum)		3	mg/kg	110	<3	<3			
>C10 - C16 Fraction minus Naphthalene		3	mg/kg	4	<3	<3			
(F2)									

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_0.0-0.5	FD01	FD05	TS1	TB1
	Cli	ient sampli	ng date / time	31-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-079	ES1936029-081	ES1936029-083	ES1936029-085	ES1936029-086
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg				<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg				9.4	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg				1.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg				8.1	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg				3.4	<0.5
^ Sum of BTEX		0.2	mg/kg				22.4	<0.2
^ Total Xylenes		0.5	mg/kg				11.5	<0.5
Naphthalene	91-20-3	1	mg/kg				<1	<1
EP080-SD / EP071-SD: Total Petrole	um Hydrocarbons							
C6 - C9 Fraction		3	mg/kg	<3	<3	<3		
C10 - C14 Fraction		3	mg/kg	<3	<3	<3		
C15 - C28 Fraction		3	mg/kg	48	<3	<3		
C29 - C36 Fraction		5	mg/kg	46	<5	<5		
^ C10 - C36 Fraction (sum)		3	mg/kg	94	<3	<3		
EP080-SD / EP071-SD: Total Recove	rable Hydrocarbons							
C6 - C10 Fraction	C6_C10	3	mg/kg	<3	<3	<3		
C6 - C10 Fraction minus BTEX	C6_C10-BTEX	3.0	mg/kg	<3.0	<3.0	<3.0		
(F1)								
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2		
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2		
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2		
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	<0.2		
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2		
^ Total Xylenes		0.5	mg/kg	<0.5	<0.5	<0.5		
^ Sum of BTEX		0.2	mg/kg	<0.2	<0.2	<0.2		
Naphthalene	91-20-3	0.2	mg/kg	<0.2	<0.2	<0.2		
EP130A: Organophosphorus Pestic	ides (Ultra-trace)							
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10		
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10		
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	<10.0		
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10		
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10		
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10		

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Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_0.0-0.5	FD01	FD05	TS1	TB1		
	Cli	ent samplir	ng date / time	31-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936029-079	ES1936029-081	ES1936029-083	ES1936029-085	ES1936029-086		
				Result	Result	Result	Result	Result		
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued										
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10				
Diazinon	333-41-5	10	µg/kg	<10	<10	<10				
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10				
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10				
Ethion	563-12-2	10	µg/kg	<10	<10	<10				
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10				
Fenthion	55-38-9	10	µg/kg	<10	<10	<10				
Malathion	121-75-5	10	µg/kg	<10	<10	<10				
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10				
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10				
Parathion	56-38-2	10	µg/kg	<10	<10	<10				
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10				
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10				
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10				
EP131A: Organochlorine Pesticides										
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50				
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50				
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50				
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50				
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50				
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50				
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50				
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.50	µg/kg	<0.50	<0.50	<0.50				
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50				
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50				
beta-Endosulfan	33213-65-9	0.50	μg/kg	<0.50	<0.50	<0.50				
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50				
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50				
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50				
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50				
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50				
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50				
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50				
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50				

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_0.0-0.5	FD01	FD05	TS1	TB1
	Cl	ient sampliı	ng date / time	31-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-079	ES1936029-081	ES1936029-083	ES1936029-085	ES1936029-086
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides -	Continued							
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25		
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50		
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	<0.25		
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25		
^ Total Chlordane (sum)		0.25	µg/kg	<0.25	<0.25	<0.25		
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50		
EP131B: Polychlorinated Biphenyls (as Aroclors)							
^ Total Polychlorinated biphenyls		5.0	µg/kg	<5.0	<5.0	<5.0		
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	<5.0		
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0		
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0		
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0		
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0		
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0		
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0		
EP132B: Polynuclear Aromatic Hydro	ocarbons							
Naphthalene	91-20-3	5	µg/kg	116	<5	<5		
2-Methylnaphthalene	91-57-6	5	µg/kg	44	<5	<5		
Acenaphthylene	208-96-8	4	µg/kg	297	<4	<4		
Acenaphthene	83-32-9	4	µg/kg	44	<4	<4		
Fluorene	86-73-7	4	µg/kg	95	<4	<4		
Phenanthrene	85-01-8	4	µg/kg	885	<4	<4		
Anthracene	120-12-7	4	µg/kg	286	<4	<4		
Fluoranthene	206-44-0	4	µg/kg	1890	<4	<4		
Pyrene	129-00-0	4	µg/kg	1780	<4	4		
Benz(a)anthracene	56-55-3	4	µg/kg	1130	<4	<4		
Chrysene	218-01-9	4	µg/kg	997	<4	<4		
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	1490	<4	<4		
Benzo(k)fluoranthene	207-08-9	4	µg/kg	661	<4	<4		
Benzo(e)pyrene	192-97-2	4	µg/kg	631	<4	<4		
Benzo(a)pyrene	50-32-8	4	µg/kg	1570	<4	5		
Perylene	198-55-0	4	µg/kg	329	<4	<4		
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	1000	<4	<4		
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	219	<4	<4		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_0.0-0.5	FD01	FD05	TS1	TB1
	Client sampling date / time			31-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936029-079	ES1936029-081	ES1936029-083	ES1936029-085	ES1936029-086
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydro	ocarbons - Continued							
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	963	<4	<4		
Coronene	191-07-1	5	µg/kg	375	<5	<5		
^ Sum of PAHs		4	µg/kg	14800	<4	9		
EP075(SIM)S: Phenolic Compound S	urrogates							
Phenol-d6	13127-88-3	0.5	%	84.6	86.1	84.2		
2-Chlorophenol-D4	93951-73-6	0.5	%	93.6	96.2	93.7		
2.4.6-Tribromophenol	118-79-6	0.5	%	74.9	67.4	65.7		
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	114	116	114		
Anthracene-d10	1719-06-8	0.5	%	102	102	101		
4-Terphenyl-d14	1718-51-0	0.5	%	95.8	102	100		
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%				90.1	101
Toluene-D8	2037-26-5	0.2	%				99.8	106
4-Bromofluorobenzene	460-00-4	0.2	%				104	111
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	109	82.3	108		
Toluene-D8	2037-26-5	0.2	%	99.8	85.8	97.0		
4-Bromofluorobenzene	460-00-4	0.2	%	111	84.3	107		
EP130S: Organophosphorus Pesticio	de Surrogate							
DEF	78-48-8	10	%	53.6	49.3	37.7		
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	42.0	60.7	67.4		
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	84.9	65.5	56.5		
EP132T: Base/Neutral Extractable Su	irrogates							
2-Fluorobiphenyl	321-60-8	10	%	74.2	77.7	78.3		
Anthracene-d10	1719-06-8	10	%	85.2	102	104		
4-Terphenyl-d14	1718-51-0	10	%	98.4	105	113		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			TSC				
	Cli	ient sampli	ng date / time	31-Oct-2019 00:00				
Compound	CAS Number	LOR	Unit	ES1936029-087				
				Result				
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction		10	mg/kg	47				
EP080/071: Total Recoverable Hydro	carbons - NEPM 201	3 Fractio	ns					
C6 - C10 Fraction	C6_C10	10	mg/kg	59				
[^] C6 - C10 Fraction minus BTEX	C6_C10-BTEX	10	mg/kg	29				
(F1)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2				
Toluene	108-88-3	0.5	mg/kg	12.7				
Ethylbenzene	100-41-4	0.5	mg/kg	2.1				
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	10.9				
ortho-Xylene	95-47-6	0.5	mg/kg	4.5				
^ Sum of BTEX		0.2	mg/kg	30.2				
^ Total Xylenes		0.5	mg/kg	15.4				
Naphthalene	91-20-3	1	mg/kg	<1				
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	94.8				
Toluene-D8	2037-26-5	0.2	%	103				
4-Bromofluorobenzene	460-00-4	0.2	%	108				

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Client	: GHD PTY LTD
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Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			RIN_01	 	
	Cl	ient samplii	ng date / time	30-Oct-2019 00:00	 	
Compound	CAS Number	LOR	Unit	ES1936029-084	 	
				Result	 	
EG020T: Total Metals by ICP-MS						
Arsenic	7440-38-2	0.001	mg/L	<0.001	 	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	 	
Chromium	7440-47-3	0.001	mg/L	<0.001	 	
Copper	7440-50-8	0.001	mg/L	<0.001	 	
Nickel	7440-02-0	0.001	mg/L	<0.001	 	
Lead	7439-92-1	0.001	mg/L	<0.001	 	
Zinc	7440-66-6	0.005	mg/L	<0.005	 	
EG035T: Total Recoverable Mercury	by FIMS					
Mercury	7439-97-6	0.0001	mg/L	<0.0001	 	
EP075(SIM)B: Polynuclear Aromatic	Hydrocarbons					
Naphthalene	91-20-3	1.0	µg/L	<1.0	 	
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	 	
Acenaphthene	83-32-9	1.0	µg/L	<1.0	 	
Fluorene	86-73-7	1.0	µg/L	<1.0	 	
Phenanthrene	85-01-8	1.0	µg/L	<1.0	 	
Anthracene	120-12-7	1.0	µg/L	<1.0	 	
Fluoranthene	206-44-0	1.0	µg/L	<1.0	 	
Pyrene	129-00-0	1.0	µg/L	<1.0	 	
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	 	
Chrysene	218-01-9	1.0	µg/L	<1.0	 	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	 	
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	 	
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	 	
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	 	
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	 	
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	 	
^ Sum of polycyclic aromatic hydrocarbo	ons	0.5	µg/L	<0.5	 	
^ Benzo(a)pyrene TEQ (zero)		0.5	µg/L	<0.5	 	
EP080/071: Total Petroleum Hydroca	rbons					
C6 - C9 Fraction		20	µg/L	<20	 	
C10 - C14 Fraction		50	µg/L	<50	 	
C15 - C28 Fraction		100	µg/L	<100	 	
C29 - C36 Fraction		50	µg/L	<50	 	
^ C10 - C36 Fraction (sum)		50	µg/L	<50	 	

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Client	: GHD PTY LTD
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Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			RIN_01	 	
	Cli	ient samplii	ng date / time	30-Oct-2019 00:00	 	
Compound	CAS Number	LOR	Unit	ES1936029-084	 	
				Result	 	
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3 Fractio	าร			
C6 - C10 Fraction	C6_C10	20	µg/L	<20	 	
[^] C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	µg/L	<20	 	
(F1)						
>C10 - C16 Fraction		100	µg/L	<100	 	
>C16 - C34 Fraction		100	µg/L	<100	 	
>C34 - C40 Fraction		100	µg/L	<100	 	
^ >C10 - C40 Fraction (sum)		100	µg/L	<100	 	
^ >C10 - C16 Fraction minus Naphthalene		100	µg/L	<100	 	
(F2)						
EP080: BTEXN						
Benzene	71-43-2	1	µg/L	<1	 	
Toluene	108-88-3	2	µg/L	<2	 	
Ethylbenzene	100-41-4	2	µg/L	<2	 	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	 	
ortho-Xylene	95-47-6	2	µg/L	<2	 	
^ Total Xylenes		2	µg/L	<2	 	
^ Sum of BTEX		1	µg/L	<1	 	
Naphthalene	91-20-3	5	µg/L	<5	 	
EP075(SIM)S: Phenolic Compound Su	rrogates					
Phenol-d6	13127-88-3	1.0	%	26.1	 	
2-Chlorophenol-D4	93951-73-6	1.0	%	63.7	 	
2.4.6-Tribromophenol	118-79-6	1.0	%	80.0	 	
EP075(SIM)T: PAH Surrogates						
2-Fluorobiphenyl	321-60-8	1.0	%	87.0	 	
Anthracene-d10	1719-06-8	1.0	%	84.4	 	
4-Terphenyl-d14	1718-51-0	1.0	%	85.9	 	
EP080S: TPH(V)/BTEX Surrogates						
1.2-Dichloroethane-D4	17060-07-0	2	%	90.8	 	
Toluene-D8	2037-26-5	2	%	95.1	 	
4-Bromofluorobenzene	460-00-4	2	%	94.3	 	

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Work Order	: ES1936029 Amendment 1
Client	: GHD PTY LTD
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Surrogate Control Limits

Compound CAS Number Low High EP0749: VOC Surrogates 12-Dichloroethane-D4 17060-07-0 64 130 12-Dichloroethane-D4 17060-07-0 64 130 130 Toluene-D8 2037-26-5 666 1312 EP075(SIM)S: Phenolic Compound Surrogates 93951-73-6 666 122 2.4.6.Tribromophenol-D4 93951-73-6 666 122 2.4.6.Tribromophenol 118-79-6 400 138 EP075(SIM)T: PAH Surrogates 2 2 129 Anthracene-d10 1719-06-8 66 128 4-Terphenyl-d14 1718-51-0 65 129 EP075S: Acid Extractable Surrogates 2 128 2.Chlorophenol-D4 93951-73-6 32 128 2.Als-Tribromophenol 118-79-6 133 121 EP075T: Base/Neutral Extractable Surrogates 2 128 2.Als-Tribromophenol 118-79-6 33 125 1.2.Dichlorobenzene-D4 2199-69-1 34 108	Sub-Matrix: SOIL		Recovery	Limits (%)
EP0743: VOC Surrogates 1.2-Dichloroethane-D4 17060-07-0 64 130 Toluene-D8 2037-26-5 66 136 4-Bromofluorobenzene 460-00-4 60 122 EP075(SIM)S: Phenolic Compound Surrogates 120 127-86-3 63 123 2-Chlorophenol-D4 93951-73-6 66 122 12.45-Tribromophenol 118-79-6 40 138 EP075(SIM)T: PAH Surrogates 2 2-Chlorophenol 1719-06-8 66 122 2-Huorobiphenyl 321-60-8 70 122 Anthracene-d10 1719-06-8 66 128 4-Terphenyl-d14 1718-10 65 129 149 Phenol-d6 13127-88-3 32 128 2-Fluorophenol 367-12-4 29 149 Phenol-d6 13127-88-3 32 128 2-Fluorophenol-D4 93951-73-6 32 128 2-Fluorophenol-D4 93951-73-6 32 121 EP0751: Base//Neutral Extractable Surrogates 121 <th>Compound</th> <th>CAS Number</th> <th>Low</th> <th>High</th>	Compound	CAS Number	Low	High
1.2-Dichloroethane-D4 17060-07-0 64 130 Toluene-D8 2037-26-5 66 136 4-Bromofluorobenzene 460-00-4 60 122 EP075(SIM)S: Phenolic Compound Surrogates 123 2-Chlorophenol-D4 93951-73-6 66 122 2.4.6.ribromophenol 118-79-6 66 122 2.4.6.ribromophenol 118-79-6 66 122 2.4.6.ribromophenol 118-79-6 66 122 Anthracene-d10 1719-06-8 66 128 4-Terphonyl-d14 1718-51-0 65 129 EP075S: Acid Extractable Surrogates 2 128 2.Fluorophenol-D4 93951-73-6 32 128 2.Fluorophenol-D4 93951-73-6 32 <td< th=""><th>EP074S: VOC Surrogates</th><th></th><th></th><th></th></td<>	EP074S: VOC Surrogates			
Toluene-D8 2037-26-5 66 136 4-Bromofluorobenzene 460-00-4 60 122 EPO75(SIM)S: Phenolic Compound Surrogates 9 53 123 Phenol-d6 13127-88-3 63 122 2.4.6.Tribromophenol 118-79-6 66 122 2.4.6.Tribromophenol 118-79-6 40 138 EP075(SIM)T: PAH Surrogates 70 122 Anthracene-d10 1719-06-8 66 128 4.Terphenyl-d14 1718-51-0 65 129 EP075S: Acid Extractable Surrogates 2 149 2.Fluorophenol-D4 93951-73-6 32 128 2.Chlorophenol-D4 33951-73-6 32 128 2.Chlorophenol-D4 3193-121 121 121 <th>1.2-Dichloroethane-D4</th> <th>17060-07-0</th> <th>64</th> <th>130</th>	1.2-Dichloroethane-D4	17060-07-0	64	130
4-Bromofluorobenzene 460-00-4 60 122 EP075(SIM)S: Phenolic Compound Surrogates 118 Phenol-d6 13127-88-3 63 123 2.Chlorophenol-D4 93951-73-6 66 122 2.4.6-Tribromophenol 118-79-6 66 122 2.4.6-Tribromophenol 118-79-6 66 122 2.4.6-Tribromophenol 1719-06-8 66 128 4-Torphenyl-d14 1718-51-0 65 129 EP075S: Acid Extractable Surrogates 2 149 Phenol-d6 13127-88-3 32 128 2.4.6-Tribromophenol 367-12-4 29 149 Phenol-d6 13127-88-3 32 128 2.4.6-Tribromophenol 118-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates 2 129 149 Nitrobenzene-D5 4165-60-0 33 125 121 1.2-Dichorobenzene-D4 2199-68-1 34 108 121 2.Fluorobiphenyl 321-60-8 35 123 121 1.2-Dichorobenzene-D4 <td< th=""><th>Toluene-D8</th><th>2037-26-5</th><th>66</th><th>136</th></td<>	Toluene-D8	2037-26-5	66	136
EP075(SIM)S: Phenolic Compound Surrogates Phenol-d6 13127-88-3 63 123 2-Chlorophenol-D4 93951-73-6 66 122 2.4.6-Tribromophenol 118-79-6 40 138 EP075(SIM)T: PAH Surrogates 2 2 4.7 70 122 Anthracene-d10 1719-06-8 66 128 4 4-Terphenyl-d14 1718-51-0 65 129 EP075(SIM)S: Acid Extractable Surrogates 2 128 2 2-Fluorophenol 367-12-4 29 149 Phenol-d6 13127-88-3 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2-Abe-Tribromophenol 118-79-6 13 121 EP0751: Base/Neutral Extractable Surrogates 3 125 1.2-Dichlorobenzene-D4 2199-69-1	4-Bromofluorobenzene	460-00-4	60	122
Phenol-d6 13127-88-3 63 123 2-Chlorophenol-D4 93951-73-6 66 122 2.4.6-Tribromophenol 118-79-6 40 138 EP075(SIM)T: PAH Surrogates 70 122 2-Fluorobiphenyl 321-60-8 70 122 Anthracene-d10 1719-06-8 66 128 4-Terphenyl-d14 1718-51-0 65 129 EP075S: Acid Extractable Surrogates 2 149 Phenol-d6 13127-88-3 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2-Chlorophenol-D4 13127-88-3 32 128 2-At-Stribromophenol 118-79-6 33 125 12-Dichorobenzene-D4 2199-69-1 34 108	EP075(SIM)S: Phenolic Compound Surrogates			
2-Chlorophenol-D4 93951-73-6 66 122 2.4.6-Tribromophenol 118-79-6 40 138 EP075{(SIM)T: PAH Surrogates 70 122 Anthracene-d10 1719-06-8 66 128 4-Terphenyl-d14 1718-51-0 65 129 EP075S: Acid Extractable Surrogates 2 149 Phenol-d6 13127-88-3 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2-A6-Tribromophenol 118-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates 129 149 Nitrobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 1.2-Dichlorobenzene-D4 17060-07-0 73 133 <th>Phenol-d6</th> <th>13127-88-3</th> <th>63</th> <th>123</th>	Phenol-d6	13127-88-3	63	123
2.4.6-Tribromophenol 118-79-6 40 138 EP075(SIM)T: PAH Surrogates	2-Chlorophenol-D4	93951-73-6	66	122
EP075(SIM)T: PAH Surrogates 2-Fluorobiphenyl 321-60-8 70 122 Anthracene-d10 1719-06-8 66 128 4-Terphenyl-d14 1718-51-0 65 129 EP075S: Acid Extractable Surrogates 2 149 Phenol-d6 13127-88-3 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2-Ad-Tribromophenol 118-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates 121 125 P12-Dichlorobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 123 125 1.2-Dichloroethane-D4 17060-07-0 73 133 10a 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 </th <th>2.4.6-Tribromophenol</th> <th>118-79-6</th> <th>40</th> <th>138</th>	2.4.6-Tribromophenol	118-79-6	40	138
2-Fluorobiphenyl 321-60-8 70 122 Anthracene-d10 1719-06-8 66 128 4-Terphenyl-d14 1718-51-0 65 129 EP075S: Acid Extractable Surrogates 2 149 Phenol-d6 13127-88-3 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2-Chlorophenol 18-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates 122 128 Nitrobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 1312 134 134 4-Bromofluorobenzene 460-00-4 <t< th=""><th>EP075(SIM)T: PAH Surrogates</th><th></th><th></th><th></th></t<>	EP075(SIM)T: PAH Surrogates			
Anthracene-d10 1719-06-8 66 128 4-Terphenyl-d14 1718-51-0 65 129 EP075S: Acid Extractable Surrogates 2 149 Phenol-d6 13127-88-3 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2.4.6-Tribromophenol 118-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates 128 Nitrobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 132 1.2-Dichlorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 132 1.2-Dichlorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 137 134 4-Bromofluorobenzene 460-00-4 73 137	2-Fluorobiphenyl	321-60-8	70	122
4-Terphenyl-d14 1718-51-0 65 129 EP075S: Acid Extractable Surrogates 2 149 Phenol-d6 13127-88-3 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2.4.6-Tribromophenol 118-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates 118-79-6 13 121 Sitrobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 123 125 1.2-Dichlorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 132 132 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 132 132 132 1.2-Dichloroethane-D4 17060-07-0 67 137 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5	Anthracene-d10	1719-06-8	66	128
EP075S: Acid Extractable Surrogates 2-Fluorophenol 367-12-4 29 149 Phenol-d6 13127-88-3 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2.4.6-Tribromophenol 118-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates 1 125 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 1 132 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 1 134 14 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137	4-Terphenyl-d14	1718-51-0	65	129
2-Fluorophenol 367-12-4 29 149 Phenol-d6 13127-88-3 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2.4.6-Tribromophenol 118-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates 12 12 Nitrobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 12 132 1.2-Dichloroethane-D4 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 12 134 4-Bromofluorobenzene 460-00-4 73 137 Toluene-D8 2037-26-5 74 134	EP075S: Acid Extractable Surrogates			
Phenol-d6 13127-88-3 32 128 2-Chlorophenol-D4 93951-73-6 32 128 2.4.6-Tribromophenol 118-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates Nitrobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 132 4-8 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 132 132 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137	2-Fluorophenol	367-12-4	29	149
2-Chlorophenol-D4 93951-73-6 32 128 2.4.6-Tribromophenol 118-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates 125 12-0 125 Nitrobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 120 132 133 1.2-Dichloroethane-D4 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 12 134 134 1.2-Dichloroethane-D4 17060-07-0 67 137 1.2-Dichloroethane-D4 17060-07-0 67 137 1.2-Dichloroethane-D4 17060-07-0 67 137 1.2-Dichloroethane	Phenol-d6	13127-88-3	32	128
2.4.6-Tribromophenol 118-79-6 13 121 EP075T: Base/Neutral Extractable Surrogates 125 Nitrobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 120 132 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 12 134 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 F090S: Organotin Surrogate 2037-26-5 74 134 <th>2-Chlorophenol-D4</th> <th>93951-73-6</th> <th>32</th> <th>128</th>	2-Chlorophenol-D4	93951-73-6	32	128
EP0751: Base/Neutral Extractable Surrogates Nitrobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 12 1.2-Dichloroethane-D4 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 137 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 102 102 <th>2.4.6-Tribromophenol</th> <th>118-79-6</th> <th>13</th> <th>121</th>	2.4.6-Tribromophenol	118-79-6	13	121
Nitrobenzene-D5 4165-60-0 33 125 1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 33 125 1.2-Dichloroethane-D4 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 137 133 1.2-Dichloroethane-D4 17060-07-0 67 137 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 134 134 4-Bromofluorobenzene 460-00-4 73 137 FO1000-SC Organotin Surrogate 35 130 EP090S: Organotin Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate	EP075T: Base/Neutral Extractable Surrogates			
1.2-Dichlorobenzene-D4 2199-69-1 34 108 2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 33 125 1.2-Dichloroethane-D4 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 17060-07-0 67 137 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 73 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 130 137 EP130S: Organophosphorus Pesticide Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 102 102	Nitrobenzene-D5	4165-60-0	33	125
2-Fluorobiphenyl 321-60-8 35 121 Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 33 125 1.2-Dichloroethane-D4 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 1 132 133 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 130 137 EP130S: Organophosphorus Pesticide Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 102 102	1.2-Dichlorobenzene-D4	2199-69-1	34	108
Anthracene-d10 1719-06-8 35 123 4-Terphenyl-d14 1718-51-0 33 125 EP080S: TPH(V)/BTEX Surrogates 120 125 1.2-Dichloroethane-D4 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 12-Dichloroethane-D4 72 130 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate	2-Fluorobiphenyl	321-60-8	35	121
4-Terphenyl-d14 1718-51-0 33 125 EP0800S: TPH(V)/BTEX Surrogates 133 133 1.2-Dichloroethane-D4 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 17060-07-0 67 137 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 35 130 EP130S: O. Desticide Surrogate	Anthracene-d10	1719-06-8	35	123
EP080S: TPH(V)/BTEX Surrogates 1.2-Dichloroethane-D4 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 17060-07-0 67 137 1.2-Dichloroethane-D4 17060-07-0 67 133 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate	4-Terphenyl-d14	1718-51-0	33	125
1.2-Dichloroethane-D4 17060-07-0 73 133 Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 17060-07-0 67 137 1.2-Dichloroethane-D4 17060-07-0 67 133 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 73 130 EP130S: Organophosphorus Pesticide Surrogate 35 130 EP130S: O. Desticide Surrogate 78-48-8 14 102	EP080S: TPH(V)/BTEX Surrogates			
Toluene-D8 2037-26-5 74 132 4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 17060-07-0 67 137 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 73 137 EP090S: Organotin Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 98-48-8 14 102	1.2-Dichloroethane-D4	17060-07-0	73	133
4-Bromofluorobenzene 460-00-4 72 130 EP080-SD: TPH(V)/BTEX Surrogates 17060-07-0 67 137 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 7 73 130 EP130S: Organophosphorus Pesticide Surrogate 78-48-8 14 102	Toluene-D8	2037-26-5	74	132
EP080-SD: TPH(V)/BTEX Surrogates 1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 5 14 102	4-Bromofluorobenzene	460-00-4	72	130
1.2-Dichloroethane-D4 17060-07-0 67 137 Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 205 14 DEF 78-48-8 14 102	EP080-SD: TPH(V)/BTEX Surrogates			
Toluene-D8 2037-26-5 74 134 4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 35 130 EP130S: Organophosphorus Pesticide Surrogate 2037-26-5 DEF 78-48-8 14 102	1.2-Dichloroethane-D4	17060-07-0	67	137
4-Bromofluorobenzene 460-00-4 73 137 EP090S: Organotin Surrogate 35 130 Tripropyltin 35 130 EP130S: Organophosphorus Pesticide Surrogate 200 100 DEF 78-48-8 14 102	Toluene-D8	2037-26-5	74	134
EP090S: Organotin Surrogate Tripropyltin 35 130 EP130S: Organophosphorus Pesticide Surrogate DEF 78-48-8 14 102	4-Bromofluorobenzene	460-00-4	73	137
Tripropyltin 35 130 EP130S: Organophosphorus Pesticide Surrogate DEF 78-48-8 14 102	EP090S: Organotin Surrogate			
EP130S: Organophosphorus Pesticide Surrogate DEF 78-48-8 14 102	Tripropyltin		35	130
DEF 78-48-8 14 102	EP130S: Organophosphorus Pesticide Surrogate			
ED4248: OC Destiside Summerste	DEF	78-48-8	14	102
EPISIS: OC Pesicide Surrogate	EP131S: OC Pesticide Surrogate			
Dibromo-DDE 21655-73-2 10 119	Dibromo-DDE	21655-73-2	10	119
EP131T: PCB Surrogate	EP131T: PCB Surrogate			



Page	: 60 of 60
Work Order	ES1936029 Amendment 1
Client	: GHD PTY LTD
Project	12517046

Sub-Matrix: SOIL		Recovery	Limits (%)
Compound	CAS Number	Low	High
EP131T: PCB Surrogate - Continued			
Decachlorobiphenyl	2051-24-3	10	106
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	55	135
Anthracene-d10	1719-06-8	70	136
4-Terphenyl-d14	1718-51-0	57	127
Sub-Matrix: WATER		Recovery	Limits (%)
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128





QUALITY CONTROL REPORT

Work Order	: ES1936029	Page	: 1 of 33
Amendment	:1		
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Jessica Watson	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	:	Telephone	: +61-2-8784 8555
Project	: 12517046	Date Samples Received	: 31-Oct-2019
Order number	:	Date Analysis Commenced	:01-Nov-2019
C-O-C number	:	Issue Date	: 10-Dec-2019
Sampler	: Sarah Eccleshall		Hac-MRA NATA
Site	:		
Quote number	: SY/522/19		Accreditation No. 835
No. of samples received	: 87		Accredited for compliance with
No. of samples analysed	: 47		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
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Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key: Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

- CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
- LOR = Limit of reporting
- RPD = Relative Percentage Difference
- # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL						Laboratory L	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005(ED093)-SD: 1	otal Metals in Sediments by	ICP-AES (QC Lot: 2682883)							
ES1936029-071	VC01_1.0-1.1	EG005-SD: Aluminium	7429-90-5	50	mg/kg	2820	3290	15.4	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	1020	930	9.00	0% - 20%
ES1936029-058	VC04_0.3-0.4	EG005-SD: Aluminium	7429-90-5	50	mg/kg	14800	13500	9.21	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	2510	2170	14.3	0% - 20%
EG035T: Total Reco	overable Mercury by FIMS (L	ow Level) (QC Lot: 2682884)							
ES1936029-071	VC01_1.0-1.1	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.00	No Limit
ES1936029-058	VC04_0.3-0.4	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.01	0.00	No Limit
EA037: Ass Field S	creening Analysis (QC Lot: :	2684165)							
ES1936029-013	VC03_0.0-0.1	EA037: pH (F)		0.1	pH Unit	7.9	8.0	0.00	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	6.2	6.2	0.00	0% - 20%
ES1936029-023	VC10_0.0-0.1	EA037: pH (F)		0.1	pH Unit	7.7	7.8	1.55	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	6.4	6.3	0.00	0% - 20%
EA037: Ass Field S	creening Analysis (QC Lot:	2684166)							
ES1936029-033	VC07_1.0-1.1	EA037: pH (F)		0.1	pH Unit	7.9	7.9	0.00	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	5.9	5.9	0.00	0% - 20%
ES1936183-005	Anonymous	EA037: pH (F)		0.1	pH Unit	7.3	7.1	1.67	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	5.6	5.6	0.00	0% - 20%
EA055: Moisture Co	ntent (Dried @ 105-110°C) (QC Lot: 2682887)							
EM1918213-004	Anonymous	EA055: Moisture Content		0.1	%	38.8	39.1	0.774	0% - 20%
ES1935859-001	Anonymous	EA055: Moisture Content		0.1	%	29.3	26.6	9.72	0% - 20%
EA055: Moisture Co	ntent (Dried @ 105-110°C)(QC Lot: 2682888)							
ES1936029-058	VC04_0.3-0.4	EA055: Moisture Content		0.1	%	17.1	17.5	2.34	0% - 50%
EG020-SD: Total Me	tals in Sediments by ICPMS	(QC Lot: 2682877)							
EM1918213-002	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	0.2	0.1	0.00	No Limit

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Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020-SD: Total Me	tals in Sediments by IC	PMS (QC Lot: 2682877) - continued							
EM1918213-002	Anonymous	EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.9	0.8	0.00	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	0.4	0.3	36.8	No Limit
		EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	<0.50	0.00	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	1.3	0.9	42.4	No Limit
		EG020-SD: Arsenic	7440-38-2	1	mg/kg	9.66	8.58	11.8	No Limit
		EG020-SD: Chromium	7440-47-3	1	mg/kg	11.0	8.7	23.4	0% - 50%
		EG020-SD: Copper	7440-50-8	1	mg/kg	12.2	# 7.0	54.6	0% - 50%
		EG020-SD: Lead	7439-92-1	1	mg/kg	10.0	# 5.1	65.6	0% - 50%
		EG020-SD: Nickel	7440-02-0	1	mg/kg	5.4	4.2	25.3	No Limit
		EG020-SD: Zinc	7440-66-6	1	mg/kg	34.8	# 18.8	59.8	0% - 20%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	60	46	26.2	No Limit
		EG020-SD: Vanadium	7440-62-2	2	mg/kg	21.0	17.6	17.4	0% - 50%
EM1918213-018	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	0.3	0.2	0.00	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.4	0.3	0.00	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	0.3	0.3	0.00	No Limit
	EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	<0.50	0.00	No Limit	
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	1.4	1.2	11.0	No Limit
		EG020-SD: Arsenic	7440-38-2	1	mg/kg	6.87	5.66	19.2	No Limit
	EG020-SD: Chromium	7440-47-3	1	mg/kg	6.5	6.6	1.61	No Limit	
	EG020-SD: Copper	7440-50-8	1	mg/kg	12.2	12.8	5.12	0% - 50%	
		EG020-SD: Lead	7439-92-1	1	mg/kg	11.8	12.1	2.46	0% - 50%
	EG020-SD: Nickel	7440-02-0	1	mg/kg	3.0	3.0	0.00	No Limit	
		EG020-SD: Zinc	7440-66-6	1	mg/kg	46.0	45.5	1.08	0% - 20%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	57	58	0.00	No Limit
		EG020-SD: Vanadium	7440-62-2	2	mg/kg	6.7	6.8	1.68	No Limit
EG020-SD: Total Me	tals in Sediments by IC	PMS (QC Lot: 2682885)							
ES1936029-058	VC04_0.3-0.4	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.2	0.3	0.00	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	0.1	<0.1	0.00	No Limit
		EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	<0.50	0.00	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	1.0	71.0	No Limit
		EG020-SD: Arsenic	7440-38-2	1	mg/kg	<1.00	1.15	14.2	No Limit
		EG020-SD: Chromium	7440-47-3	1	mg/kg	13.2	12.3	7.25	0% - 50%
		EG020-SD: Copper	7440-50-8	1	mg/kg	<1.0	1.1	12.6	No Limit
		EG020-SD: Lead	7439-92-1	1	mg/kg	28.0	26.7	4.83	0% - 20%
		EG020-SD: Nickel	7440-02-0	1	mg/kg	2.0	3.6	57.8	No Limit
		EG020-SD: Zinc	7440-66-6	1	mg/kg	3.4	3.0	14.1	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	<10	0.00	No Limit
		EG020-SD: Vanadium	7440-62-2	2	mg/kg	10.4	6.9	40.0	No Limit
EK026SF: Total CN	by Segmented Flow An	alyser (QC Lot: 2677335)							

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EK026SF: Total CN	by Segmented Flow Analyse	r (QC Lot: 2677335) - continued							
ES1935865-002	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
ES1936029-007	VC07_0.0-0.2	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
EK026SF: Total CN	by Segmented Flow Analyse	r (QC Lot: 2677336)							
ES1936029-076	VC10_0.7-0.8	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
WN1908608-002	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
EK040T: Fluoride To	tal (QC Lot: 2683332)								
EB1928984-011	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	860	820	4.66	0% - 20%
EB1929055-002	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	<40	<40	0.00	No Limit
EP003: Total Organi	c Carbon (TOC) in Soil (QC	Lot: 2687095)							
EB1929034-001	Anonymous	EP003: Total Organic Carbon		0.02	%	29.6	26.5	11.2	0% - 20%
ES1936029-063	VC04_0.5-1.0	EP003: Total Organic Carbon		0.02	%	0.05	0.06	17.8	No Limit
EP074A: Monocyclic	Aromatic Hvdrocarbons (Q	C Lot: 2677735)							
ES1936029-007	VC07 0.0-0.2	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
	_	EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074B: Oxygenate	d Compounds (QC Lot: 2677	735)							
ES1936029-007	VC07_0.0-0.2	EP074: Vinyl Acetate	108-05-4	5	mg/kg	<5	<5	0.00	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.00	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	<5	0.00	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	<5	0.00	No Limit
EP074C: Sulfonated	Compounds (QC Lot: 26777	/35)							
ES1936029-007	VC07_0.0-0.2	EP074: Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074D: Fumigants	(QC Lot: 2677735)								
ES1936029-007	VC07 0.0-0.2	EP074: 2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
	_	EP074: 1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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EP074D: Fumigants	(QC Lot: 2677735) - co	ontinued							
ES1936029-007	VC07_0.0-0.2	EP074: 1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074E: Halogenate	d Aliphatic Compound	s (QC Lot: 2677735)							
ES1936029-007	VC07_0.0-0.2	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: lodomethane	74-88-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Chloromethane	74-87-3	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Bromomethane	74-83-9	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Chloroethane	75-00-3	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	<5	0.00	No Limit
EP074F: Halogenated	d Aromatic Compound	s (QC Lot: 2677735)							
ES1936029-007	VC07_0.0-0.2	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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EP074G: Trihalometh	nanes (QC Lot: 2677735)								
ES1936029-007	VC07_0.0-0.2	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074H: Naphthalen	e (QC Lot: 2677735)								
ES1936029-007	VC07_0.0-0.2	EP074: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP075(SIM)A: Pheno	lic Compounds (QC Lot: 26	680331)							
ES1936029-001	VC09 0.0-0.2	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
201000020 001	-	EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
ES1936029-071	VC01_1.0-1.1	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075A: Phenolic Co	ompounds (QC Lot: 268977	7)							
ES1936029-011	VC07_0.0-0.5	EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Work Order	: ES1936029 Amendment 1
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075A: Phenolic Co	mpounds (QC Lot: 2689777	′) - continued							
ES1936029-011	VC07_0.0-0.5	EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	<1	0.00	No Limit
EP075B: Polynuclear	Aromatic Hydrocarbons (C	C Lot: 2689777)							
ES1936029-011	VC07_0.0-0.5	EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Phenanthrene	85-01-8	0.5	mg/kg	0.7	<0.5	37.7	No Limit
		EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Fluoranthene	206-44-0	0.5	mg/kg	1.5	0.9	50.0	No Limit
		EP075: Pyrene	129-00-0	0.5	mg/kg	1.5	1.0	40.6	No Limit
		EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	0.8	0.6	34.1	No Limit
		EP075: Chrysene	218-01-9	0.5	mg/kg	0.7	<0.5	30.0	No Limit
		EP075: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.8	0.7	16.8	No Limit
		EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.5	<0.5	0.00	No Limit
		EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2	1	mg/kg	1	1	0.00	No Limit
			207-08-9						
EP075C: Phthalate Es	ters (QC Lot: 2689777)								
ES1936029-011	VC07_0.0-0.5	EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075D: Nitrosamine	s (QC Lot: 2689777)								
ES1936029-011	VC07_0.0-0.5	EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075D: Nitrosamine	s (QC Lot: 2689777) - conti	nued							
ES1936029-011	VC07_0.0-0.5	EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075E: Nitroaromat	ics and Ketones (QC Lot: 2	689777)							
ES1936029-011	VC07_0.0-0.5	EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.6-Dinitrotoluene	606-20-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Azobenzene	103-33-3	1	mg/kg	<1	<1	0.00	No Limit
EP075F: Haloethers	(QC Lot: 2689777)								
ES1936029-011	VC07_0.0-0.5	EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075G: Chlorinated	Hydrocarbons (QC Lot: 268	39777)							
ES1936029-011	VC07_0.0-0.5	EP075: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5	<2.5	0.00	No Limit
EP075H: Anilines and	Benzidines (QC Lot: 2689)	777)							
ES1936029-011	VC07_0.0-0.5	EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
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Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075H: Anilines and	Benzidines (QC Lot: 2689	777) - continued							
ES1936029-011	VC07_0.0-0.5	EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 3.3`-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075I: Organochlori	ne Pesticides (QC Lot: 268	9777)							
ES1936029-011	VC07_0.0-0.5	EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4.4`-DDE	72-55-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4.4`-DDD	72-54-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4.4`-DDT	50-29-3	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
EP075J: Organophos	phorus Pesticides (QC Lot	: 2689777)							
ES1936029-011	VC07_0.0-0.5	EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Tota <u>l Petr</u>	oleum Hydrocarbons (QC	Lot: 2680181)							
ES1936027-001	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
ES1936111-004	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Rec	overable Hydrocarbons - N	EPM 2013 Eractions (QC Lot: 2680181)							



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Red	coverable Hydrocarbons - N	EPM 2013 Fractions (QC Lot: 2680181) - continued							
ES1936027-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1936111-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC	Lot: 2680181)								
ES1936027-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	0.4	<0.2	72.1	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1936111-004	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080-SD / EP071-S	D: Total Petroleum Hydroca	rbons (QC Lot: 2677697)							
ES1936029-001	VC09_0.0-0.2	EP071-SD: C10 - C14 Fraction		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: C15 - C28 Fraction		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: C10 - C36 Fraction (sum)		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: C29 - C36 Fraction		5	mg/kg	<5	<5	0.00	No Limit
ES1936029-071	VC01_1.0-1.1	EP071-SD: C10 - C14 Fraction		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: C15 - C28 Fraction		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: C10 - C36 Fraction (sum)		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: C29 - C36 Fraction		5	mg/kg	<5	<5	0.00	No Limit
EP080-SD / EP071-S	D: Total Petroleum Hydroca	rbons (QC Lot: 2677734)							
ES1936029-071	VC01_1.0-1.1	EP080-SD: C6 - C9 Fraction		3	mg/kg	<3	<3	0.00	No Limit
ES1936029-007	VC07_0.0-0.2	EP080-SD: C6 - C9 Fraction		3	mg/kg	<3	<3	0.00	No Limit
EP080-SD / EP071-S	D: Total Recoverable Hydro	carbons (QC Lot: 2677697)							
ES1936029-001	VC09_0.0-0.2	EP071-SD: >C10 - C16 Fraction		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: >C16 - C34 Fraction		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: >C10 - C40 Fraction (sum)		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: >C34 - C40 Fraction		5	mg/kg	<5	<5	0.00	No Limit
ES1936029-071	VC01_1.0-1.1	EP071-SD: >C10 - C16 Fraction		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: >C16 - C34 Fraction		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: >C10 - C40 Fraction (sum)		3	mg/kg	<3	<3	0.00	No Limit
		EP071-SD: >C34 - C40 Fraction		5	mg/kg	<5	<5	0.00	No Limit
EP080-SD: BTEXN (QC of: 2677734)								


Sub-Matrix: SOIL		Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080-SD: BTEXN	(QC Lot: 2677734) - co	ontinued							
ES1936029-071	VC01 1.0-1.1	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
	_	EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
			106-42-3						
		EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1936029-007	VC07_0.0-0.2	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
			106-42-3						
		EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP090: Organotin	Compounds (QC Lot: 2	2698344)							
EM1919013-021	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	4.8	3.5	30.2	No Limit
		EP090: MonobutyItin	78763-54-9	1	µgSn/kg	<1	<1	0.00	No Limit
		EP090: Dibutyltin	1002-53-5	1	µgSn/kg	2	<1	77.0	No Limit
ES1936183-029	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	6.9	5.3	26.4	0% - 50%
		EP090: MonobutyItin	78763-54-9	1	µgSn/kg	<1	<1	0.00	No Limit
		EP090: Dibutyltin	1002-53-5	1	µgSn/kg	3	3	0.00	No Limit
EP090: Organotin	Compounds (QC Lot: 2	2745160)							
ES1936029-055	VC03_0.0-0.5	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.00	No Limit
		EP090: MonobutyItin	78763-54-9	1	µgSn/kg	<1	<1	0.00	No Limit
		EP090: Dibutyltin	1002-53-5	1	µgSn/kg	<1	<1	0.00	No Limit
EP130A: Organoph	nosphorus Pesticides (I	Ultra-trace) (QC Lot: 2677727)							
ES1936029-001	VC09_0.0-0.2	EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	<10.0	0.00	No Limit
		EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP130A: Organopho	osphorus Pesticides (U	Jltra-trace) (QC Lot: 2677727) - continued							
ES1936029-001	VC09_0.0-0.2	EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.00	No Limit
ES1936029-071	VC01_1.0-1.1	EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	<10.0	0.00	No Limit
		EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.00	No Limit
EP131A: Organochl	orine Pesticides (QC L	_ot: 2677729)							
ES1936029-001	VC09_0.0-0.2	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: Total Chlordane (sum)		0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Sum of DDD + DDE + DDT	72-54-8/72-55-	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
			9/50-2						
		EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit

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Work Order	ES1936029 Amendment 1
Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL					Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EP131A: Organochlo	rine Pesticides (QC Lot:	2677729) - continued								
ES1936029-001	VC09_0.0-0.2	EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
ES1936029-071	VC01_1.0-1.1	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit	
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit	
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.00	No Limit	
		EP131A: Total Chlordane (sum)		0.25	µg/kg	<0.25	<0.25	0.00	No Limit	
		EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Sum of DDD + DDE + DDT	72-54-8/72-55-	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
			9/50-2							
		EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
		EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit	
EP131B: Polychlorina	ated Biphenyls (as Arocl	ors) (QC Lot: 2677728)								
ES1936029-001	VC09 0.0-0.2	EP131B: Total Polychlorinated binhenvis		5	µg/kg	<5.0	<5.0	0.00	No Limit	
	_	EP131B: Aroclor 1016	12674-11-2	5	µg/kg	<5.0	<5.0	0.00	No Limit	
		EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	<5.0	0.00	No Limit	
		EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	<5.0	0.00	No Limit	



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP131B: Polychlorina	ated Biphenyls (as Aroclors) (QC Lot: 2677728) - continued							
ES1936029-001	VC09_0.0-0.2	EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	<5.0	0.00	No Limit
ES1936029-071	VC01_1.0-1.1	EP131B: Total Polychlorinated biphenyls		5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1016	12674-11-2	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	<5.0	0.00	No Limit
EP132B: Polynuclear	Aromatic Hydrocarbons (C	QC Lot: 2677696)					·		
ES1936029-001	VC09_0.0-0.2	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(b+j)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.00	No Limit
			205-82-3						
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Sum of PAHs		4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.00	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.00	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.00	No Limit
ES1936029-071	VC01_1.0-1.1	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.00	No Limit



Sub Matrix SOI						Laboratory I	Junlicato (DUP) Poport		
Sub-Matrix: SOIL	Olivert - annula ID		040 North an	100	11				D
Laboratory sample ID		Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP132B: Polynuclear	Aromatic Hydrocarbons (C	(C Lot: 2677696) - continued				-			
ES1936029-071	VC01_1.0-1.1	EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(b+j)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.00	No Limit
			205-82-3						
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Sum of PAHs		4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.00	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.00	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.00	No Limit
Sub Matrix: WATER						Laboratory I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals	by ICP-MS (OC Lot: 26863)					onginarrooan	2 april a to 1 to a to	1.1.2 (7.0)	
ES1026020 084	BIN 01		7440 42 0	0.0001	ma/l	<0.0001	<0.0001	0.00	No Limit
E31930029-004	RIN_01		7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
			7440-36-2	0.001	mg/L	<0.001	<0.001	0.00	NO LIIIII
		EG020A-1: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-1: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	NO LIMIT
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
EG035T: Total Recov	verable Mercury by FIMS(Q	C Lot: 2686717)							
WN1908881-036	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP080/071: Total Petr	oleum Hydrocarbons (QC I	₋ot: 2681218)							
ES1936026-002	Anonymous	EP080: C6 - C9 Fraction		20	µg/L	<20	<20	0.00	No Limit
ES1936051-002	Anonymous	EP080: C6 - C9 Fraction		20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Rec	overable Hydrocarbons - NE	EPM 2013 Fractions (QC Lot: 2681218)							
ES1936026-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1936051-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC L	.ot: 2681218)								
ES1936026-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µq/L	<2	<2	0.00	No Limit

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Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EP080: BTEXN (QC Lot: 2681218) - continued										
ES1936026-002	Anonymous	EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
ES1936051-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EG005(ED093)-SD: Total Metals in Sediments by ICP-A	ES (QCLot: 268288	3)							
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	108	88.2	136	
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	86.0	70.0	109	
EG035T: Total Recoverable Mercury by FIMS (Low Lev	vel) (QCLot: 268288	34)							
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.257 mg/kg	83.3	72.0	116	
EG020-SD: Total Metals in Sediments by ICPMS (QCL	ot: 2682877)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	4.6 mg/kg	81.4	70.0	130	
EG020-SD: Arsenic	7440-38-2	1	mg/kg	<1.00	21.7 mg/kg	100	80.0	139	
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	4.64 mg/kg	103	83.0	127	
EG020-SD: Chromium	7440-47-3	1	mg/kg	<1.0	43.9 mg/kg	86.0	73.0	130	
EG020-SD: Copper	7440-50-8	1	mg/kg	<1.0	32 mg/kg	96.6	76.0	130	
EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	16 mg/kg	105	81.0	130	
EG020-SD: Lead	7439-92-1	1	mg/kg	<1.0	40 mg/kg	98.3	74.0	130	
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	130 mg/kg	106	76.0	130	
EG020-SD: Nickel	7440-02-0	1	mg/kg	<1.0	55 mg/kg	97.1	83.0	130	
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	5.37 mg/kg	122	71.0	130	
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	4 mg/kg	111	64.0	148	
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	29.6 mg/kg	106	84.0	131	
EG020-SD: Zinc	7440-66-6	1	mg/kg	<1.0	60.8 mg/kg	110	82.0	137	
EG020-SD: Total Metals in Sediments by ICPMS (QCL	ot: 2682885)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	4.6 mg/kg	74.5	70.0	130	
EG020-SD: Arsenic	7440-38-2	1	mg/kg	<1.00	21.7 mg/kg	87.2	80.0	139	
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	4.64 mg/kg	89.9	83.0	127	
EG020-SD: Chromium	7440-47-3	1	mg/kg	<1.0	43.9 mg/kg	75.5	73.0	130	
EG020-SD: Copper	7440-50-8	1	mg/kg	<1.0	32 mg/kg	85.2	76.0	130	
EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	16 mg/kg	90.1	81.0	130	
EG020-SD: Lead	7439-92-1	1	mg/kg	<1.0	40 mg/kg	79.4	74.0	130	
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	130 mg/kg	81.9	76.0	130	
EG020-SD: Nickel	7440-02-0	1	mg/kg	<1.0	55 mg/kg	86.2	83.0	130	
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	5.37 mg/kg	94.4	71.0	130	
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	4 mg/kg	68.0	64.0	148	
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	29.6 mg/kg	86.0	84.0	131	
EG020-SD: Zinc	7440-66-6	1	mg/kg	<1.0	60.8 mg/kg	88.6	82.0	137	
EK026SF: Total CN by Segmented Flow Analyser (QC	Lot: 2677335)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	40 mg/kg	106	81.0	129	



Sub-Matrix: SOIL			Method Blank (MB)	Laboratory Control Spike (LCS) Report				
			Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 2677336)								
EK026SF: Total Cyanide 57-12-5	1	mg/kg	<1	40 mg/kg	112	81.0	129	
EK040T: Fluoride Total (OCLot: 2683332)								
EK040T: Fluoride 16984-48-8	40	mg/kg	<40	400 mg/kg	76.0	67.2	96.3	
EP003: Total Organic Carbon (TOC) in Soil (QCI of: 2687095)								
EP003: Total Organic Carbon	0.02	%	<0.02	1.03 %	101	70.0	130	
			<0.02	0.48 %	105	70.0	130	
EP074A: Monocyclic Aromatic Hydrocarbons (OCI of: 2677735)								
EP074: Benzene 71-43-2	0.2	mg/kg	<0.2	1 mg/kg	88.3	71.0	121	
EP074: Toluene 108-88-3	0.5	mg/kg	<0.5	1 mg/kg	86.6	65.0	131	
EP074: Ethylbenzene 100-41-4	0.5	mg/kg	<0.5	1 mg/kg	85.8	72.0	114	
EP074: meta- & para-Xylene 108-38-3	0.5	mg/kg	<0.5	2 mg/kg	84.8	70.0	116	
106-42-3								
EP074: Styrene 100-42-5	0.5	mg/kg	<0.5	1 mg/kg	82.1	67.0	113	
EP074: ortho-Xylene 95-47-6	0.5	mg/kg	<0.5	1 mg/kg	86.5	75.0	115	
EP074: Isopropylbenzene 98-82-8	0.5	mg/kg	<0.5	1 mg/kg	84.8	65.0	117	
EP074: n-Propylbenzene 103-65-1	0.5	mg/kg	<0.5	1 mg/kg	82.5	66.0	122	
EP074: 1.3.5-Trimethylbenzene 108-67-8	0.5	mg/kg	<0.5	1 mg/kg	82.4	68.0	118	
EP074: sec-Butylbenzene 135-98-8	0.5	mg/kg	<0.5	1 mg/kg	83.8	69.0	119	
EP074: 1.2.4-Trimethylbenzene 95-63-6	0.5	mg/kg	<0.5	1 mg/kg	83.8	69.0	117	
EP074: tert-Butylbenzene 98-06-6	0.5	mg/kg	<0.5	1 mg/kg	83.7	69.0	115	
EP074: p-lsopropyltoluene 99-87-6	0.5	mg/kg	<0.5	1 mg/kg	84.1	66.0	118	
EP074: n-Butylbenzene 104-51-8	0.5	mg/kg	<0.5	1 mg/kg	82.7	59.0	125	
EP074B: Oxygenated Compounds (QCLot: 2677735)								
EP074: Vinyl Acetate 108-05-4	5	mg/kg	<5	10 mg/kg	100	29.6	156	
EP074: 2-Butanone (MEK) 78-93-3	5	mg/kg	<5	10 mg/kg	96.4	58.0	136	
EP074: 4-Methyl-2-pentanone (MIBK) 108-10-1	5	mg/kg	<5	10 mg/kg	92.6	62.0	132	
EP074: 2-Hexanone (MBK) 591-78-6	5	mg/kg	<5	10 mg/kg	90.0	54.0	136	
EP074C: Sulfonated Compounds (QCLot: 2677735)								
EP074: Carbon disulfide 75-15-0	0.5	mg/kg	<0.5	1 mg/kg	80.0	54.0	126	
EP074D: Fumigants (QCLot: 2677735)								
EP074: 2.2-Dichloropropane 594-20-7	0.5	mg/kg	<0.5	1 mg/kg	87.8	60.0	126	
EP074: 1.2-Dichloropropane 78-87-5	0.5	mg/kg	<0.5	1 mg/kg	87.8	68.0	124	
EP074: cis-1.3-Dichloropropylene 10061-01-5	0.5	mg/kg	<0.5	1 mg/kg	83.2	51.0	119	
EP074: trans-1.3-Dichloropropylene 10061-02-6	0.5	mg/kg	<0.5	1 mg/kg	81.5	52.0	114	
EP074: 1.2-Dibromoethane (EDB) 106-93-4	0.5	mg/kg	<0.5	1 mg/kg	90.8	63.0	115	
EP074E: Halogenated Aliphatic Compounds (QCLot: 2677735)								
EP074: Dichlorodifluoromethane 75-71-8	5	mg/kg	<5	10 mg/kg	75.6	30.0	148	
EP074: Chloromethane 74-87-3	5	mg/kg	<5	10 mg/kg	86.4	41.0	141	

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EP074E: Halogenated Aliphatic Compounds (QCLo	ot: 2677735) - continued	1							
EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	10 mg/kg	84.7	43.0	147	
EP074: Bromomethane	74-83-9	5	mg/kg	<5	10 mg/kg	84.4	47.0	141	
EP074: Chloroethane	75-00-3	5	mg/kg	<5	10 mg/kg	88.2	49.0	143	
EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	10 mg/kg	86.1	49.0	135	
EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	1 mg/kg	87.4	54.0	126	
EP074: lodomethane	74-88-4	0.5	mg/kg	<0.5	1 mg/kg	54.6	43.0	129	
EP074: trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	1 mg/kg	84.8	64.0	120	
EP074: 1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	1 mg/kg	84.9	67.0	125	
EP074: cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	1 mg/kg	88.2	69.0	121	
EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	1 mg/kg	83.6	65.0	117	
EP074: 1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	1 mg/kg	86.5	65.0	123	
EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	1 mg/kg	81.5	59.0	125	
EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	1 mg/kg	92.7	65.0	125	
EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	1 mg/kg	86.4	70.0	118	
EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	1 mg/kg	89.7	68.0	118	
EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	1 mg/kg	89.0	64.0	126	
EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	1 mg/kg	90.2	68.0	122	
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	86.3	67.0	143	
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	1 mg/kg	83.2	62.0	122	
EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	1 mg/kg	78.7	54.0	128	
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	1 mg/kg	83.4	55.0	129	
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	1 mg/kg	88.4	65.0	121	
EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	1 mg/kg	92.5	61.0	125	
EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	1 mg/kg	74.7	19.8	134	
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	1 mg/kg	86.9	53.0	129	
EP074: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	1 mg/kg	83.0	50.0	128	
EP074F: Halogenated Aromatic Compounds (QCL	ot: 2677735)								
EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	1 mg/kg	86.5	68.0	116	
EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	1 mg/kg	86.2	70.0	114	
EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	1 mg/kg	85.2	68.0	122	
EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	1 mg/kg	85.2	67.0	123	
EP074: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	1 mg/kg	85.6	70.0	116	
EP074: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1 mg/kg	85.2	67.0	117	
EP074: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1 mg/kg	87.0	70.0	114	
EP074: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1 mg/kg	83.0	48.0	122	
EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	1 mg/kg	85.6	52.0	122	
EP074G: Trihalomethanes (QCLot: 2677735)									
EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	1 mg/kg	84.7	66.0	124	
EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	1 mg/kg	84.7	61.0	121	

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report			
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP074G: Trihalomethanes (QCLot: 2677735) - continue	d							
EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	1 mg/kg	81.7	63.0	121
EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	1 mg/kg	79.7	60.0	126
EP074H: Naphthalene (QCLot: 2677735)								
EP074: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	87.2	67.0	129
EP075(SIM)A: Phenolic Compounds (QCLot: 2680331)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	99.9	71.0	125
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	106	72.0	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	109	71.0	123
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	117	67.0	127
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	97.4	54.0	114
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	104	68.0	126
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	107	66.0	120
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	110	70.0	120
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	104	70.0	116
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	106	54.0	114
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	108	60.0	114
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	39.3	10.0	57.0
EP075A: Phenolic Compounds (QCLot: 2689777)								
EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	1.5 mg/kg	102	64.0	114
EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	1.5 mg/kg	106	57.0	115
EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	1.5 mg/kg	98.0	55.0	117
EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	1.5 mg/kg	98.9	46.0	122
EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	1.5 mg/kg	92.2	47.0	117
EP075: 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	1.5 mg/kg	96.3	13.7	108
EP075: 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	1.5 mg/kg	94.4	47.0	105
EP075: 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	1.5 mg/kg	80.6	48.0	110
EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	1.5 mg/kg	79.9	57.0	113
EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	1.5 mg/kg	66.7	49.0	109
EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	1.5 mg/kg	65.0	49.0	107
EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	3 mg/kg	16.0	12.0	76.0
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 2	2689777)							
EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	96.4	62.0	118
EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	1.5 mg/kg	79.1	58.0	116
EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	1.5 mg/kg	75.4	54.0	112
EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	80.7	56.0	114
EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	98.9	62.0	112
EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	101	59.0	115
EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	97.9	63.0	113

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report			
	Report Report	Report	Spike	Spike Recovery (%)	Recovery	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075B: Polynuclear Aromatic Hydrocarbons (QCLo	ot: 2689777) - continu	ed						
EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	101	57.0	111
EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	101	58.0	114
EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	103	57.0	117
EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	1.5 mg/kg	110	58.0	114
EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	108	59.0	115
EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	110	61.0	117
EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	3 mg/kg	101	57.0	119
EP075: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	1.5 mg/kg	101	48.1	106
EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	104	56.0	116
EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	1.5 mg/kg	83.4	50.0	116
EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	97.2	55.0	117
EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	96.2	53.0	119
EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	92.7	56.0	120
EP075C: Phthalate Esters (QCLot: 2689777)								
EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	1.5 mg/kg	81.9	60.0	118
EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	1.5 mg/kg	96.6	65.0	115
EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	1.5 mg/kg	98.9	65.0	121
EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	1.5 mg/kg	104	62.0	116
EP075: bis(2-ethylhexyl) phthalate	117-81-7		mg/kg		1.5 mg/kg	93.7	69.0	133
EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	1.5 mg/kg	95.0	62.0	124
EP075D: Nitrosamines (QCLot: 2689777)								
EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	1.5 mg/kg	93.7	39.4	124
EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	1.5 mg/kg	83.4	59.0	117
EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<0.5	1.5 mg/kg	103	53.0	125
EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	1.5 mg/kg	99.4	65.0	121
EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	1.5 mg/kg	102	59.0	123
EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	1.5 mg/kg	109	57.0	115
EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	1.5 mg/kg	74.1	57.0	119
EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<0.6	3 mg/kg	101	42.0	112
EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	1.5 mg/kg	64.7	16.3	123
EP075E: Nitroaromatics and Ketones (QCLot: 26897	77)							
EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	1.5 mg/kg	91.1	27.3	129
EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	1.5 mg/kg	102	60.0	116
EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	1.5 mg/kg	106	65.0	119
EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	1.5 mg/kg	104	62.0	116
EP075: 2.6-Dinitrotoluene	606-20-2	0.5	mg/kg	<0.5	1.5 mg/kg	83.0	58.0	118

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Sub-Matrix: SOIL		Method Blank (MB)	Laboratory Control Spike (LCS) Report					
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075E: Nitroaromatics and Ketones (QCLot: 2689)	777) - continued							
EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	1.5 mg/kg	102	59.0	115
EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	1.5 mg/kg	25.3	18.0	112
EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	1.5 mg/kg	66.8	10.0	87.0
EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	1.5 mg/kg	93.4	48.3	98.5
EP075: Azobenzene	103-33-3	1	mg/kg	<1	1.5 mg/kg	99.7	62.0	118
EP075: 1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	1.5 mg/kg	75.5	36.0	114
EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	1.5 mg/kg	103	62.0	114
EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	1.5 mg/kg	81.3	36.1	102
EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	1.5 mg/kg	91.5	56.0	110
EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	1.5 mg/kg	87.6	54.0	110
EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	1.5 mg/kg	101	48.0	108
EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	1.5 mg/kg	95.0	57.4	112
EP075F: Haloethers (QCLot: 2689777)								
EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	1.5 mg/kg	102	63.0	121
EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	1.5 mg/kg	102	59.0	115
EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	1.5 mg/kg	99.9	58.0	112
EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	98.5	58.0	110
EP075G: Chlorinated Hydrocarbons (QCLot: 26897)	77)							
EP075: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	1.5 mg/kg	101	58.0	112
EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1.5 mg/kg	100	58.0	116
EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1.5 mg/kg	99.8	57.0	115
EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	1.5 mg/kg	95.4	54.0	116
EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1.5 mg/kg	103	62.9	108
EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	1.5 mg/kg	83.4	39.1	110
EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	1.5 mg/kg	78.2	59.0	117
EP075: Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5	1.5 mg/kg	# 21.7	24.3	108
EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	1.5 mg/kg	93.2	57.0	109
EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<0.5	1.5 mg/kg	97.3	59.0	111
EP075H: Anilines and Benzidines (QCLot: 2689777)								
EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	1.5 mg/kg	89.0	13.2	108
EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	1.5 mg/kg	29.4	20.5	99.0
EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<0.5	1.5 mg/kg	83.0	52.0	112
EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<0.5	1.5 mg/kg	75.9	31.5	93.7
EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	1.5 mg/kg	99.4	60.0	110
EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	1.5 mg/kg	94.6	42.0	112
EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	1.5 mg/kg	100	59.0	111
EP075: 3.3`-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	1.5 mg/kg	82.6	23.1	113
EP075I: Organochlorine Pesticides (QCLot: 268977	7)							

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Sub-Matrix: SOIL				Method Blank (MB)	3) Laboratory Control Spike (LCS) Report			
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075I: Organochlorine Pesticides (QCLot: 2689777) - con	tinued							
EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	1.5 mg/kg	96.8	63.0	113
EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	1.5 mg/kg	102	57.0	113
EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	1.5 mg/kg	88.1	61.0	117
EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	1.5 mg/kg	93.1	64.0	118
EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	1.5 mg/kg	89.1	55.0	115
EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	1.5 mg/kg	90.5	61.0	115
EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	1.5 mg/kg	83.6	56.0	118
EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	1.5 mg/kg	88.4	65.0	125
EP075: 4.4`-DDE	72-55-9	0.5	mg/kg	<0.5	1.5 mg/kg	97.7	60.0	116
EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	1.5 mg/kg	94.3	64.0	118
EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	1.5 mg/kg	89.6	53.0	117
EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	1.5 mg/kg	99.7	65.0	115
EP075: 4.4`-DDD	72-54-8	0.5	mg/kg	<0.5	1.5 mg/kg	98.9	62.0	118
EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	1.5 mg/kg	119	63.0	129
EP075: 4.4`-DDT	50-29-3	0.5	mg/kg	<0.5	1.5 mg/kg	98.6	46.0	122
EP075: Sum of DDD + DDE + DDT	72-54-8/72-5	0.5	mg/kg	<0.5				
	5-9/50-2							
EP075: Sum of Aldrin + Dieldrin	309-00-2/60-	0.5	mg/kg	<0.5				
	57-1							
EP075J: Organophosphorus Pesticides (QCLot: 2689777)								
EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	67.5	46.0	112
EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	1.5 mg/kg	106	63.0	119
EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	1.5 mg/kg	99.8	68.0	134
EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	1.5 mg/kg	97.2	60.0	130
EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	1.5 mg/kg	120	65.0	127
EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	1.5 mg/kg	99.7	60.0	116
EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	1.5 mg/kg	93.6	63.0	113
EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	1.5 mg/kg	99.7	65.0	115
EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	1.5 mg/kg	87.6	59.0	103
EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	1.5 mg/kg	100	59.0	119
EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	1.5 mg/kg	110	62.0	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 268018	1)							
EP080: C6 - C9 Fraction		10	mg/kg	<10	26 mg/kg	91.8	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 F	ractions (QC	Lot: 2680181)						
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	94.0	68.4	128
EP080: BTEXN (QCLot: 2680181)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	83.9	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	87.4	67.0	121

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report			
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080: BTEXN (QCLot: 2680181) - continued								
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	88.7	65.0	117
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	88.9	66.0	118
	106-42-3							
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	91.6	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	92.4	63.0	119
EP080-SD / EP071-SD: Total Petroleum Hydrocarb	ons (QCLot: 2677697)							
EP071-SD: C10 - C14 Fraction		3	mg/kg	<3	5 mg/kg	92.6	78.0	118
EP071-SD: C15 - C28 Fraction		3	mg/kg	<3	7.5 mg/kg	96.3	84.0	118
EP071-SD: C29 - C36 Fraction		5	mg/kg	<5	5 mg/kg	94.9	73.0	119
EP071-SD: C10 - C36 Fraction (sum)		3	mg/kg	<3				
EP080-SD / EP071-SD: Total Petroleum Hydrocarb	ons (QCLot: 2677734)							
EP080-SD: C6 - C9 Fraction		3	mg/kg	<3	6.2 mg/kg	91.5	61.0	133
EP080-SD / EP071-SD: Total Recoverable Hydroca	rbons (QCLot: 2677697)							
EP071-SD: >C10 - C16 Fraction		3	mg/kg	<3	6.25 mg/kg	96.1	70.0	130
EP071-SD: >C16 - C34 Fraction		3	mg/kg	<3	8.75 mg/kg	94.4	74.0	138
EP071-SD: >C34 - C40 Fraction		5	mg/kg	<5	3.75 mg/kg	95.8	63.0	131
EP071-SD: >C10 - C40 Fraction (sum)		3	mg/kg	<3				
EP080-SD: BTEXN (QCLot: 2677734)								
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	0.2 mg/kg	105	66.0	122
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	0.2 mg/kg	109	70.0	130
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.2 mg/kg	102	66.0	126
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	0.4 mg/kg	102	59.0	129
	106-42-3							
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.2 mg/kg	104	66.0	126
EP090: Organotin Compounds (QCLot: 2698344)								
EP090: Monobutyltin	78763-54-9	1	µgSn/kg	<1	1.25 µgSn/kg	65.6	36.0	128
EP090: Dibutyltin	1002-53-5	1	µgSn/kg	<1	1.25 µgSn/kg	91.3	42.0	132
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	135	52.0	139
EP090: Organotin Compounds (QCLot: 2745160)								
EP090: Monobutyltin	78763-54-9	1	µgSn/kg	<1	1.25 µgSn/kg	37.1	36.0	128
EP090: Dibutyltin	1002-53-5	1	µgSn/kg	<1	1.25 µgSn/kg	103	42.0	132
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	109	52.0	139
EP130A: Organophosphorus Pesticides (Ultra-trac	e) (QCLot: 2677727)							
EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	50 µg/kg	87.6	49.0	117
EP130: Carbophenothion	786-19-6	10	µg/kg	<10	50 µg/kg	92.7	54.0	104
EP130: Chlorfenvinphos (E)	18708-86-6	10	μg/kg	<10.0	5 µg/kg	88.5	48.0	156
EP130: Chlorfenvinphos (Z)	18708-87-7	10	μg/kg	<10	50 µg/kg	89.2	53.0	119
EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	50 µg/kg	91.2	54.0	112

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report			
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP130A: Organophosphorus Pesticides (Ultra-t	trace) (QCLot: 2677727) - (continued						
EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	50 µg/kg	90.8	52.0	108
EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	50 µg/kg	83.8	51.0	109
EP130: Diazinon	333-41-5	10	µg/kg	<10	50 µg/kg	87.4	57.0	121
EP130: Dichlorvos	62-73-7	10	µg/kg	<10	50 µg/kg	80.8	48.0	104
EP130: Dimethoate	60-51-5	10	μg/kg	<10	50 µg/kg	98.2	52.0	120
EP130: Ethion	563-12-2	10	µg/kg	<10	50 µg/kg	88.0	51.0	121
EP130: Fenamiphos	22224-92-6	10	μg/kg	<10	50 µg/kg	82.8	50.0	120
EP130: Fenthion	55-38-9	10	µg/kg	<10	50 µg/kg	88.1	48.0	112
EP130: Malathion	121-75-5	10	µg/kg	<10	50 µg/kg	89.7	51.0	121
EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	50 µg/kg	92.4	45.0	127
EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	50 µg/kg	78.8	48.0	128
EP130: Parathion	56-38-2	10	µg/kg	<10	50 µg/kg	86.7	49.0	125
EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	50 µg/kg	86.9	51.0	119
EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	50 µg/kg	87.7	48.0	120
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	50 µg/kg	84.9	51.0	117
EP131A: Organochlorine Pesticides (QCLot: 20	677729)							
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	92.1	38.0	139
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	92.5	17.6	136
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	110	30.5	131
EP131A: delta-BHC	319-86-8	0.5	μg/kg	<0.50	5 µg/kg	69.6	37.0	140
EP131A: 4.4`-DDD	72-54-8	0.5	μg/kg	<0.50	5 µg/kg	118	25.9	141
EP131A: 4.4`-DDE	72-55-9	0.5	μg/kg	<0.50	5 µg/kg	94.0	35.0	129
EP131A: 4.4`-DDT	50-29-3	0.5	μg/kg	<0.50	5 µg/kg	116	23.4	138
EP131A: Sum of DDD + DDE + DDT	72-54-8/72-5	0.5	µg/kg	<0.50				
	5-9/50-2							
EP131A: Dieldrin	60-57-1	0.5	μg/kg	<0.50	5 µg/kg	122	30.2	140
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	102	38.0	140
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	116	32.0	152
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	116	36.0	155
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50				
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	100	25.8	158
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	115	20.1	118
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	100	13.4	135
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	99.6	39.0	155
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	104	34.0	148
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	92.5	26.1	152
EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	5 µg/kg	94.9	31.2	137
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	116	36.0	152
EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	5 µg/kg	113	36.0	142

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Sub-Matrix: SOIL			Method Blank (MB)	Laboratory Control Spike (LCS) Report						
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High		
EP131A: Organochlorine Pesticides (QCLot: 2677729) - continued										
EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	5 µg/kg	110	29.5	138		
EP131A: Total Chlordane (sum)		0.25	µg/kg	<0.25						
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 2677728)										
EP131B: Total Polychlorinated biphenyls		5	µg/kg	<5.0	50 µg/kg	75.5	45.0	115		
EP131B: Aroclor 1016	12674-11-2	5	µg/kg	<5.0						
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0						
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0						
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0						
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0						
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	75.5	45.0	115		
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0						
EP132B: Polynuclear Aromatic Hydrocarbons (QC	Lot: 2677696)									
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	94.3	63.0	129		
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	80.0	64.0	128		
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	97.9	65.0	129		
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	90.6	68.0	132		
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	84.4	68.0	124		
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	93.1	64.0	134		
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	94.9	65.0	131		
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	96.1	64.0	130		
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	82.2	67.0	133		
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	105	62.0	130		
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	95.9	65.0	133		
EP132B-SD: Benzo(b+j)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	110	68.0	120		
	205-82-3									
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	98.9	61.0	133		
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	96.7	63.0	127		
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	106	66.0	118		
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	88.0	69.0	119		
EP132B-SD: Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	106	66.0	120		
EP132B-SD: Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	98.9	64.0	122		
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	96.3	64.0	120		
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	82.4	68.0	136		
EP132B-SD: Sum of PAHs		4	µg/kg	<4						
Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LC	S) Report			
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High		
EG020T: Total Metals by ICP-MS (QCLot: 2686305)										

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Sub-Matrix: WATER			Method Blank (MB)	Laboratory Control Spike (LCS) Report						
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High		
EG020T: Total Metals by ICP-MS (QCLot: 2686305) - continued										
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	82.0	114		
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	106	84.0	112		
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	110	86.0	116		
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	105	83.0	118		
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	104	85.0	115		
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	107	84.0	116		
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	103	79.0	117		
EG035T: Total Recoverable Mercury by FIMS (QC	Lot: 2686717)									
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	91.2	77.0	111		
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	s (QCLot: 2677025)									
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	76.4	50.0	94.0		
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	77.3	63.6	114		
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	71.2	62.2	113		
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	76.4	63.9	115		
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	71.8	62.6	116		
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	73.3	64.3	116		
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	88.3	63.6	118		
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	99.4	63.1	118		
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	88.0	64.1	117		
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	88.9	62.5	116		
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	97.3	61.7	119		
	205-82-3									
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	81.6	63.0	115		
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	98.7	63.3	117		
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	94.7	59.9	118		
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	99.7	61.2	117		
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	98.2	59.1	118		
EP080/071: Total Petroleum Hydrocarbons (QCLo	t: 2677026)									
EP071: C10 - C14 Fraction		50	µg/L	<50	2000 µg/L	67.4	55.8	112		
EP071: C15 - C28 Fraction		100	µg/L	<100	3000 µg/L	89.8	71.6	113		
EP071: C29 - C36 Fraction		50	µg/L	<50	2000 µg/L	92.9	56.0	121		
EP080/071: Total Petroleum Hydrocarbons (QCLo	t: 2681218)									
EP080: C6 - C9 Fraction		20	µg/L	<20	260 µg/L	91.2	75.0	127		
EP080/071: Total Recoverable Hydrocarbons - NEF	PM 2013 Fractions (QCL	.ot: 2677026)								
EP071: >C10 - C16 Fraction		100	µg/L	<100	2500 μg/L	75.6	57.9	119		
EP071: >C16 - C34 Fraction		100	µg/L	<100	3500 µg/L	93.6	62.5	110		
EP071: >C34 - C40 Fraction		100	µg/L	<100	1500 µg/L	94.0	61.5	121		
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2681218)										



Sub-Matrix: WATER				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery I	.imits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2681218) - continued									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	94.4	75.0	127	
EP080: BTEXN (QCLot: 2681218)									
EP080: Benzene	71-43-2	1	μg/L	<1	10 µg/L	94.1	70.0	122	
EP080: Toluene	108-88-3	2	μg/L	<2	10 µg/L	99.2	69.0	123	
EP080: Ethylbenzene	100-41-4	2	μg/L	<2	10 µg/L	97.3	70.0	120	
EP080: meta- & para-Xylene	108-38-3	2	μg/L	<2	10 µg/L	95.6	69.0	121	
	106-42-3								
EP080: ortho-Xylene	95-47-6	2	μg/L	<2	10 µg/L	98.8	72.0	122	
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	98.3	70.0	120	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL			Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery L	mits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035T: Total Rec	coverable Mercury by FIMS (Low Level) (QCLot: 268288	4)					
ES1936029-001	VC09_0.0-0.2	EG035T-LL: Mercury	7439-97-6	0.05 mg/kg	108	70.0	130
EG020-SD: Total M	etals in Sediments by ICPMS (QCLot: 2682877)						
EM1918213-003	Anonymous	EG020-SD: Arsenic	7440-38-2	50 mg/kg	90.8	70.0	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	87.8	70.0	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	89.5	70.0	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	94.9	70.0	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	92.3	70.0	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	85.7	70.0	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	78.0	70.0	130
EG020-SD: Total M	etals in Sediments by ICPMS (QCLot: 2682885)						
ES1936029-063	VC04_0.5-1.0	EG020-SD: Arsenic	7440-38-2	50 mg/kg	91.6	70.0	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	96.5	70.0	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	102	70.0	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	93.9	70.0	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	97.0	70.0	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	97.8	70.0	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	94.3	70.0	130
EK026SF: Total CM	N by Segmented Flow Analyser (QCLot: 2677335)						
ES1935865-002	Anonymous	EK026SF: Total Cyanide	57-12-5	40 mg/kg	128	70.0	130

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Sub-Matrix: SOIL				Ма	atrix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Recovery Li	mits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK026SF: Total Cl	N by Segmented Flow Analyser (QCLot: 2677336)						
ES1936029-076	VC10_0.7-0.8	EK026SF: Total Cyanide	57-12-5	40 mg/kg	130	70.0	130
EK040T: Fluoride 1	Fotal (QCLot: 2683332)						
EB1928984-011	Anonymous	EK040T: Fluoride	16984-48-8	400 mg/kg	107	70.0	130
EP074A: Monocyc	ic Aromatic Hydrocarbons (QCLot: 2677735)						
ES1936029-007	VC07_0.0-0.2	EP074: Benzene	71-43-2	2.5 mg/kg	84.0	70.0	130
		EP074: Toluene	108-88-3	2.5 mg/kg	87.4	70.0	130
EP074E: Halogena	ted Aliphatic Compounds (QCLot: 2677735)						
ES1936029-007	VC07_0.0-0.2	EP074: 1.1-Dichloroethene	75-35-4	2.5 mg/kg	# 61.0	70.0	130
		EP074: Trichloroethene	79-01-6	2.5 mg/kg	82.3	70.0	130
EP074F: Halogena	ted Aromatic Compounds (QCLot: 2677735)						
ES1936029-007	VC07_0.0-0.2	EP074: Chlorobenzene	108-90-7	2.5 mg/kg	90.2	70.0	130
EP075(SIM)A: Phei	nolic Compounds (QCLot: 2680331)						
ES1936029-001	VC09 0.0-0.2	EP075(SIM): Phenol	108-95-2	10 ma/ka	87.2	70.0	130
	_	EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	92.1	70.0	130
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	86.7	60.0	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	87.9	70.0	130
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	66.8	20.0	130
EP075A: Phenolic	Compounds (QCLot: 2689777)						
ES1936029-011	VC07_0.0-0.5	EP075: Phenol	108-95-2	10 mg/kg	99.4	60.0	130
		EP075: 2-Chlorophenol	95-57-8	10 mg/kg	95.8	60.0	130
		EP075: 2-Nitrophenol	88-75-5	10 mg/kg	98.4	50.0	130
		EP075: 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	93.7	50.0	130
		EP075: Pentachlorophenol	87-86-5	10 mg/kg	30.1	10.0	130
EP075B: Polynucle	ear Aromatic Hydrocarbons (QCLot: 2689777)						
ES1936029-011	VC07_0.0-0.5	EP075: Acenaphthene	83-32-9	10 mg/kg	81.7	50.0	130
		EP075: Pyrene	129-00-0	10 mg/kg	82.2	50.0	130
EP075D: Nitrosami	ines (QCLot: 2689777)						
ES1936029-011	VC07_0.0-0.5	EP075: N-Nitrosodi-n-propylamine	621-64-7	10 mg/kg	96.5	50.0	130
EP075E: Nitroarom	natics and Ketones (QCLot: 2689777)						
ES1936029-011	VC07_0.0-0.5	EP075: 2.4-Dinitrotoluene	121-14-2	10 mg/kg	89.4	40.0	130
EP075G: Chlorinat	ed Hydrocarbons (QCLot: 2689777)						
ES1936029-011	VC07_0.0-0.5	EP075: 1.4-Dichlorobenzene	106-46-7	10 mg/kg	87.8	60.0	130
		EP075: 1.2.4-Trichlorobenzene	120-82-1	10 mg/kg	85.5	50.0	130
EP080/071: Total P	etroleum Hydrocarbons (QCLot: 2680181)						
ES1936027-001	Anonymous	EP080: C6 - C9 Fraction		32.5 mg/kg	104	70.0	130



Sub-Matrix: SOIL					atrix Spike (MS) Repor	t	
				Spike	SpikeRecovery(%)	Recovery L	imits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total R	ecoverable Hydrocarbons - NEPM 2013 Fractions(QCL	.ot: 2680181)					
ES1936027-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	105	70.0	130
EP080: BTEXN (Q	CLot: 2680181)						
ES1936027-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	85.5	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	96.7	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	98.0	70.0	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	98.6	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	101	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	88.6	70.0	130
EP080-SD / EP071-	SD: Total Petroleum Hydrocarbons (QCLot: 2677697)						
ES1936029-001	VC09_0.0-0.2	EP071-SD: C10 - C14 Fraction		14 mg/kg	102	70.0	130
		EP071-SD: C15 - C28 Fraction		59 mg/kg	84.0	70.0	130
		EP071-SD: C29 - C36 Fraction		42 mg/kg	114	70.0	130
EP080-SD / EP071-	SD: Total Petroleum Hydrocarbons (QCLot: 2677734)						
ES1936029-007	VC07_0.0-0.2	EP080-SD: C6 - C9 Fraction		6.5 mg/kg	108	70.0	130
EP080-SD: BTEXN	(QCLot: 2677734)						
ES1936029-007	VC07_0.0-0.2	EP080-SD: Benzene	71-43-2	0.5 mg/kg	94.2	70.0	130
		EP080-SD: Toluene	108-88-3	0.5 mg/kg	103	70.0	130
		EP080-SD: Ethylbenzene	100-41-4	0.5 mg/kg	103	70.0	130
		EP080-SD: meta- & para-Xylene	108-38-3	0.5 mg/kg	102	70.0	130
			106-42-3				
		EP080-SD: ortho-Xylene	95-47-6	0.5 mg/kg	104	70.0	130
EP090: Organotin	Compounds (QCLot: 2698344)						
EM1919013-022	Anonymous	EP090: MonobutyItin	78763-54-9	1.25 µgSn/kg	84.0	20.0	130
		EP090: DibutyItin	1002-53-5	1.25 µgSn/kg	# 201	20.0	130
		EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	# 866	20.0	130
EP090: Organotin	Compounds (QCLot: 2745160)						
ES1939786-001	Anonymous	EP090: Monobutyltin	78763-54-9	1.25 µgSn/kg	# 7.69	20.0	130
		EP090: DibutyItin	1002-53-5	1.25 µgSn/kg	58.6	20.0	130
		EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	52.7	20.0	130
EP130A: Organoph	osphorus Pesticides (Ultra-trace) (QCLot: 2677727)						
ES1936029-001	VC09_0.0-0.2	EP130: Bromophos-ethyl	4824-78-6	50 µg/kg	57.1	36.0	144
		EP130: Carbophenothion	786-19-6	50 µg/kg	59.1	38.0	120
		EP130: Chlorfenvinphos (E)	18708-86-6	5 µg/kg	59.5	49.0	157
		EP130: Chlorfenvinphos (Z)	18708-87-7	50 µg/kg	59.9	53.0	145
		EP130: Chlorpyrifos	2921-88-2	50 µg/kg	71.0	60.0	140
		EP130: Chlorpyrifos-methyl	5598-13-0	50 µg/kg	71.5	56.0	126



Sub-Matrix: SOIL					atrix Spike (MS) Repor	t		
				Spike	SpikeRecovery(%)	Recovery L	imits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 2677727) - continued								
ES1936029-001	VC09_0.0-0.2	EP130: Demeton-S-methyl	919-86-8	50 µg/kg	60.3	9.70	148	
		EP130: Diazinon	333-41-5	50 µg/kg	66.7	60.0	122	
		EP130: Dichlorvos	62-73-7	50 µg/kg	56.4	33.0	123	
		EP130: Dimethoate	60-51-5	50 µg/kg	64.2	36.0	142	
		EP130: Ethion	563-12-2	50 µg/kg	59.4	48.0	136	
		EP130: Fenamiphos	22224-92-6	50 µg/kg	52.3	42.0	136	
		EP130: Fenthion	55-38-9	50 µg/kg	60.5	35.0	131	
		EP130: Malathion	121-75-5	50 µg/kg	60.7	55.0	141	
		EP130: Azinphos Methyl	86-50-0	50 µg/kg	54.6	23.5	132	
		EP130: Monocrotophos	6923-22-4	50 µg/kg	60.1	35.0	153	
		EP130: Parathion	56-38-2	50 µg/kg	63.3	57.0	147	
		EP130: Parathion-methyl	298-00-0	50 µg/kg	54.9	48.0	140	
		EP130: Pirimphos-ethyl	23505-41-1	50 µg/kg	60.2	45.0	137	
		EP130: Prothiofos	34643-46-4	50 µg/kg	57.5	51.0	137	
EP131A: Organoch	lorine Pesticides (QCLot: 2677729)							
ES1936029-001	VC09_0.0-0.2	EP131A: Aldrin	309-00-2	5 µg/kg	75.4	23.4	153	
		EP131A: alpha-BHC	319-84-6	5 µg/kg	80.2	17.6	156	
		EP131A: beta-BHC	319-85-7	5 µg/kg	107	24.9	153	
		EP131A: delta-BHC	319-86-8	5 µg/kg	80.2	25.2	147	
		EP131A: 4.4`-DDD	72-54-8	5 µg/kg	67.8	25.9	150	
		EP131A: 4.4`-DDE	72-55-9	5 µg/kg	59.9	31.2	125	
		EP131A: 4.4`-DDT	50-29-3	5 µg/kg	107	23.4	163	
		EP131A: Dieldrin	60-57-1	5 µg/kg	92.6	30.2	140	
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	59.8	28.8	135	
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	80.3	22.6	141	
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	86.1	16.1	156	
		EP131A: Endrin	72-20-8	5 µg/kg	105	17.7	162	
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	105	20.1	116	
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	77.5	13.4	151	
		EP131A: Heptachlor	76-44-8	5 µg/kg	89.1	23.8	170	
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	80.1	28.3	140	
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	82.7	17.7	144	
		EP131A: gamma-BHC	58-89-9	5 µg/kg	84.0	21.8	158	
		EP131A: Methoxychlor	72-43-5	5 µg/kg	112	24.4	158	
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	85.2	27.3	139	
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	83.5	29.5	138	
EP131B: Polychlor	inated Biphenyls (as Aroclors) (QCLot: 2677728)							
ES1936029-007	VC07_0.0-0.2	EP131B: Total Polychlorinated biphenyls		50 µg/kg	101	44.0	136	
		EP131B: Aroclor 1254	11097-69-1	50 µg/kg	101	44.0	136	



Sub-Matrix: SOIL				M	atrix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Recovery	Limits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP132B: Polynucle	ear Aromatic Hydrocarbons (QCI	Lot: 2677696)					
ES1936029-001	VC09_0.0-0.2	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	85.9	70.0	130
	_	EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	88.3	70.0	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	101	70.0	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	92.5	70.0	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	99.7	70.0	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	94.9	70.0	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	97.6	70.0	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	98.1	70.0	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	98.9	70.0	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	108	70.0	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	95.4	70.0	130
		EP132B-SD: Benzo(b+j)fluoranthene	205-99-2	25 µg/kg	106	70.0	130
			205-82-3				
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	91.4	70.0	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	91.4	70.0	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	106	70.0	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	92.4	70.0	130
		EP132B-SD: Benzo(g.h.i)perylene	191-24-2	25 µg/kg	95.0	70.0	130
		EP132B-SD: Dibenz(a.h)anthracene	53-70-3	25 µg/kg	99.8	70.0	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	98.5	70.0	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	108	70.0	130
Sub-Matrix: WATER				М	atrix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Recovery	Limits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035T: Total Re	coverable Mercury by FIMS(QCL	Lot: 2686717)					
EP1911175-003	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	78.2	70.0	130
EP080/071: Total F	etroleum Hydrocarbons (QCLot	: 2681218)					
ES1936026-002	Anonymous	EP080: C6 - C9 Fraction		325 µg/L	98.4	70.0	130
EP080/071: Total F	ecoverable Hydrocarbons - NEP	M 2013 Fractions (QCLot: 2681218)					
ES1936026-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 μg/L	97.8	70.0	130
EP080: BTEXN (Q	CLot: 2681218)						
ES1936026-002	Anonymous	EP080: Benzene	71-43-2	25 µg/L	92.7	70.0	130
	-	EP080: Toluene	108-88-3	25 µg/L	91.7	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	92.1	70.0	130
		EP080: meta- & para-Xvlene	108-38-3	25 µg/L	92.0	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	94.7	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	96.2	70.0	130

Page	: 33 of 33
Work Order	ES1936029 Amendment 1
Client	: GHD PTY LTD
Project	: 12517046



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CLIENT	GHD Ply Ltd		TURNAROUN		and TAT fills	st due date)	r.				FO	TEABORATORY US	E ONLY (Circl)			
OFFICE:	level 15, 133 Castlercagh St, Sydney		(Standard TAT r some tests e.g.	nay be longer for <u>Ultra Frace Organics)</u> Non S	Standard or u	irgent TAT (I	List due dete)	:			0.5	ody Sen Intact?				No. (ŵ
PROJECT	r; 12517046		ALS QUOTE	NÖ.: SY-522-1	19			COC SEC	ARENCE NUN	IBER (Circle)		CLEARDZON ICO DIICKE	Nesent (jpon rece	pt?		, No	1/2
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COC ema	iled to ALS? (YES / NO)	EDD FORMA	T (or default):	S. Ecclesi	hall	_	لحاصد	ep-Als	Liou	10ezo					201	Ars	
Email Re;	ports to: sarah.eccleshall@ghd.com; carmen	.yi@ghd.com; labreprots@g	hd.com	DATE/TIM	E: 74 A 4	~/1a	5 19 ^^	телтіме: . Г., Г. <i>Сл</i>	1.51		DATE/TIM	E:		DATE/TIM	iE:	(1)	
Email Inv	olce to (with default to PM if no other addresse	s are listed):		2710	a 17(v	911	0/	11/19	101	ر		······		<u>0</u> ([[[[]]	19 190	<u>«</u>
COMMEN	TS/SPECIAL HANDLING/STORAGE OR DIS	iPOSAL: Please inform G	HD contacts of	any possible holding time iss	sues that ar	re pecievec	i with these s	samples									
118E	BAMPLE MATRIX, SOLID	DETALS (3) WATER (W) ⁺		CONTAINER INFORM	ATION - A			ANA Where Me t	LYSIS REQL als are requin	liREO including ad, specify Tota	BUITES (NB (unfitered bo	Suite Codes must be interesting the state of the second se	sted to attract suit /ed (field filterad b	e price) ottle required	I }.		-
LABID	SAMPLE D	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	ASS Field Screen EA037)	Phenols EP075A)	IRH/BTEXN (EP080- SD)	FRH Ultra trace in sediments (EP071-SD)		TCN FEK0265F)	SciOPPCB/PAH (10-02) (SD03) Maticle Size Astribution (EA150H) Cata Short Suite	S .	BT (EP090)	Diaxins/Fumas EPs00)	loid
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5	VC12_1.0-1.1	31/10/2019 20:30	S	ASS	1	×			1	Mar	k Ry I	O / Interr	al Sheet				-
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10	VC13_0.0-0.1	31/10/2019 21:45	S	ASS	1	×											
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Water Container Codes: P = Unpreserved Plastic: N = Nitic Preserved Plastic: ORC = Nitic Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved Plastic; N = Nitic Preserved Plastic; ORC = Nitic Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved; S = Sodium; S = Sodium Hydroxide Preserv

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SAMPLE	R: Sarah Eccleshall	SAMPLER	AOBILE: 0459 5	46 332	RELINQUIS	HED BY:			RECEIVED BY	:		RELING	UISHED BY:			RECEIV	ED BY	Are	
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LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESE	RVATIVE below)	TOTAL CONTAINERS	ASS Field Screen (EA637)	Phanols (EP075A)	1000 1000 1000 1000 1000 1000 1000 100	IRH Ultra trace in sediments {EP0713	гос ЕР0(3)	ICN EK0265F)	OCIOPIPCB/PAH SD-02)	CMPS Matals (15 netals + Iow lave! kg)(SD03)	Particle Size listribution (EA150			lloxins/Furnas EP300)	
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z = zona na marina zu z zona val souran olsupriale Meserved; VS = VOA via Sunuhic Preserved; AV = Ainreight Unpreserved Viat SG = Su Z = Zinc Acetate Preserved Bottle; E = EDIA Preserved Bottles; ST = Stanle Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Env		CHAIN OF CUSTODY ALS Laboratory: please tick →	ДАСБЕЛИВ 95 (8836) СВВ8540 95 (97324) ⊕1640510 ₽5 (97324)	: 27 Burna Road Po 18250 El radiolalde@o 192 Shand Sireet S 7222 El samples.bri St& Afr Callemon dah S600 El glessionefi	koraka S/A 5095 Negloběl com Kofford OLO 2052 Isběnego Isyloběl com n Orive Ušních OLO 4080 Rokejskihat com	Ph 07 Ph 07 Ph 02 Ph 02 Ph 02	4844 01771 (4844 01771 (4800RNE 2- 3 8540 5600 E 2011 27 Syds 6372 8735 E	wi Nood Macki Markay(Esleji) Mesiali Road 1 Sahipisa metu Ny Road Mudgi Wudgee,maikiji	ay QuU 4740 obal.com Sprinsvale VIC cume(galagio en NSW 2850 Iakgiobal.com	LINE WC 12h; 02.4) C 317.1 DNG bAlcom 42h C	ASB SRoso 689433 Et san WRA 4/13 Gear 244232063 Et WELK1041014 Par 03 9209760	Sum Road Watob phalaeticastic@v y Hace North Nor ownafgang boar d Way Manga - W 5 El samplas.psd	rock NSW 2204 dogbballsom wa NSW 7541 om A 6090 n@alsgloballson	e	ມຮາ Ph: I Ph: I Ph: I Ph: I ມາຍ: ເ	ONEY 277 12 8764 85: 19/N \$VILL 197 4796 96 07 4796 96 04 ONG 04 42 4225 313	-289 Weodj 551 - sampi 514-15 Des 59 Et lonnas NG 94 Keon 25 Et partke	iark Road Sr As sydney@a nta Court Bo vilie.envl.acon iy Street Vice ຫຍ້າວຜູ້ຈາກຜູ້ເກ	nrhfeld N8 Alsglobal.co Alle QLD 16 Antal@alsgli Pongong N5 X03l.com	W 21(4)m 318 Iohal com \$W 2500	
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Email Rep	orts to: sarah.eccleshalk	2ghd.com; carmen.yi	@ghd.com; labreprots@g	phd.com		DATE/TIME:	:			ATE/TIME:			DATE/TIN	MË:			DA	ТЕЛТІМЕ	11		
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		SAMPLE DE Matrix: Solid (S	TAILS WATER (W)		CONTAINE	RINFORMAT	rion	·		AN Where Me	IALYSIS REG Italis are requi	UIRED Includi red, specify To	ng SUITES (N bai (unfiltered l	IB. Suite Code: bottle required)	s must be listed) or Dissolved (lo attract field filter	suite pric ed bottle r	equined).			
LABID	SAMPLE	di :	DATE / TIME	MATRIX	TYPE & PRESE (refer to code)	RVATIVE s below)	TOTAL CONTAINERS	LSS Fleid Screen	honols EP07SA)	RH/BTEXN (EP080-	RH Ultra trace In ediments (EP071-SD)	0C EP003)	CN	IC/OP/PCB/PAH SD-02)	2MPS Motals (15 Datals + faw levai 19)SC03	article Size (stribution (EA150H)	-7/4 Short Suite		BT (EP090)	toxins/r-urnas	
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32	VC08_0.3-0 4		31/10/2019 20:45	3	jar		1														x
33	VC08_0.5	0.6	31/10/2019 20:45	9	jar		1														
34	VC08_0.7-	-0.0	31/10/2019 20:45	5	jar 1		1														
35	VC08_1.0-	1.1	31/10/2019 20:45	5	jar		1													i	
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V = VOA Vial HCI Preserved; VB = VOA Vial Solium Bisulphale Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved VIal SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic: HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic: F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphale Solis; B = Unpreserved Bag.

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Email Re	oorts to: sarah.eccieshall@ghd.co	m; carmen.yl@ghd.com; labreprots@	ghd.com		IE:		D	ATE/TIME:			DATEM	ME:			DATE/T	ME:	l a	10
Email thy	oice to (will default to PM if no oth	er addresses are listed):	. _							_						(u)	<u> </u>	L.
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37	VC08_1.5-1.6	31/10/2019 20:45	5	Jar	1]			
38	VC08_0.0-0.5	31/10/2019 20:45	5	Jar	3													
39	VC08_0.5-1.0	31/10/2019 20:45	\$	Jar and bag	4							_						
40	VC08_1.0-1.5	31/10/2019 20:45	5	Jar and bag	4		x	×	×	¥	r	x	x	×		×	×	
41	VC13_0.0-0.1	31/10/2019 21:45	ŝ	Jər	1					×				r				
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43	VC13_0.5-0.6	31/10/2019 21:45	8	Jar	1													,
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48	VC14_0.0-0.1	31/10/2019 22:15	s	Jar	1													ļ	x
49	VC14_0.3-0.4	31/10/2019 22:15	5	Jar	1										:				x
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52	VC14_1.0-1.1	31/10/2019 22:15	s	Jar		4				×					x				
53	VC14_1.3-1.4	31/10/2019 22:15	S	Jar		1												1	x
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55	VC14_0.5-1.0	31/10/2019 22:15	s	jar		3		" [_											x
56	SW01	31/10/2019	w	P		1													x
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Would you please let the lab know to hold off the TBT and Dioxins testing for these 3 samples? We're awaiting some approvals which haven't landed yet.

Apologies for any inconvenience caused.

Regards, Carmen

From: Sarah Eccleshall <<u>Sarah.Eccleshall@ghd.com</u>> Sent: Saturday, 2 November 2019 6:13 PM To: Brenda Hong (InTouch) <<u>brenda.hong@alsglobal.com</u>> Cc: Carmen Yi <<u>Carmen.Yi@ghd.com</u>> Subject: Additional analysis requerst for: ES1936029:

Hi Brenda,

We'd like to request additional analysis on three sediment samples under work order ES1936029

Samples	Analyses	
VC01_0.5-1.0	TBT, Dioxins	
VC04_0.5-1.0	TBT, Dioxins	
VC07_0.0-0.5	TBT, Dioxins	

Many Thanks,

Sarah Eccleshall PhD MSc BSc Hons Graduate Environmental Scientist Contamination & Environmental Management

GHD Proudly employee owned T: +61 2 9239 7715 | M: +61 459 546 332 | E: <u>sarah.eccleshall@ghd.com</u> Level 15 133 Castlereagh Street Sydney NSW 2000 Australia | <u>www.qhd.com</u>





Environmental Division

Telephone : - 61-2-6784 8555

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

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21.11.19 -707

Kim Phan

From:Loren SchiavonSent:Thursday, 7 November 2019 10:26 AMTo:Kim PhanSubject:FW: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:Attachments:image001.png; image002.png; image003.png; image004.png

Hi Kim,

Can I get you to assist with this one?

We need to add in the testing requested below to two active work orders. Please leave the current due dates and email CS to send a prelim - we then need to create the separate batches for the dioxins. Vanessa has confirmed 10 days from receipt for the TBT.

Thanks.

Kind Regards Loren Schiavon Sample Administration Coordinator, Environmental

 T +61 2 8784 8555
 WO No: E

 F +61 2 8784 8500
 Artach By I

 Loren.schiavon@alsglobal.com
 277-289 Woodpark Road

 277-289 Woodpark Road
 Smithfield NSW 2164

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-----Original Message-----From: Grace White Sent: Thursday, 7 November 2019 8:52 AM To: Loren Schiavon <loren.schiavon@alsglobal.com> Subject: FW: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:

Hey Loren,

Can you please organise making the below amendments?

Thank you!

Grace White Client Services Officer, Environmental Sydney

T +61 2 8784 8555 D +61 2 8784 8531 F +61 2 8784 8500 grace.white@alsglobal.com 277-289 Woodpark Road Smithfield, NSW, 2164

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-----Original Message-----From: Carmen Yi [mailto:Carmen.Yi@ghd.com] Sent: Wednesday, 6 November 2019 11:07 PM To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com> Cc: Sarah.Eccleshall@ghd.com; Brenda Hong <Brenda.Hong@alsglobal.com> Subject: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi ALS team,

We have now received approval to go ahead with the TBT, dioxin and SVOC tests for ES1936183 and ES1936029. Would you please test the following samples on standard turnaround time please?

ES1936183

VC08_1.0-1.5 (4 c) VC12_0.0-0.5 (2)

ES1936029

VC01_0.5-1.0

VC04_0.5-1.0

VC07_0.0-0.5

Kind regards

Carmen Yi

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4



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	ES1936183			
Client Contact Address	: GHD PTY LTD : MS CARMEN YI : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Laboratory Contact Address	: Environme : Customer : 277-289 W NSW Aust	ental Division Sydney Services ES /oodpark Road Smithfield ralia 2164
E-mail Telephone Facsimile	: carmen.yi@ghd.com : +61 0451 962 988 :	E-mail Telephone Facsimile	: ALSEnviro : +61-2-878 : +61-2-878	.Sydney@ALSGlobal.com 4 8555 4 8500
Project Order number C-O-C number Site Sampler	: 12517046 : : : : SARAH ECCLESHALL	Page Quote number QC Level	: 1 of 5 : ES2019GF : NEPM 201	HDSER0030 (SY/522/19) I3 B3 & ALS QC Standard
Dates Date Samples Rece Client Requested D Date	eived : 01-Nov-2019 15:15 Due : 11-Nov-2019	Issue Date Scheduled Report	ing Date	: 07-Nov-2019 : 11-Nov-2019
Delivery Deta Mode of Delivery No. of coolers/boxe Receipt Detail	ails : Client Drop Off s : 6 :	Security Seal Temperature No. of samples re	ceived / analysed	: Not Available : 3.3'C - Ice present : 66 / 27

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Sample SW01 was not received by ALS Sydney.
- Sample VC06_0.5-1.0 was received as VC06_0.5-0.9.
- 07/11/19: This is an updated SRA which indicates TBT and SVOC for the samples VC12_0.0-0.5 (#29), VC08_1.0-1.5 (#40).
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).
- PSD and Total Fluoride analysis will be conducted by ALS Newcastle.
- TOC analysis to be conducted by ALS Brisbane.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Samples FD06, FD08 and FD10 have been forwarded to Eurofins as per COC request.
- Preliminary results will be available on the scheduled reporting date listed in this report. However the final report with TBT analysis will be complete on 21/11/19.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical
 analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this
 temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS
 recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Segmented Flow Analyser

(Solids)

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rbon (TOC) in Soil M Phenols only hort Suite 'aste Classification (SCC) -

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Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: SOIL) SOIL sis requ	A037 d Scree	A055-10 Conten	(026SF inide By	2003 anic Ca	P075 SI	7/4 - S CCW M
Laboratory sample	Client sampling	Client sample ID	On Hold	OIL - E/	OIL - E/	OIL - EV	OIL - EF	OIL - EF	ISW DE
ES1936183-001	31-Oct-2019 20:00	VC06_0.0-0.1	<u> </u>	√	02			0 0	
ES1936183-002	31-Oct-2019 20:00	VC06_0.5-0.6		✓					
ES1936183-003	31-Oct-2019 20:30	VC12_0.0-0.1		✓					
ES1936183-004	31-Oct-2019 20:30	VC12_0.5-0.6		✓					
ES1936183-005	31-Oct-2019 20:30	VC12_1.0-1.1		✓					
ES1936183-006	31-Oct-2019 20:45	VC08_0.0-0.1		✓					
ES1936183-007	31-Oct-2019 20:45	VC08_0.5-0.6		✓					
ES1936183-008	31-Oct-2019 20:45	VC08_1.0-1.1		✓					
ES1936183-009	31-Oct-2019 20:45	VC08_1.5-1.6		✓					
ES1936183-010	31-Oct-2019 21:45	VC13_0.0-0.1		✓					
ES1936183-011	30-Oct-2019 21:45	VC13_0.5-0.6		✓					
ES1936183-012	30-Oct-2019 21:45	VC13_1.0-1.1		✓					
ES1936183-013	31-Oct-2019 22:15	VC14_0.0-0.1		✓					
ES1936183-014	31-Oct-2019 22:15	VC14_0.5-0.6		✓					
ES1936183-015	31-Oct-2019 22:15	VC14_1.0-1.1		✓					
ES1936183-016	31-Oct-2019 22:15	VC14_1.3-1.4		✓					
ES1936183-017	31-Oct-2019 20:00	VC06_0.0-0.1			✓		✓		✓
ES1936183-018	31-Oct-2019 20:00	VC06_0.3-0.4	 ✓ 						
ES1936183-019	31-Oct-2019 20:00	VC06_0.5-0.6	 ✓ 						
ES1936183-020	31-Oct-2019 20:00	VC06_0.7-0.8	 ✓ 						
ES1936183-021	31-Oct-2019 20:00	VC06_0.8-0.9	✓						
ES1936183-022	31-Oct-2019 20:00	VC06_0.0-0.5	✓						
ES1936183-023	31-Oct-2019 20:00	VC06_0.5-0.9	✓						
ES1936183-024	31-Oct-2019 20:30	VC12_0.0-0.1	✓						
ES1936183-025	31-Oct-2019 20:30	VC12_0.3-0.4	1						
ES1936183-026	31-Oct-2019 20:30	VC12_0.5-0.6	✓						
ES1936183-027	31-Oct-2019 20:30	VC12_0.8-0.9	✓						
ES1936183-028	31-Oct-2019 20:30	VC12_1.0-1.1			✓		✓		✓
ES1936183-029	31-Oct-2019 20:30	VC12_0.0-0.5			✓	1	✓	1	
ES1936183-030	31-Oct-2019 20:30	VC12_0.5-1.0	✓						
ES1936183-031	31-Oct-2019 20:45	VC0S_0.0-0.1			1		✓		✓
ES1936183-032	31-Oct-2019 20:45	VC08_0.3-0.4	✓						
ES1936183-033	31-Oct-2019 20:45	VC0B_0.5-0.6	✓						
ES1936183-034	31-Oct-2019 20:45	VC0B_0.7-0.8	✓						
ES1936183-035	31-Oct-2019 20:45	VC08_1.0-1.1	✓						
Issue Date	: 07-Nov-2019								
------------	-----------------------								
Page	: 3 of 5								
Work Order	ES1936183 Amendment 0								
Client	: GHD PTY LTD								



			OIL requested	37 creening Analysis	55-103 intent	26SF (Solids) Je By Segmented Flow Analyser	03 ic Carbon (TOC) in Soil	75 SIM Phenols only Jls only	4 - Short Suite :W Waste Classification (SCC) -
			in Hold) S analysis	JIL - EA05 S Field S	JIL - EA0€ bisture Co	JIL - EK02 tal Cyanid	JIL - EPOC tal Organi	DIL - EPO7 M - Pheno	JIL - P- 7/
E01026192 026	21 Oct 2010 20:45	VC09 1 2 1 4	<u>Q ž</u>	AS SC	ŭ ₹	S ₽	S ₽	<u>യ യ</u>	δž
ES1930183-030	31 Oct 2019 20:45	VC08_1.5-1.4	•						
ES1036183-037	31 Oct 2019 20:45	VC08_0.0.0.5	• •						
ES1930183-038	31 Oct 2019 20:45	VC08_0.5_1.0	•						
ES1936183-040	31-Oct-2019 20:45	VC08_1.0-1.5	•		1	4	1	1	
ES1936183-041	31-Oct_2010 21:45	VC13_0.0-0.1			, ,	-	, ,	•	1
ES1936183-042	31-Oct-2019 21:45	VC13_0.3-0.4	1		*		-		
ES1936183-043	31-Oct_2010 21:45	VC13_0.5-0.6	•						
ES1936183-044	31-Oct-2019 21:45	VC13_0.7-0.8	· ·						
ES1936183-045	31-Oct-2019 21:45	VC13_1.0-1.1	· •						
ES1936183-046	31-Oct-2019 21:45	VC13_0.0-0.5	· •						
ES1936183-047	31-Oct-2019 21:45	VC13_0.5-1.0	· •						
ES1936183-048	31-Oct-2019 22:15	VC14_0.0.0.1	· •						
ES1936183-049	31-Oct-2019 22:15	VC14_0304	1						
ES1936183-050	31-Oct-2019 22:15	VC14-0.5-0.6	· •						
ES1936183-051	31-Oct-2019 22:15	VC14_0708	· •						
ES1936183-052	31-Oct-2019 22:15	VC14_1_0-1_1			1		1		1
ES1936183-053	31-Oct-2019 22:15	VC14_1 3-1 4	1						
ES1936183-054	31-Oct-2019 22:15	VC14_0.0-0.5	· •						
ES1936183-055	31-Oct-2019 22:15	VC14_0.5-1.0	1						
ES1936183-060	30-Oct-2019 00:00	FD07	1						
ES1936183-061	31-Oct-2019 00:00	FD09	1						
ES1936183-066	31-Oct-2019 00:00	VC12 0.9-1.0	1						
ES1936183-067	31-Oct-2019 00:00	VC14 1.0-1.4	1						
			0H Analysis by Hydrometer: AS1289	1 - SD ce in sediments	5 (solids) Drganic Compounds	D-SD AN in Sediments) (solids)	PAH ultra trace	MS (15 metals + low level Hg)
Laboratory sample	Client sampling	Client sample ID	OIL - EA15(article Size	OIL - EP07 [.] RH ultra tra	OIL - EP07{ smivolatile (OIL - EP08(3H(V)/BTE)	OIL - EP09('ganotins	OIL - SD-02 C/OP/PCB/	OIL - SD-0č etals by ICF
ID	<u>date / time</u>	VC12 0 0-0 5	<u>м</u> М	ы К	<u>ഗ്ഗ്</u>	ĭŏ ⊭ ∡	<u>ග්ර්</u>	<u>ა ე</u>	<u>ة م</u>
ES1936183-040	31-Oct-2019 20:45	VC08 1.0-1 5	•	•	, ,	•	· •	• •	· ·
	0. 000 20.40		<u> </u>	<u> </u>	· ·	<u> </u>	<u> </u>		



Matrix: SOIL Laboratory sample ID ES1936183-063 ES1936183-064 ES1936183-065	Client sampling date / time 31-Oct-2019 00:00 31-Oct-2019 00:00 31-Oct-2019 00:00	Client sample ID TS2 TB2 Trip Spike control	 Soil - EP080 BTEXN 	SOIL - S-18 (NO MOIST) TRH(C6-C9)/BTEXN with No Moisture for TBs
Matrix: WATER Laboratory sample	Client sampling date / time	Client sample ID	(On Hold) WATER No analysis requested	WATER - W-26T TRH/BTEXN/PAH/Total 8 Metals
ES1936183-057	31-Oct-2019 00:00	SW02	1	
ES1936183-058	31-Oct-2019 00:00	SW03	1	
ES1936183-059	31-Oct-2019 00:00	SWB	✓	
ES1936183-062	31-Oct-2019 00:00	RIN_02		1

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE (Hobart)



- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
CARMEN YI		
 *AU Certificate of Analysis - NATA (COA) 	Email	carmen.yi@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	carmen.yi@ghd.com
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	carmen.yi@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	carmen.yi@ghd.com
- Attachment - Report (SUBCO)	Email	carmen.yi@ghd.com
- Chain of Custody (CoC) (COC)	Email	carmen.yi@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	carmen.yi@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	carmen.yi@ghd.com
 Electronic SRN for ESdat (ESRN_ESDAT) 	Email	carmen.yi@ghd.com
GHD LAB REPORTS		
 *AU Certificate of Analysis - NATA (COA) 	Email	ghdlabreports@ghd.com
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	ghdlabreports@ghd.com
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	ghdlabreports@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ghdlabreports@ghd.com
- Attachment - Report (SUBCO)	Email	ghdlabreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	ghdlabreports@ghd.com
 Electronic SRN for ESdat (ESRN_ESDAT) 	Email	ghdlabreports@ghd.com
SARAH ECCLESHALL		
 *AU Certificate of Analysis - NATA (COA) 	Email	sarah.eccleshall@ghd.com
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	sarah.eccleshall@ghd.com
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	sarah.eccleshall@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sarah.eccleshall@ghd.com
- Attachment - Report (SUBCO)	Email	sarah.eccleshall@ghd.com
- Chain of Custody (CoC) (COC)	Email	sarah.eccleshall@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	sarah.eccleshall@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	sarah.eccleshall@ghd.com



CERTIFICATE OF ANALYSIS

Work Order	ES1936183	Page	: 1 of 37
Client	: GHD PTY LTD	Laboratory	Environmental Division Sydney
Contact	: MS CARMEN YI	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW. AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 0451 962 988	Telephone	: +61-2-8784 8555
Project	: 12517046	Date Samples Received	: 01-Nov-2019 15:15
Order number	:	Date Analysis Commenced	: 05-Nov-2019
C-O-C number	:	Issue Date	: 20-Nov-2019 19:48
Sampler	: SARAH ECCLESHALL		HALA NALA
Site	:		
Quote number	: SY/522/19		Accreditation No. 925
No. of samples received	: 66		Accredited for compliance with
No. of samples analysed	: 27		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Minh Wills	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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Work Order	: ES1936183
Client	: GHD PTY LTD
Project	12517046



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

- Key :
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

 LOR = Limit of reporting
 - ^ = This result is computed from individual analyte detections at or above the level of reporting
 - ø = ALS is not NATA accredited for these tests.
 - ~ = Indicates an estimated value.
- EA150H: Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1 2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently NATA endorsement does not apply to hydrometer results.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EG048G:Poor spike recovery for Alkyl Hexavalent Chromium due to matrix interferences.
- EP131B : Positive PCB result is confirmed by re-extraction and re-analysis.
- EP080-SD: Poor matrix spike recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- EP071: Particular samples required dilution due to the presence of high level contaminants. LOR values have been adjusted accordingly.
- EP080: The trip spike and its control have been analysed for volatile TPH and BTEX only. The trip spike and control were prepared in the lab using reagent grade sand spiked with petrol. The spike was dispatched from the lab and the control retained.
- EP090 Organotin: Particular sample shows poor matrix spike recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 Slight; 2 Moderate; 3 Strong; 4 Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.
- EP075: 'Sum of PAH' is the sum of the USEPA 16 priority PAHs
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

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Work Order	ES1936183
Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC06_0.0-0.1	VC06_0.5-0.6	VC12_0.0-0.1	VC12_0.5-0.6	VC12_1.0-1.1
Client sampling date / time				31-Oct-2019 20:00	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:30
Compound	CAS Number	LOR	Unit	ES1936183-001	ES1936183-002	ES1936183-003	ES1936183-004	ES1936183-005
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	8.7	8.1	8.7	8.2	7.3
øpH (Fox)		0.1	pH Unit	5.2	5.7	6.1	5.9	5.6
Ø Reaction Rate		1	-	3	3	3	3	3

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Work Order	ES1936183
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC08_0.0-0.1	VC08_0.5-0.6	VC08_1.0-1.1	VC08_1.5-1.6	VC13_0.0-0.1
Client sampling date / time				31-Oct-2019 20:45	31-Oct-2019 20:45	31-Oct-2019 20:45	31-Oct-2019 20:45	31-Oct-2019 21:45
Compound	CAS Number	LOR	Unit	ES1936183-006	ES1936183-007	ES1936183-008	ES1936183-009	ES1936183-010
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	8.2	8.5	7.9	8.1	8.3
øpH (Fox)		0.1	pH Unit	6.3	6.4	5.9	6.3	6.4
Ø Reaction Rate		1	-	3	3	3	3	3

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Work Order	ES1936183
Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC13_0.5-0.6	VC13_1.0-1.1	VC14_0.0-0.1	VC14_0.5-0.6	VC14_1.0-1.1
	CI	lient sampli	ng date / time	30-Oct-2019 21:45	30-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 22:15	31-Oct-2019 22:15
Compound	CAS Number	LOR	Unit	ES1936183-011	ES1936183-012	ES1936183-013	ES1936183-014	ES1936183-015
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	8.2	7.8	8.4	8.6	8.6
øpH (Fox)		0.1	pH Unit	6.2	6.3	6.4	6.5	6.5
Ø Reaction Rate		1	-	3	3	3	3	3

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Work Order	: ES1936183
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1
	Cl	ient samplii	ng date / time	31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	8.1				
ø pH (Fox)		0.1	pH Unit	6.3				
ø Reaction Rate		1	-	3				
EA055: Moisture Content (Dried @ 105-11	0°C)							
Moisture Content		1.0	%		48.2	19.9	24.2	31.1
EA150: Particle Sizing								
+75μm		1	%				81	
+150μm		1	%				75	
+300μm		1	%				52	
+425µm		1	%				29	
+600µm		1	%				10	
+1180μm		1	%				1	
+2.36mm		1	%				<1	
+4.75mm		1	%				<1	
+9.5mm		1	%				<1	
+19.0mm		1	%				<1	
+37.5mm		1	%				<1	
+75.0mm		1	%				<1	
EA150: Soil Classification based on Partic	le Size							
Clay (<2 µm)		1	%				15	
Silt (2-60 µm)		1	%				4	
Sand (0.06-2.00 mm)		1	%				81	
Gravel (>2mm)		1	%				<1	
Cobbles (>6cm)		1	%				<1	
EG005(ED093)-SD: Total Metals in Sedime	ents by ICP-AES	3						
Aluminium	7429-90-5	50	mg/kg				4790	
Iron	7439-89-6	50	mg/kg				4290	
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg		18	<5		14
Beryllium	7440-41-7	1	mg/kg		<1	<1		<1
Cadmium	7440-43-9	1	mg/kg		<1	<1		<1
Lead	7439-92-1	5	mg/kg		224	42		117
Molybdenum	7439-98-7	2	mg/kg		<2	<2		<2
Nickel	7440-02-0	2	mg/kg		10	4		6

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1
	Cli	ent samplii	ng date / time	31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound CAS	Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EG005(ED093)T: Total Metals by ICP-AES - Contin	nued							
Selenium 7	782-49-2	5	mg/kg		<5	<5		<5
Silver 74	440-22-4	2	mg/kg		<2	<2		<2
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony 74	440-36-0	0.50	mg/kg				<0.50	
Arsenic 74	440-38-2	1.00	mg/kg				2.20	
Cadmium 74	440-43-9	0.1	mg/kg				<0.1	
Chromium 74	440-47-3	1.0	mg/kg				6.0	
Copper 74	440-50-8	1.0	mg/kg				4.5	
Cobalt 74	440-48-4	0.5	mg/kg				<0.5	
Lead 74	439-92-1	1.0	mg/kg				10.6	
Manganese 74	439-96-5	10	mg/kg				<10	
Nickel 74	440-02-0	1.0	mg/kg				<1.0	
Selenium 7	782-49-2	0.1	mg/kg				<0.1	
Silver 74	440-22-4	0.1	mg/kg				0.2	
Vanadium 74	440-62-2	2.0	mg/kg				13.5	
Zinc 74	440-66-6	1.0	mg/kg				14.4	
EG035T: Total Recoverable Mercury by FIMS								
Mercury 74	439-97-6	0.01	mg/kg				0.12	
Mercury 74	439-97-6	0.1	mg/kg		3.4	<0.1		1.8
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium 18	540-29-9	0.5	mg/kg		<0.5	<0.5		<0.5
EK026SF: Total CN by Segmented Flow Analyse	ər							
Total Cyanide	57-12-5	1	mg/kg		<1	<1	<1	<1
EK028SF: Weak Acid Dissociable CN by Segme	nted Flov	w Analyse	ər					
Weak Acid Dissociable Cyanide		1	mg/kg		<1	<1		<1
EK040T: Fluoride Total								
Fluoride 16	984-48-8	40	mg/kg		90	80		120
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon		0.02	%		2.05	0.13	0.34	1.20
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls		0.1	mg/kg		<0.1	<0.1		<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05		<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05		<0.05

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1
	Client sampling date / time			31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides	s (OC) - Continued							
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05		<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05		<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05		<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05		<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05		<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05		<0.05
^ Total Chlordane (sum)		0.05	mg/kg		<0.05	<0.05		<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05		<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05		<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05		<0.05
Dieldrin	60-57-1	0.05	mg/kg		<0.05	<0.05		<0.05
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05		<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05		<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05		<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05		<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05		<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05		<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2		<0.2
EP068B: Organophosphorus Pestic	cides (OP)							
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05		<0.05
EP071 SG: Total Recoverable Hydro	ocarbons - NEPM 201	3 Fractior	is - Silica gel o	cleanup				
>C10 - C16 Fraction		50	mg/kg		<50	<50		<50
>C16 - C34 Fraction		100	mg/kg		610	<100		190
>C34 - C40 Fraction		100	mg/kg		190	<100		<100
^ >C10 - C40 Fraction (sum)		50	mg/kg		800	<50		190
EP071 SG-S: Total Petroleum Hydro	ocarbons in Soil - Silio	ca gel clea	anup					
C10 - C14 Fraction		50	mg/kg		<50	<50		<50
C15 - C28 Fraction		100	mg/kg		350	<100		110
C29 - C36 Fraction		100	mg/kg		370	<100		110
^ C10 - C36 Fraction (sum)		50	mg/kg		720	<50		220
EP074A: Monocyclic Aromatic Hyd	rocarbons							
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2		<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5		<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5		<0.5

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1
	Cli	ient sampli	ng date / time	31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EP074A: Monocyclic Aromatic Hydro	ocarbons - Continued							
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5		<0.5
Styrene	100-42-5	0.5	mg/kg		<0.5	<0.5		<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5		<0.5
EP074B: Oxygenated Compounds								
2-Butanone (MEK)	78-93-3	5	mg/kg		<5	<5		<5
EP074E: Halogenated Aliphatic Com	pounds							
Vinyl chloride	75-01-4	4	mg/kg		<4	<4		<4
1.1-Dichloroethene	75-35-4	0.5	mg/kg		<0.5	<0.5		<0.5
Methylene chloride	75-09-2	0.5	mg/kg		<0.5	<0.5		<0.5
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg		<0.5	<0.5		<0.5
Carbon Tetrachloride	56-23-5	0.5	mg/kg		<0.5	<0.5		<0.5
1.2-Dichloroethane	107-06-2	0.5	mg/kg		<0.5	<0.5		<0.5
Trichloroethene	79-01-6	0.5	mg/kg		<0.5	<0.5		<0.5
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg		<0.5	<0.5		<0.5
Tetrachloroethene	127-18-4	0.5	mg/kg		<0.5	<0.5		<0.5
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg		<0.5	<0.5		<0.5
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg		<0.5	<0.5		<0.5
EP074F: Halogenated Aromatic Com	npounds							
Chlorobenzene	108-90-7	0.5	mg/kg		<0.5	<0.5		<0.5
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg		<0.5	<0.5		<0.5
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg				<0.5	
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg				<0.5	
2.4-Dimethylphenol	105-67-9	0.5	mg/kg				<0.5	
2.4-Dichlorophenol	120-83-2	0.5	mg/kg				<0.5	
2.6-Dichlorophenol	87-65-0	0.5	mg/kg				<0.5	
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1
	Client sampling date / time			31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic	Hydrocarbons							
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5		<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5		<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5		<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5		<0.5
Phenanthrene	85-01-8	0.5	mg/kg		0.7	<0.5		<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5		<0.5
Fluoranthene	206-44-0	0.5	mg/kg		2.3	<0.5		1.3
Pyrene	129-00-0	0.5	mg/kg		2.6	<0.5		1.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		1.0	<0.5		0.6
Chrysene	218-01-9	0.5	mg/kg		1.0	<0.5		0.6
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		1.8	<0.5		1.0
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		0.8	<0.5		<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		1.8	<0.5		0.9
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		0.9	<0.5		<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5		<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		1.1	<0.5		<0.5
^ Sum of polycyclic aromatic hydrocarb	ons	0.5	mg/kg		14.0	<0.5		5.9
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg		2.3	<0.5		1.1
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg		2.5	0.6		1.4
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg		2.8	1.2		1.7
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg				<0.5	
2-Chlorophenol	95-57-8	0.5	mg/kg				<0.5	
2-Methylphenol	95-48-7	0.5	mg/kg				<0.5	
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg				<0.5	
2-Nitrophenol	88-75-5	0.5	mg/kg				<0.5	
2.4-Dimethylphenol	105-67-9	0.5	mg/kg				<0.5	
2.4-Dichlorophenol	120-83-2	0.5	mg/kg				<0.5	
2.6-Dichlorophenol	87-65-0	0.5	mg/kg				<0.5	
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg				<0.5	
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg				<0.5	
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg				<0.5	
Pentachlorophenol	87-86-5	1	mg/kg				<1	
EP075B: Polynuclear Aromatic Hyd	rocarbons							

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1
	Cli	ient samplii	ng date / time	31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EP075B: Polynuclear Aromatic Hydro	ocarbons - Cont <u>inued</u>							
Naphthalene	91-20-3	0.5	mg/kg				<0.5	
2-Methylnaphthalene	91-57-6	0.5	mg/kg				<0.5	
2-Chloronaphthalene	91-58-7	0.5	mg/kg				<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg				<0.5	
Acenaphthene	83-32-9	0.5	mg/kg				<0.5	
Fluorene	86-73-7	0.5	mg/kg				<0.5	
Phenanthrene	85-01-8	0.5	mg/kg				<0.5	
Anthracene	120-12-7	0.5	mg/kg				<0.5	
Fluoranthene	206-44-0	0.5	mg/kg				<0.5	
Pyrene	129-00-0	0.5	mg/kg				<0.5	
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg				<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg				<0.5	
Chrysene	218-01-9	0.5	mg/kg				<0.5	
Benzo(b+j) &	205-99-2 207-08-9	1	mg/kg				<1	
Benzo(k)fluoranthene								
7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg				<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg				<0.5	
3-Methylcholanthrene	56-49-5	0.5	mg/kg				<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg				<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg				<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg				<0.5	
^ Sum of PAHs		0.5	mg/kg				<0.5	
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg				<0.5	
[^] Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg				0.6	
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg				1.2	
EP075C: Phthalate Esters								
Dimethyl phthalate	131-11-3	0.5	mg/kg				<0.5	
Diethyl phthalate	84-66-2	0.5	mg/kg				<0.5	
Di-n-butyl phthalate	84-74-2	0.5	mg/kg				<0.5	
Butyl benzyl phthalate	85-68-7	0.5	mg/kg				<0.5	
bis(2-ethylhexyl) phthalate	117-81-7	5.0	mg/kg				<5.0	
Di-n-octylphthalate	117-84-0	0.5	mg/kg				<0.5	
EP075D: Nitrosamines								
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg				<0.5	
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg				<0.5	

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Clear subject dire form 31-0c-2019 2:03 31-0c-2019 2:03 31-0c-2019 2:03 31-0c-2019 2:03 Compound CLBR UPR ES193519-16 ES193519-16 ES193519-201	Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1
ConcordCAS NumberVariatEstassatesEst		Cli	ient sampli	ng date / time	31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
PRVSD: PResult Result Result Result Result Result Natiossopyrolations 0005552 0.0 mg/sq	Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
EPV560: Nitrosaminos-Ocnativad Second S					Result	Result	Result	Result	Result
NHirosopyrolidine 99.05.5 10. mg/sg	EP075D: Nitrosamines - Continued								
Niriscence/phalme 59.89.2 0.5 mg/kg 40.5 Nirisceptions/serolyamine 61.64.7 0.5 mg/kg 40.5 Nirisceptions/serolyamine 62.41.63 0.5 mg/kg 40.5 Nirisceptions/serolyamine 62.41.63 0.5 mg/kg 40.5 Polyneymine 62.63.0 1.5 mg/kg 40.5 Wethayvine 91.40.5 0.5 mg/kg 40.5 2.Picoline 100.06.8 0.5 mg/kg 40.5 2.Picoline 100.06.8 0.5 mg/kg 40.5 2.Picoline 100.06.8 0.5 mg/kg 40.5 2.Picoline 100.05.8 0.5 mg/kg	N-Nitrosopyrrolidine	930-55-2	1.0	mg/kg				<1.0	
NHinosophenpropylamine 621-64-7 0.5 mg/kg 4.05 NHinosophenyl & 68-30 122-304 0.5 mg/kg -0.5 NHinosophenyl & 68-30 122-304 1.0 mg/kg <td>N-Nitrosomorpholine</td> <td>59-89-2</td> <td>0.5</td> <td>mg/kg</td> <td></td> <td></td> <td></td> <td><0.5</td> <td></td>	N-Nitrosomorpholine	59-89-2	0.5	mg/kg				<0.5	
Nincoscipipandine 100-754 0.5 mg/kg 0.5 Nincoscipipandine 863-06 122-394 1.0 mg/kg <td>N-Nitrosodi-n-propylamine</td> <td>621-64-7</td> <td>0.5</td> <td>mg/kg</td> <td></td> <td></td> <td></td> <td><0.5</td> <td></td>	N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg				<0.5	
Nitrosodibuyiamine 924-163 0.5 mg/kg 1.0 Nitrosodibhenyl & 68-30-6 122.394 1.0 mg/kg	N-Nitrosopiperidine	100-75-4	0.5	mg/kg				<0.5	
Nicosciptionny 16 86-30.6 122-30.4 1.0 mg/kg	N-Nitrosodibutylamine	924-16-3	0.5	mg/kg				<0.5	
Dippenyamine PH - Point Point	N-Nitrosodiphenyl &	86-30-6 122-39-4	1.0	mg/kg				<1.0	
Methopyreline 91-80-5 0.5 mg/kg EPO73E: Nitrobaronatics and Ketones 2	Diphenylamine								
Utroaromatics and Ketones 2-Picoline 109-06.8 0.5 mg/kg -0.5 Acetophenone 98-86.2 0.5 mg/kg -0.5 Nitrobanzane 98-95.3 0.5 mg/kg	Methapyrilene	91-80-5	0.5	mg/kg				<0.5	
2-Picoline 100-06-8 0.5 mg/kg 0.05 Acstophenone 98-86-2 0.5 mg/kg 0.05 Istrobenzene 98-96-3 0.5 mg/kg 0.05 Istrobenzene 98-96-3 0.5 mg/kg 0.05 2.4-Dintrotoluene 666-20-2 10 mg/kg 0.05 2.4-Dintrotoluene 121-42 10 mg/kg 0.05 2.4-Dintrotoluene 121-42 10 mg/kg 0.05 2.4-Dintrotoluene 108-55 0.5 mg/kg 0.05 4-NitropulnolineA-oxide 56-5 mg/kg 0.05 5-Nitro-oclolidine	EP075E: Nitroaromatics and Ketones								
Accophenone 98.862 0.5 mg/kg	2-Picoline	109-06-8	0.5	mg/kg				<0.5	
Nitobanzene 98.96.3 0.5 mg/kg <	Acetophenone	98-86-2	0.5	mg/kg				<0.5	
Isophorone 78-59-1 0.5 mg/kg <-0.5	Nitrobenzene	98-95-3	0.5	mg/kg				<0.5	
24-Dinitrotoluene 606-20-2 1.0 mg/kg	Isophorone	78-59-1	0.5	mg/kg				<0.5	
24.2 1.0 mg/kg	2.6-Dinitrotoluene	606-20-2	1.0	mg/kg				<1.0	
1-Naphthylamine 134-32-7 0.5 mg/kg <	2.4-Dinitrotoluene	121-14-2	1.0	mg/kg				<1.0	
4-Nitroquinoline-N-oxide 56-57.5 0.5 mg/kg <-0.5	1-Naphthylamine	134-32-7	0.5	mg/kg				<0.5	
5-Nitro-o-toluidine 99-55-8 0.5 mg/kg <-0.5	4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg				<0.5	
Azobenzene 103-33-3 1 mg/kg <1	5-Nitro-o-toluidine	99-55-8	0.5	mg/kg				<0.5	
1.3.5-Trinitrobenzene 99-354 0.5 mg/kg <	Azobenzene	103-33-3	1	mg/kg				<1	
Phenacetin 62-44-2 0.5 mg/kg <	1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg				<0.5	
4-Aminobiphenyl 92-67-1 0.5 mg/kg <-0.5	Phenacetin	62-44-2	0.5	mg/kg				<0.5	
Pentachloronitrobenzene 82-68-8 0.5 mg/kg <	4-Aminobiphenyl	92-67-1	0.5	mg/kg				<0.5	
Pronamide 23950-58-5 0.5 mg/kg <	Pentachloronitrobenzene	82-68-8	0.5	mg/kg				<0.5	
Dimethylaminoazobenzene 60-11-7 0.5 mg/kg <-0.5	Pronamide	23950-58-5	0.5	mg/kg				<0.5	
Chlorobenzilate 510-15-6 0.5 mg/kg <	Dimethylaminoazobenzene	60-11-7	0.5	mg/kg				<0.5	
EP075F: Haloethers Bis(2-chloroethyl) ether 111-444 0.5 mg/kg <-0.5	Chlorobenzilate	510-15-6	0.5	mg/kg				<0.5	
Bis(2-chloroethyl) ether 111-444 0.5 mg/kg <	EP075F: Haloethers								
Bis(2-chloroethoxy) methane 111-91-1 0.5 mg/kg <	Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg				<0.5	
4-Chlorophenyl phenyl ether 7005-72-3 0.5 mg/kg <-0.5	Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg				<0.5	
4-Bromophenyl phenyl ether 101-55-3 0.5 mg/kg <0.5	4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg				<0.5	
EP075G: Chlorinated Hydrocarbons 1.3-Dichlorobenzene 541-73-1 0.5 mg/kg < <0.5	4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg				<0.5	
1.3-Dichlorobenzene 541-73-1 0.5 mg/kg <0.5	EP075G: Chlorinated Hydrocarbons								
	1.3-Dichlorobenzene	541-73-1	0.5	mg/kg				<0.5	
1.4-Dichlorobenzene 106-46-7 0.5 mg/kg < <0.5	1.4-Dichlorobenzene	106-46-7	0.5	mg/kg				<0.5	

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1
	Cl	ient sampli	ng date / time	31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EP075G: Chlorinated Hydrocarbons -	Continued							
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg				<0.5	
Hexachloroethane	67-72-1	0.5	mg/kg				<0.5	
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg				<0.5	
Hexachloropropylene	1888-71-7	0.5	mg/kg				<0.5	
Hexachlorobutadiene	87-68-3	0.5	mg/kg				<0.5	
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg				<2.5	
Pentachlorobenzene	608-93-5	0.5	mg/kg				<0.5	
Hexachlorobenzene (HCB)	118-74-1	1.0	mg/kg				<1.0	
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg				<0.5	
4-Chloroaniline	106-47-8	0.5	mg/kg				<0.5	
2-Nitroaniline	88-74-4	1.0	mg/kg				<1.0	
3-Nitroaniline	99-09-2	1.0	mg/kg				<1.0	
Dibenzofuran	132-64-9	0.5	mg/kg				<0.5	
4-Nitroaniline	100-01-6	0.5	mg/kg				<0.5	
Carbazole	86-74-8	0.5	mg/kg				<0.5	
3.3`-Dichlorobenzidine	91-94-1	0.5	mg/kg				<0.5	
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg				<0.5	
beta-BHC	319-85-7	0.5	mg/kg				<0.5	
gamma-BHC	58-89-9	0.5	mg/kg				<0.5	
delta-BHC	319-86-8	0.5	mg/kg				<0.5	
Heptachlor	76-44-8	0.5	mg/kg				<0.5	
Aldrin	309-00-2	0.5	mg/kg				<0.5	
Heptachlor epoxide	1024-57-3	0.5	mg/kg				<0.5	
alpha-Endosulfan	959-98-8	0.5	mg/kg				<0.5	
4.4`-DDE	72-55-9	0.5	mg/kg				<0.5	
Dieldrin	60-57-1	0.5	mg/kg				<0.5	
Endrin	72-20-8	0.5	mg/kg				<0.5	
beta-Endosulfan	33213-65-9	0.5	mg/kg				<0.5	
4.4`-DDD	72-54-8	0.5	mg/kg				<0.5	
Endosulfan sulfate	1031-07-8	0.5	mg/kg				<0.5	
4.4`-DDT	50-29-3	1.0	mg/kg				<1.0	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5	0.5	mg/kg				<0.5	
	0-2							

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID		VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1	
	Cli	ent samplii	ng date / time	31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EP075I: Organochlorine Pesticides - Cor	ntinued							
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	mg/kg				<0.5	
EP075J: Organophosphorus Pesticides								
Dichlorvos	62-73-7	0.5	mg/kg				<0.5	
Dimethoate	60-51-5	0.5	mg/kg				<0.5	
Diazinon	333-41-5	0.5	mg/kg				<0.5	
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg				<0.5	
Malathion	121-75-5	0.5	mg/kg				<0.5	
Fenthion	55-38-9	0.5	mg/kg				<0.5	
Chlorpyrifos	2921-88-2	0.5	mg/kg				<0.5	
Pirimphos-ethyl	23505-41-1	0.5	mg/kg				<0.5	
Chlorfenvinphos	470-90-6	0.5	mg/kg				<0.5	
Prothiofos	34643-46-4	0.5	mg/kg				<0.5	
Ethion	563-12-2	0.5	mg/kg				<0.5	
EP080/071: Total Petroleum Hydrocarbo	ons							
C6 - C9 Fraction		10	mg/kg		<10	<10		<10
EP080/071: Total Recoverable Hydrocar	bons - NEPM 201	3 Fractio	าร					
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10		<10
>C10 - C16 Fraction		3	mg/kg				<12	
>C16 - C34 Fraction		3	mg/kg				185	
>C34 - C40 Fraction		5	mg/kg				72	
>C10 - C40 Fraction (sum)		3	mg/kg				257	
>C10 - C16 Fraction minus Naphthalene		3	mg/kg				<12	
(F2)								
EP080-SD / EP071-SD: Total Petroleum	Hydrocarbons							
C6 - C9 Fraction		3	mg/kg				<3	
C10 - C14 Fraction		3	mg/kg				<6	
C15 - C28 Fraction		3	mg/kg				109	
C29 - C36 Fraction		5	mg/kg				112	
^ C10 - C36 Fraction (sum)		3	mg/kg				221	
EP080-SD / EP071-SD: Total Recoverab	le Hydrocarbons							
C6 - C10 Fraction	C6_C10	3	mg/kg				<3	
C6 - C10 Fraction minus BTEX	C6_C10-BTEX	3.0	mg/kg				<3.0	
(F1)								
EP080-SD: BTEXN								

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	Client sampling date / time			31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EP080-SD: BTEXN - Continued								
Benzene	71-43-2	0.2	mg/kg				<0.2	
Toluene	108-88-3	0.2	mg/kg				<0.2	
Ethylbenzene	100-41-4	0.2	mg/kg				<0.2	
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg				<0.2	
ortho-Xylene	95-47-6	0.2	mg/kg				<0.2	
^ Total Xylenes		0.5	mg/kg				<0.5	
^ Sum of BTEX		0.2	mg/kg				<0.2	
Naphthalene	91-20-3	0.2	mg/kg				<0.2	
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg				6.9	
EP130A: Organophosphorus Pest	ticides (Ultra-trace)							
Bromophos-ethyl	4824-78-6	10	µg/kg				<10	
Carbophenothion	786-19-6	10	µg/kg				<10	
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg				<10.0	
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg				<10	
Chlorpyrifos	2921-88-2	10	µg/kg				<10	
Chlorpyrifos-methyl	5598-13-0	10	µg/kg				<10	
Demeton-S-methyl	919-86-8	10	µg/kg				<10	
Diazinon	333-41-5	10	µg/kg				<10	
Dichlorvos	62-73-7	10	µg/kg				<10	
Dimethoate	60-51-5	10	µg/kg				<10	
Ethion	563-12-2	10	µg/kg				<10	
Fenamiphos	22224-92-6	10	µg/kg				<10	
Fenthion	55-38-9	10	µg/kg				<10	
Malathion	121-75-5	10	µg/kg				<10	
Azinphos Methyl	86-50-0	10	µg/kg				<10	
Monocrotophos	6923-22-4	10	µg/kg				<10	
Parathion	56-38-2	10	µg/kg				<10	
Parathion-methyl	298-00-0	10	µg/kg				<10	
Pirimphos-ethyl	23505-41-1	10	µg/kg				<10	
Prothiofos	34643-46-4	10	µg/kg				<10	
EP131A: Organochlorine Pesticid	es							
Aldrin	309-00-2	0.50	µg/kg				<0.50	
alpha-BHC	319-84-6	0.50	µg/kg				<0.50	

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1
	Cli	ient samplii	ng date / time	31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides	- Continued							
beta-BHC	319-85-7	0.50	µg/kg				<0.50	
delta-BHC	319-86-8	0.50	µg/kg				<0.50	
4.4`-DDD	72-54-8	0.50	µg/kg				<0.50	
4.4`-DDE	72-55-9	0.50	µg/kg				<0.50	
4.4`-DDT	50-29-3	0.50	µg/kg				<0.50	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5	0.50	µg/kg				<0.50	
Dieldrin	60 57 1	0.50	ua/ka				<0.50	
alpha-Endosulfan	00-07-1	0.50	µg/kg				<0.50	
beta-Endosulfan	22212 65 0	0.50	µg/kg				<0.50	
Endosulfan sulfate	1021 07 9	0.50	µg/kg				<0.50	
^ Endosulfan (sum)	115 20 7	0.50	µg/kg				<0.50	
Endrin	72.20.9	0.50	µg/kg				<0.50	
Endrin aldebyde	72-20-0	0.50	µg/kg				<0.50	
Endrin kotono	7421-93-4 52404 70 5	0.50	µg/kg				<0.50	
Hentachlor	55494-70-5	0.50	µg/kg				<0.50	
Hentachlor enovide	1024 57 2	0.50	µg/kg				<0.50	
	11024-37-3	0.50	µg/kg				<0.50	
	FR 90.0	0.00	µg/kg				<0.00	
Motheyychlor		0.20	µg/kg				<0.20	
	72-43-3	0.30	µg/kg				<0.25	
	5103-71-9	0.25	µg/kg				<0.25	
^ Total Chlordano (sum)	5103-74-2	0.25	µg/kg				<0.25	
		0.25	µg/kg				<0.20	
	27304-13-8	0.50	μg/kg				-0.50	
EP131B: Polychlorinated Biphenyls	(as Aroclors)	5.0	ua/ka				34.6	
Aroclor 1016	1267/ 11 2	5.0	µg/kg				<5.0	
Aroclor 1221	11104 28 2	5.0	ua/ka				<5.0	
Aroclor 1232	11141-16-5	5.0	µg/kg				<5.0	
Aroclor 1242	53460 21 0	5.0	µg/kg				<5.0	
Aroclor 1242	12672-20.6	5.0	ua/ka			 	<5.0	
Aroclor 1254	11007_60 1	5.0	ug/kg				34.6	
Aroclor 1260	11006-82.5	5.0	ug/ka				<5.0	
EP132B: Polynuclear Aromatic Hydr	ocarbons	0.0	P.33				0.0	
Naphthalene	91-20-3	5	µg/kg				10	

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC14_1.3-1.4	VC06_0.0-0.1	VC12_1.0-1.1	VC12_0.0-0.5	VC0S_0.0-0.1
	Client sampling date / time			31-Oct-2019 22:15	31-Oct-2019 20:00	31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45
Compound	CAS Number	LOR	Unit	ES1936183-016	ES1936183-017	ES1936183-028	ES1936183-029	ES1936183-031
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic H	ydrocarbons - Continued							
2-Methylnaphthalene	91-57-6	5	µg/kg				<5	
Acenaphthylene	208-96-8	4	µg/kg				60	
Acenaphthene	83-32-9	4	µg/kg				<4	
Fluorene	86-73-7	4	µg/kg				8	
Phenanthrene	85-01-8	4	µg/kg				96	
Anthracene	120-12-7	4	µg/kg				37	
Fluoranthene	206-44-0	4	µg/kg				201	
Pyrene	129-00-0	4	µg/kg				217	
Benz(a)anthracene	56-55-3	4	µg/kg				147	
Chrysene	218-01-9	4	µg/kg				122	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg				226	
Benzo(k)fluoranthene	207-08-9	4	µg/kg				116	
Benzo(e)pyrene	192-97-2	4	µg/kg				117	
Benzo(a)pyrene	50-32-8	4	µg/kg				255	
Perylene	198-55-0	4	µg/kg				55	
Benzo(g.h.i)perylene	191-24-2	4	µg/kg				197	
Dibenz(a.h)anthracene	53-70-3	4	µg/kg				40	
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg				155	
Coronene	191-07-1	5	µg/kg				126	
^ Sum of PAHs		4	µg/kg				2180	
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%		78.6	83.8		71.4
EP068S: Organochlorine Pesticio	de Surrogate							
Dibromo-DDE	21655-73-2	0.05	%		95.3	91.6		94.5
EP068T: Organophosphorus Pes	sticide Surrogate							
DEF	78-48-8	0.05	%		96.1	73.3		86.7
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%		85.4	82.9		84.6
Toluene-D8	2037-26-5	0.5	%		112	106		105
4-Bromofluorobenzene	460-00-4	0.5	%		112	105		101
EP075(SIM)S: Phenolic Compour	nd Surrogates							
Phenol-d6	13127-88-3	0.5	%		72.0	76.1	79.2	76.2
2-Chlorophenol-D4	93951-73-6	0.5	%		80.3	85.6	79.6	85.9
2.4.6-Tribromophenol	118-79-6	0.5	%		67.8	66.5	64.0	71.0

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(Matrix: SOIL)	VC12_0.0-0.5	VC0S_0.0-0.1								
Client sampling date / time 31-Oct-2019 22:15 31-Oct-2019 20:00 31-Oct-2019 20:30	31-Oct-2019 20:30	31-Oct-2019 20:45								
Compound CAS Number LOR Unit ES1936183-016 ES1936183-017 ES1936183-028	ES1936183-029	ES1936183-031								
Result Result Result	Result	Result								
EP075(SIM)T: PAH Surrogates										
2-Fluorobiphenyl 321-60-8 0.5 % 94.4 102	90.9	101								
Anthracene-d10 1719-06-8 0.5 % 88.2 96.0	87.0	92.4								
4-Terphenyl-d14 1718-51-0 0.5 % 78.9 86.0	95.7	83.6								
EP075S: Acid Extractable Surrogates										
2-Fluorophenol 367-12-4 0.5 %	94.3									
Phenol-d6 13127-88-3 0.5 %	88.5									
2-Chlorophenol-D4 93951-73-6 0.5 %	93.0									
2.4.6-Tribromophenol 118-79-6 0.5 %	60.2									
EP075T: Base/Neutral Extractable Surrogates										
Nitrobenzene-D5 4165-60-0 0.5 %	88.1									
1.2-Dichlorobenzene-D4 2199-69-1 0.5 %	82.6									
2-Fluorobiphenyl 321-60-8 0.5 %	103									
Anthracene-d10 1719-06-8 0.5 %	84.0									
4-Terphenyl-d14 1718-51-0 0.5 %	93.2									
EP080S: TPH(V)/BTEX Surrogates										
1.2-Dichloroethane-D4 17060-07-0 0.2 % 82.3 80.4		81.3								
Toluene-D8 2037-26-5 0.2 % 101 95.5		94.8								
4-Bromofluorobenzene 460-00-4 0.2 % 106 97.1		94.7								
EP080-SD: TPH(V)/BTEX Surrogates										
1.2-Dichloroethane-D4 17060-07-0 0.2 %	124									
Toluene-D8 2037-26-5 0.2 %	131									
4-Bromofluorobenzene 460-00-4 0.2 %	137									
EP090S: Organotin Surrogate										
Tripropyltin 0.5 %	82.0									
EP130S: Organophosphorus Pesticide Surrogate										
DEF 78-48-8 10 %	69.2									
EP131S: OC Pesticide Surrogate										
Dibromo-DDE 21655-73-2 0.50 %	44.1									
EP131T: PCB Surrogate										
Decachlorobiphenyl 2051-24-3 0.5 %	57.5									
EP132T: Base/Neutral Extractable Surrogates										
2-Fluorobiphenyl 321-60-8 10 %	79.8									
Anthracene-d10 1719-06-8 10 %	80.7									
4-Terphenyl-d14 1718-51-0 10 %	94.9									

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Client	: GHD PTY LTD
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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2
	Client sampling date / time			31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-	110°C)							
Moisture Content		1.0	%	17.5	32.2	24.9		
EA150: Particle Sizing								
+75μm		1	%	44				
+150μm		1	%	35				
+300μm		1	%	18				
+425μm		1	%	10				
+600µm		1	%	3				
+1180μm		1	%	<1				
+2.36mm		1	%	<1				
+4.75mm		1	%	<1				
+9.5mm		1	%	<1				
+19.0mm		1	%	<1				
+37.5mm		1	%	<1				
+75.0mm		1	%	<1				
EA150: Soil Classification based on Par	ticle Size							
Clay (<2 μm)		1	%	33				
Silt (2-60 µm)		1	%	19				
Sand (0.06-2.00 mm)		1	%	48				
Gravel (>2mm)		1	%	<1				
Cobbles (>6cm)		1	%	<1				
EG005(ED093)-SD: Total Metals in Sedir	nents by ICP-AES	5						
Aluminium	7429-90-5	50	mg/kg	7220				
Iron	7439-89-6	50	mg/kg	3460				
EG005(ED093)T: Total Metals by ICP-AE	S							
Arsenic	7440-38-2	5	mg/kg		13	9		
Beryllium	7440-41-7	1	mg/kg		<1	<1		
Cadmium	7440-43-9	1	mg/kg		<1	<1		
Lead	7439-92-1	5	mg/kg		154	<5		
Molybdenum	7439-98-7	2	mg/kg		<2	<2		
Nickel	7440-02-0	2	mg/kg		7	3		
Selenium	7782-49-2	5	mg/kg		<5	<5		
Silver	7440-22-4	2	mg/kg		<2	<2		
EG020-SD: Total Metals in Sediments by								
Antimony	7440-36-0	0.50	mg/kg	<0.50				

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2
	Client sampling date / time			31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064
				Result	Result	Result	Result	Result
EG020-SD: Total Metals in Sediments b	oy ICPMS - Continue	ed						
Arsenic	7440-38-2	1.00	mg/kg	3.11				
Cadmium	7440-43-9	0.1	mg/kg	<0.1				
Chromium	7440-47-3	1.0	mg/kg	10.8				
Copper	7440-50-8	1.0	mg/kg	<1.0				
Cobalt	7440-48-4	0.5	mg/kg	<0.5				
Lead	7439-92-1	1.0	mg/kg	14.6				
Manganese	7439-96-5	10	mg/kg	<10				
Nickel	7440-02-0	1.0	mg/kg	1.2				
Selenium	7782-49-2	0.1	mg/kg	0.3				
Silver	7440-22-4	0.1	mg/kg	0.2				
Vanadium	7440-62-2	2.0	mg/kg	21.3				
Zinc	7440-66-6	1.0	mg/kg	3.2				
EG035T: Total Recoverable Mercury by	y FIMS							
Mercury	7439-97-6	0.01	mg/kg	0.05				
Mercury	7439-97-6	0.1	mg/kg		2.2	<0.1		
EG048: Hexavalent Chromium (Alkaline	e Digest)							
Hexavalent Chromium	18540-29-9	0.5	mg/kg		<0.5	<0.5		
EK026SF: Total CN by Segmented Flow	w Analyser							
Total Cyanide	57-12-5	1	mg/kg	<1	<1	<1		
EK028SF: Weak Acid Dissociable CN b	by Segmented Flow	w Analyse	er					
Weak Acid Dissociable Cyanide		1	mg/kg		<1	<1		
EK040T: Fluoride Total								
Fluoride	16984-48-8	40	mg/kg		180	70		
EP003: Total Organic Carbon (TOC) in	Soil							
Total Organic Carbon		0.02	%	0.15	1.45	0.29		
EP066: Polychlorinated Biphenyls (PCI	B)							
Total Polychlorinated biphenyls		0.1	mg/kg		<0.1	<0.1		
EP068A: Organochlorine Pesticides (O	C)							
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05		
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05		
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05		
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05		
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05		
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2
	Client sampling date / time			31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides	(OC) - Continued							
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05		
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05		
^ Total Chlordane (sum)		0.05	mg/kg		<0.05	<0.05		
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05		
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05		
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05		
Dieldrin	60-57-1	0.05	mg/kg		<0.05	<0.05		
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05		
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05		
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05		
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05		
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05		
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05		
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2		
EP068B: Organophosphorus Pestici	des (OP)							
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05		
EP071 SG: Total Recoverable Hydro	carbons - NEPM 201	3 Fraction	is - Silica gel (cleanup				
>C10 - C16 Fraction		50	mg/kg		<50	<50		
>C16 - C34 Fraction		100	mg/kg		160	<100		
>C34 - C40 Fraction		100	mg/kg		<100	<100		
^ >C10 - C40 Fraction (sum)		50	mg/kg		160	<50		
EP071 SG-S: Total Petroleum Hydrod	carbons in Soil - Silio	ca gel clea	anup					
C10 - C14 Fraction		50	mg/kg		<50	<50		
C15 - C28 Fraction		100	mg/kg		<100	<100		
C29 - C36 Fraction		100	mg/kg		100	<100		
^ C10 - C36 Fraction (sum)		50	mg/kg		100	<50		
EP074A: Monocyclic Aromatic Hydro	ocarbons							
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2		
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5		
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5		
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5		
Styrene	100-42-5	0.5	mg/kg		<0.5	<0.5		
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5		
EP074B: Oxygenated Compounds								

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2
	Client sampling date / time		31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064
				Result	Result	Result	Result	Result
EP074B: Oxygenated Compounds - Contin	nued							
2-Butanone (MEK)	78-93-3	5	mg/kg		<5	<5		
EP074E: Halogenated Aliphatic Compour	nds							
Vinyl chloride	75-01-4	4	mg/kg		<4	<4		
1.1-Dichloroethene	75-35-4	0.5	mg/kg		<0.5	<0.5		
Methylene chloride	75-09-2	0.5	mg/kg		<0.5	<0.5		
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg		<0.5	<0.5		
Carbon Tetrachloride	56-23-5	0.5	mg/kg		<0.5	<0.5		
1.2-Dichloroethane	107-06-2	0.5	mg/kg		<0.5	<0.5		
Trichloroethene	79-01-6	0.5	mg/kg		<0.5	<0.5		
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg		<0.5	<0.5		
Tetrachloroethene	127-18-4	0.5	mg/kg		<0.5	<0.5		
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg		<0.5	<0.5		
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg		<0.5	<0.5		
EP074F: Halogenated Aromatic Compour	nds							
Chlorobenzene	108-90-7	0.5	mg/kg		<0.5	<0.5		
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg		<0.5	<0.5		
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5		
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5				
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5		
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1		
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5				
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5				
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5				
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5				
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5		
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5		
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5		
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2		
EP075(SIM)B: Polynuclear Aromatic Hydr	rocarbons							
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5		
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5		
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2
	Cli	ient samplii	ng date / time	31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic H	ydrocarbons - Cont	inued						
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5		
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5		
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5		
Fluoranthene	206-44-0	0.5	mg/kg		1.4	<0.5		
Pyrene	129-00-0	0.5	mg/kg		1.5	<0.5		
Benz(a)anthracene	56-55-3	0.5	mg/kg		0.7	<0.5		
Chrysene	218-01-9	0.5	mg/kg		0.6	<0.5		
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		1.1	<0.5		
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5		
Benzo(a)pyrene	50-32-8	0.5	mg/kg		1.0	<0.5		
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5		
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5		
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		0.6	<0.5		
^ Sum of polycyclic aromatic hydrocarbon	s	0.5	mg/kg		6.9	<0.5		
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg		1.2	<0.5		
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg		1.5	0.6		
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg		1.8	1.2		
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5				
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5				
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5				
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5				
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5				
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5				
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5				
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5				
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5				
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5				
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5				
Pentachlorophenol	87-86-5	1	mg/kg	<1				
EP075B: Polynuclear Aromatic Hydrod	carbons							
Naphthalene	91-20-3	0.5	mg/kg	<0.5				
2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5				
2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5				

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2			
	Cli	ent sampli	ng date / time	31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00			
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064			
				Result	Result	Result	Result	Result			
EP075B: Polynuclear Aromatic Hydrocarbons - Continued											
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5							
Acenaphthene	83-32-9	0.5	mg/kg	<0.5							
Fluorene	86-73-7	0.5	mg/kg	<0.5							
Phenanthrene	85-01-8	0.5	mg/kg	<0.5							
Anthracene	120-12-7	0.5	mg/kg	<0.5							
Fluoranthene	206-44-0	0.5	mg/kg	<0.5							
Pyrene	129-00-0	0.5	mg/kg	<0.5							
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5							
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5							
Chrysene	218-01-9	0.5	mg/kg	<0.5							
Benzo(b+j) &	205-99-2 207-08-9	1	mg/kg	<1							
Benzo(k)fluoranthene											
7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5							
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5							
3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5							
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5							
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5							
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5							
^ Sum of PAHs		0.5	mg/kg	<0.5							
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5							
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6							
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2							
EP075C: Phthalate Esters											
Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5							
Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5							
Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5							
Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5							
bis(2-ethylhexyl) phthalate	117-81-7	5.0	mg/kg	<5.0							
Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5							
EP075D: Nitrosamines											
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5							
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5							
N-Nitrosopyrrolidine	930-55-2	1.0	mg/kg	<1.0							
N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5							
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5							

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2
	Cli	ent sampli	ng date / time	31-Oct-2019 20:45	31-Oct-2019 21:45	2019 21:45 31-Oct-2019 22:15 31-Oct-2019 00:00 31-Oct-201		
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064
				Result	Result	Result	Result	Result
EP075D: Nitrosamines - Continued								
N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5				
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5				
N-Nitrosodiphenyl &	86-30-6 122-39-4	1.0	mg/kg	<1.0				
Diphenylamine								
Methapyrilene	91-80-5	0.5	mg/kg	<0.5				
EP075E: Nitroaromatics and Ketones								
2-Picoline	109-06-8	0.5	mg/kg	<0.5				
Acetophenone	98-86-2	0.5	mg/kg	<0.5				
Nitrobenzene	98-95-3	0.5	mg/kg	<0.5				
Isophorone	78-59-1	0.5	mg/kg	<0.5				
2.6-Dinitrotoluene	606-20-2	1.0	mg/kg	<1.0				
2.4-Dinitrotoluene	121-14-2	1.0	mg/kg	<1.0				
1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5				
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5				
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5				
Azobenzene	103-33-3	1	mg/kg	<1				
1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5				
Phenacetin	62-44-2	0.5	mg/kg	<0.5				
4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5				
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5				
Pronamide	23950-58-5	0.5	mg/kg	<0.5				
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5				
Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5				
EP075F: Haloethers								
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5				
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5				
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5				
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5				
EP075G: Chlorinated Hydrocarbons								
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5				
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5				
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5				
Hexachloroethane	67-72-1	0.5	mg/kg	<0.5				
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5				

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2
	Cl	ient sampli	ng date / time	31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064
				Result	Result	Result	Result	Result
EP075G: Chlorinated Hydrocarbons	- Continued							
Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5				
Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5				
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5				
Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5				
Hexachlorobenzene (HCB)	118-74-1	1.0	mg/kg	<1.0				
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg	<0.5				
4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5				
2-Nitroaniline	88-74-4	1.0	mg/kg	<1.0				
3-Nitroaniline	99-09-2	1.0	mg/kg	<1.0				
Dibenzofuran	132-64-9	0.5	mg/kg	<0.5				
4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5				
Carbazole	86-74-8	0.5	mg/kg	<0.5				
3.3`-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5				
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg	<0.5				
beta-BHC	319-85-7	0.5	mg/kg	<0.5				
gamma-BHC	58-89-9	0.5	mg/kg	<0.5				
delta-BHC	319-86-8	0.5	mg/kg	<0.5				
Heptachlor	76-44-8	0.5	mg/kg	<0.5				
Aldrin	309-00-2	0.5	mg/kg	<0.5				
Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5				
alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5				
4.4`-DDE	72-55-9	0.5	mg/kg	<0.5				
Dieldrin	60-57-1	0.5	mg/kg	<0.5				
Endrin	72-20-8	0.5	mg/kg	<0.5				
beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5				
4.4`-DDD	72-54-8	0.5	mg/kg	<0.5				
Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5				
4.4`-DDT	50-29-3	1.0	mg/kg	<1.0				
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5	0.5	mg/kg	<0.5				
	0-2							
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	mg/kg	<0.5				
EP075J: Organophosphorus Pestici	des							



QUALITY CONTROL REPORT

Work Order	: ES1936183	Page	: 1 of 35
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MS CARMEN YI	Contact	: Customer Services ES
Address	ELEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 0451 962 988	Telephone	: +61-2-8784 8555
Project	: 12517046	Date Samples Received	: 01-Nov-2019
Order number	:	Date Analysis Commenced	: 05-Nov-2019
C-O-C number	:	Issue Date	20-Nov-2019
Sampler	: SARAH ECCLESHALL		Hac-MRA NATA
Site	:		
Quote number	: SY/522/19		Accreditation No. 825
No. of samples received	: 66		Accredited for compliance with
No. of samples analysed	: 27		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
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Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Minh Wills	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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Client	: GHD PTY LTD
Project	12517046



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key: Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

- CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
- LOR = Limit of reporting
- RPD = Relative Percentage Difference
- # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) R				port		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EG005(ED093)-SD: 1	Total Metals in Sedimer	nts by ICP-AES (QC Lot: 2691340)								
ES1936183-029	VC12_0.0-0.5	EG005-SD: Aluminium	7429-90-5	50	mg/kg	4790	4620	3.72	0% - 20%	
		EG005-SD: Iron	7439-89-6	50	mg/kg	4290	3780	12.7	0% - 20%	
EG005(ED093)T: To	al Metals by ICP-AES	(QC Lot: 2691120)								
ES1936183-017	VC06_0.0-0.1	EG005T: Nickel	7440-02-0	2	mg/kg	10	10	0.00	No Limit	
		EG005T: Arsenic	7440-38-2	5	mg/kg	18	20	8.11	No Limit	
		EG005T: Lead	7439-92-1	5	mg/kg	224	245	8.82	0% - 20%	
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	5	0.00	No Limit	
ES1935800-002	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit	
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit	
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.00	No Limit	
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.00	No Limit	
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit	
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit	
		EG005T: Lead	7439-92-1	5	mg/kg	14	14	0.00	No Limit	
		EG005T: Selenium	7782-49-2	5	mg/kg	5	<5	0.00	No Limit	
ES1936183-017	VC06_0.0-0.1	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit	
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit	
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.00	No Limit	
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit	
EG035T: Total Reco	overable Mercury by Fll	MS (Low Level) (QC Lot: 2691342)								
ES1936183-029	VC12_0.0-0.5	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.12	0.13	0.00	0% - 50%	
EA037: Ass Field S	creening Analysis (QC	Lot: 2684166)								
ES1936029-033	Anonymous	EA037: pH (F)		0.1	pH Unit	7.9	7.9	0.00	0% - 20%	
		EA037: pH (Fox)		0.1	pH Unit	5.9	5.9	0.00	0% - 20%	

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Laboratory sample ID Verta sample ID Memory Consumption (%) Deglease Result PRP (%) Recovar Linkin (%) EA37: ASE Floid Screening Analysis (OC Lot: 264166) - continued 0.1 pH Unit 7.3 7.1 1.67 0%: 20% EA37: ASE Floid Screening Analysis (OC Lot: 264166) EA37: pH (F) 0.1 pH Unit 7.3 7.1 1.67 0%: 20% EA37: PH (F) 0.1 pH Unit 8.66 8.6 0.00 0%: 20% EA35: PH (F) 0.1 pH Unit 8.6 8.5 0.00 0%: 20% EA35: Mosture Content (Proc) COL Lot: 26254241 0.1 % 25.2 24.1 4.51 0%: 20% E3036178-0026 Anonymous E4055: Masture Content 0.1 % 25.2 24.1 4.51 0%: 20% E3036178-0026 Anonymous E4055: Masture Content	Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
EAD37: Ass Field Screening Analysis (QC Lot: 264169) - continued EAD37: Ass Field Screening Analysis (QC Lot: 264167) EAD37: H(Fo) 0.1 pH unit 6.5 6.4 0.0 0.1 PH unit Colspan="2">0.1 PH unit Colspan="2">0.1 PH unit 0.1 PH unit Colspan="2">PH unit Colspan="2" Colspan="2"	Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES1938183-005 VC12_1.0-1.1 EA037: pH (F) 0.1 pH Unit 7.3 7.1 1.6.7 0%-20% EA037: Ass Field Screening Analysis (OC Lot: 2684167) EA037: pH (Fo: 0.1 pH Unit 5.6 5.6 0.00 0%-20% EA037: Ass Field Screening Analysis (OC Lot: 2684167) EA037: pH (Fo: 0.1 pH Unit 8.6 8.5 0.00 0%-20% EA037: PM (Fo: 0.1 pH Unit 8.6 8.5 0.00 0%-20% EA035: Moisture Content (Dried @105-110*C) GC Lot: 2687440 0.1 %1 18.2 24.1 4.61 0.5 0.64 0.00 0%-20% EA035: Moisture Content (Dried @105-110*C) GC Lot: 2697441 0.1 %5 18.2 24.1 4.61 0.5 0.5 E103050-026 Anonymous EA035: Moisture Content 0.1 mg/kg 4.0.1 4.0.1 0.00 No Limit E103050-020 Moisture Content F772-442 0.1	EA037: Ass Field Sci	reening Analysis (QC Lot:	2684166) - continued							
EA037 chi (Fox) 0.1 pH Unit 5.6 5.6 0.00 0%-20% EA037 chi Si GCL Cut: 2684167) 0.1 pH Unit 6.6 8.5 0.00 0%-20% E303813-015 VC14_1-0.1.6 EA037: pH (Fox) 0.1 pH Unit 6.6 8.5 0.00 0%-20% EA053: Motitore Content (Drind @ 105-1107: (O C Lot: 268242) 0.1 % 25.2 24.1 4.51 0% -20% E51936183-029 Anonymous EA055: Motitore Content 0.1 % 25.2 24.1 4.51 0% -20% E51936183-029 Monymous EA055: Motitore Content 0.1 % 18.7 18.2 2.88 0% -20% E51936183-029 VC12_0-0.5 E602-50: Content 778/49-20 1 mg/kg 0.0 No Limit E6020-50: Colati 778/49-24 0.1 mg/kg 4.05 -050 0.00 No Limit E6020-50: Colati 740-448 0.5 mg/kg<	ES1936183-005	VC12_1.0-1.1	EA037: pH (F)		0.1	pH Unit	7.3	7.1	1.67	0% - 20%
EA037: Ase Field Screening Analysis (QC Lot: 2834187) ES1938183:016 VC14_1.0.1.1 EA037; pH (F) 0.1 pH Unit 8.6 8.6 0.00 0%: 20% EA055: Molsture Content (Orled @ 105-110*C) (QC Lot: 282542) 0.1 pH Unit 8.6 8.6 0.00 0%: 20% ES1038170:009 Anonymous EA055: Molsture Content 0.1 % 18.7 18.2 2.88 0%: 20% E0020-SD: Total Motals in Sediments by ICPMS GC Lot: 2601341) 0.1 % 18.7 18.2 2.88 0%: 50% E0020-SD: Cadmium 740-434 0.1 mg/kg <-0.1			EA037: pH (Fox)		0.1	pH Unit	5.6	5.6	0.00	0% - 20%
ES1939183-015 VC14_1.6-1.1 EA37: pH (F) 0.1 pH Unit 6.8 8.5 0.00 0%-20% EA055: Moisture Content (Dried @ 105-110°C) (0C Lot: 262542) 0.1 pH Unit 6.6 6.4 0.00 0%-20% ES193507-025 Anonymous EA055: Moisture Content 0.1 % 25.2 24.1 4.51 0%-20% ES193507-000 Anonymous EA055: Moisture Content 0.1 % 18.7 18.2 28.8 0%-50% EG020-SD: Total Motal= in Sodiments by ICPMS (QC Lot: 2691341) 0.1 mg/sg <0.1	EA037: Ass Field Sci	reening Analysis (QC Lot:	2684167)							
EA035: ph (Fox) 0.1 pH Unit 6.5 6.4 0.00 0%-20% EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 282242) EA055: Moisture Content 0.1 % 25.2 24.1 4.51 0%-20% ES193980-025 Anonymous EA055: Moisture Content 0.1 % 18.7 18.2 2.88 0%-50% EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 2691340) 0.1 mg/kg <0.1	ES1936183-015	VC14_1.0-1.1	EA037: pH (F)		0.1	pH Unit	8.6	8.5	0.00	0% - 20%
EA85: Moisture Content (Dried @ 105-110°C) (QC Lot: 2682542) ES1933800-025 Anonymous EA65: Moisture Content 0.1 % 25.2 24.1 4.51 0% - 20% ES1933800-025 Anonymous EA65: Moisture Content 0.1 % 18.2 28.8 0% - 60% EG020-SD: Total Metals In Sediments by ICPMS (CC Lot: 2691341) 0.1 mg/kg 40.1 40.0 No Limit EG020-SD: Solver 7440439 0.1 mg/kg 40.1 40.0 No Limit EG020-SD: Solver 7440424 0.1 mg/kg 40.5 40.0 No Limit EG020-SD: Charintomy 7440484 0.5 mg/kg 40.5 40.0 No Limit EG020-SD: Chromium 7440-484 0.5 mg/kg 40.5 40.7 No Limit EG020-SD: Chromium 7440-484 1 mg/kg 6.0 5.9 2.22 No Limit EG020-SD: Chromium 7440-473 1 mg/kg 4.5 5.4 17.7 No L			EA037: pH (Fox)		0.1	pH Unit	6.5	6.4	0.00	0% - 20%
ES193800-025 Anonymous EA055: Moisture Content 0.1 % 25.2 24.1 4.51 0%- 20% ES1938179-009 Anonymous EA055: Moisture Content 0.1 % 18.7 18.2 2.88 0%- 50% EG020-SD: Total Metals in Sodiments by ICPMS QC Lot: 2681341 0.1 mg/kg -0.1 0.1 0.00 No Limit ES1938183-029 VC12_0.0-0.5 EG02-SD: Cadmium 740-43-9 0.1 mg/kg -0.1 -0.00 No Limit EG020-SD: Selenium 740-224 0.1 mg/kg -0.5 0.00 No Limit EG020-SD: Antimony 7440-36-0 0.5 mg/kg -0.5 0.00 No Limit EG020-SD: Cobalt 7440-84 0.5 mg/kg 6.0 5.9 2.22 No Limit EG020-SD: Cobalt 7440-45-8 1 mg/kg 6.1 1.7 No Limit EG020-SD: Isola 7440-65-8 1 mg/kg 1.1 0.10 <	EA055: Moisture Con	tent (Dried @ 105-110°C) (
ES1938179-009 Anonymous EA055: Moisture Content 0.1 % 18.7 18.2 2.88 0%- 50% EG020-SD: Total Metals in Sediments by ICPMS OC Lot: 261341) 0.1 % 18.7 18.2 2.88 0%- 50% EG020-SD: Other Minimer EG020-SD: Calmium 7440-39 0.1 mg/kg <-0.1 <0.00 No Limit EG020-SD: Solver F6020-SD: Solver 7440-224 0.1 mg/kg <0.50 0.00 No Limit EG020-SD: Solver 7440-350 0.55 mg/kg <0.50 0.60 No Limit EG020-SD: Chonium 7440-360 0.55 mg/kg <0.50 <0.00 No Limit EG020-SD: Chonium 7440-380 1 mg/kg <0.60 S0 No Limit EG020-SD: Chonium 7440-47-3 1 mg/kg <0.60 No Limit EG020-SD: Chonium 7440-47-3 1 mg/kg <0.60 No Limit EG020-SD: Ninkel 7440-56 1	ES1935800-025	Anonymous	EA055: Moisture Content		0.1	%	25.2	24.1	4.51	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 2691341) EG020-SD: Calmium 740-43-9 0.1 mg/kg <0.1 <0.00 No Limit ES1936183-029 VC12_0.0-0.5 EG020-SD: Selenium 7782-49-2 0.1 mg/kg <0.1	ES1936179-009	Anonymous	EA055: Moisture Content		0.1	%	18.7	18.2	2.88	0% - 50%
ES1936183-029 VC12_0.0-0.5 EG020-SD: Cadmium 7440-43-9 0.1 mg/kg <0.1 <0.1 0.00 No Limit EG020-SD: Selenium 7782-49-2 0.1 mg/kg <0.1	EG020-SD: Total Meta	als in Sediments by ICPMS	(QC Lot: 2691341)							
EG020-SD: Selenium 7782-49-2 0.1 mg/kg <0.1	ES1936183-029	VC12_0.0-0.5	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG020-SD: Silver 7440-224 0.1 mg/kg 0.2 0.1 0.00 No Limit EG020-SD: Antimony 7440-36-0 0.5 mg/kg <0.5			EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG020-SD: Antimony 740-38-0 0.5 mg/kg <0.50 <0.50 0.00 No Limit EG020-SD: Cobalt 740-484 0.5 mg/kg <0.5			EG020-SD: Silver	7440-22-4	0.1	mg/kg	0.2	0.1	0.00	No Limit
EG020-SD: Cobalt 740-48-4 0.5 mg/kg <0.5			EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	<0.50	0.00	No Limit
EG020-SD: Arsenic 7440-38-2 1 mg/kg 2.20 2.01 9.07 No Limit EG020-SD: Chromium 7440-73 1 mg/kg 6.0 5.9 2.2 No Limit EG020-SD: Chromium 7440-67-8 1 mg/kg 6.0 5.9 12.7 No Limit EG020-SD: Chromium 7440-67-8 1 mg/kg 4.5 5.4 17.7 No Limit EG020-SD: Lead 7439-92-1 1 mg/kg 4.10 5.4 12.1 12.7 0% - 50% EG020-SD: Nickel 7440-62-0 1 mg/kg <1.0			EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EG020-SD: Chromium 7440-47-3 1 mg/kg 6.0 5.9 2.22 No Limit EG020-SD: Copper 7440-50-8 1 mg/kg 4.5 5.4 17.7 No Limit EG020-SD: Lead 7439-92-1 1 mg/kg 10.6 12.1 12.7 0% - 50% EG020-SD: Nickel 7440-62-0 1 mg/kg 4.10 0.00 No Limit EG020-SD: Nickel 7440-66-6 1 mg/kg 4.10 1.5 19.1 0% - 50% EG020-SD: Vanadium 7440-66-6 1 mg/kg 4.10 4.10 0.00 No Limit EG020-SD: Vanadium 7440-62-2 2 mg/kg 11.0 19.9 No Limit EG020-SD: Vanadium 7440-62-2 2 mg/kg 3.5 11.0 19.9 No Limit EG035T: Mercury by FIMS (QC Lot: 269119) EG035T: Mercury 7439-97-6 0.1 mg/kg 3.4 3.2 5.79 0% - 20% ES1935800-002 Anonymous EG035T: Mercury			EG020-SD: Arsenic	7440-38-2	1	mg/kg	2.20	2.01	9.07	No Limit
EG020-SD: Copper 7440-50-8 1 mg/kg 4.5 5.4 17.7 No Limit EG020-SD: Lead 7439-92-1 1 mg/kg 10.6 12.1 12.7 0% - 50% EG020-SD: Lead 7440-60-6 1 mg/kg <1.0			EG020-SD: Chromium	7440-47-3	1	mg/kg	6.0	5.9	2.22	No Limit
EG020-SD: Lead 7439-92-1 1 mg/kg 10.6 12.1 12.7 0%-50% EG020-SD: Nickel 7440-02-0 1 mg/kg <1.0			EG020-SD: Copper	7440-50-8	1	mg/kg	4.5	5.4	17.7	No Limit
EG020-SD: Nickel 7440-02-0 1 mg/kg <1.0 <1.0 No Limit EG020-SD: Zinc 7440-66-6 1 mg/kg 14.4 17.5 19.1 0% - 50% EG020-SD: Manganese 7439-96-5 10 mg/kg <10			EG020-SD: Lead	7439-92-1	1	mg/kg	10.6	12.1	12.7	0% - 50%
EG020-SD: Zinc 7440-66-6 1 mg/kg 14.4 17.5 19.1 0%-50% EG020-SD: Manganese 7439-96-5 10 mg/kg <10			EG020-SD: Nickel	7440-02-0	1	mg/kg	<1.0	<1.0	0.00	No Limit
EG020-SD: Manganese 7439-96-5 10 mg/kg <10 <10 0.00 No Limit EG020-SD: Vanadium 7440-62-2 2 mg/kg 13.5 11.0 19.9 No Limit EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2691119) EG035T: Mercury 7439-97-6 0.1 mg/kg <0.1			EG020-SD: Zinc	7440-66-6	1	mg/kg	14.4	17.5	19.1	0% - 50%
EG020-SD: Vanadium 7440-62-2 2 mg/kg 13.5 11.0 19.9 No Limit EG035T: Total Recovrable Mercury by FIMS (QC Lot: 2691119) ES1935800-002 Anonymous EG035T: Mercury 7439-97-6 0.1 mg/kg <0.1 <0.00 No Limit ES1935800-002 Anonymous EG035T: Mercury 7439-97-6 0.1 mg/kg <0.1			EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	<10	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2691119) ES1935800-002 Anonymous EG035T: Mercury 7439-97-6 0.1 mg/kg <0.1			EG020-SD: Vanadium	7440-62-2	2	mg/kg	13.5	11.0	19.9	No Limit
ES1935800-002 Anonymous EG035T: Mercury 7439-97-6 0.1 mg/kg <0.1 0.00 No Limit ES1936183-017 VC06_0.0-0.1 EG035T: Mercury 7439-97-6 0.1 mg/kg 3.4 3.2 5.79 0% - 20% EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 2684699) QC Lot: 2684699 0.5 mg/kg <0.5	EG035T: Total Recov	verable Mercury by FIMS (QC Lot: 2691119)							
ES1936183-017 VC06_0.0-0.1 EG035T: Mercury 7439-97-6 0.1 mg/kg 3.4 3.2 5.79 0% - 20% EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 2684699) QC Lot: 2684699 0.5 mg/kg 3.0 3.0 0.00 No Limit ES1935800-011 Anonymous EG048G: Hexavalent Chromium 18540-29-9 0.5 mg/kg <0.5 <0.5 0.00 No Limit ES1936425-002 Anonymous EG048G: Hexavalent Chromium 18540-29-9 0.5 mg/kg 3.0 3.0 0.00 No Limit ES1936183-028 VC12_1.0-1.1 EK026SF: Total Cyanide 57-12-5 1 mg/kg <1 <10.00 No Limit ES1935800-011 Anonymous EK026SF: Total Cyanide 57-12-5 1 mg/kg <1 <10.00 No Limit	ES1935800-002	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 2684699) ES1935800-011 Anonymous EG048G: Hexavalent Chromium 18540-29-9 0.5 mg/kg <0.5 <0.00 No Limit ES1936425-002 Anonymous EG048G: Hexavalent Chromium 18540-29-9 0.5 mg/kg 3.0 3.0 0.00 No Limit ES1936425-002 Anonymous CC Lot: 2682540 ES1936183-028 VC12_1.0-1.1 EK026SF: Total Cyanide 57-12-5 1 mg/kg <1 <1.000 No Limit ES1935800-011 Anonymous EK026SF: Total Cyanide 57-12-5 1 mg/kg <1	ES1936183-017	VC06_0.0-0.1	EG035T: Mercury	7439-97-6	0.1	mg/kg	3.4	3.2	5.79	0% - 20%
ES1935800-011 Anonymous EG048G: Hexavalent Chromium 18540-29-9 0.5 mg/kg <0.5 <0.5 0.00 No Limit ES1936425-002 Anonymous EG048G: Hexavalent Chromium 18540-29-9 0.5 mg/kg 3.0 3.0 0.00 No Limit ES1936425-002 Anonymous EG048G: Hexavalent Chromium 18540-29-9 0.5 mg/kg 3.0 3.0 0.00 No Limit EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 2682540) VC12_1.0-1.1 EK026SF: Total Cyanide 57-12-5 1 mg/kg <1	EG048: Hexavalent C	hromium (Alkaline Digest)	(QC Lot: 2684699)							
ES1936425-002 Anonymous EG048G: Hexavalent Chromium 18540-29-9 0.5 mg/kg 3.0 3.0 0.00 No Limit EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 2682540) EK026SF: Total Cyanide 57-12-5 1 mg/kg <1	ES1935800-011	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 2682540) ES1936183-028 VC12_1.0-1.1 EK026SF: Total Cyanide 57-12-5 1 mg/kg <1	ES1936425-002	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	3.0	3.0	0.00	No Limit
ES1936183-028 VC12_1.0-1.1 EK026SF: Total Cyanide 57-12-5 1 mg/kg <1 <1 0.00 No Limit ES1935800-011 Anonymous EK026SF: Total Cyanide 57-12-5 1 mg/kg <1	EK026SF: Total CN b	y Segmented Flow Analys	er (QC Lot: 2682540)							
ES1935800-011 Anonymous EK026SE: Total Cvanide 57-12-5 1 ma/kg <1 <1 0.00 No Limit	ES1936183-028	VC12_1.0-1.1	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
	ES1935800-011	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QC Lot: 2682539)	EK028SF: Weak Acid	Dissociable CN by Segme	ented Flow Analyser (QC Lot: 2682539)							
ES1935800-011 Anonymous EK028SF: Weak Acid Dissociable Cyanide 1 mg/kg <1 <1 0.00 No Limit	ES1935800-011	Anonymous	EK028SF: Weak Acid Dissociable Cyanide		1	mg/kg	<1	<1	0.00	No Limit
EK040T: Fluoride Total (QC Lot: 2685561)	EK040T: Fluoride Tot	al (QC Lot: 2685561)								
EB1928345-001 Anonymous EK040T: Fluoride 16984-48-8 40 mg/kg 180 150 12.8 No Limit	EB1928345-001	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	180	150	12.8	No Limit
ES1935800-011 Anonymous EK040T: Fluoride 16984-48-8 40 mg/kg 60 50 0.00 No Limit	ES1935800-011	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	60	50	0.00	No Limit
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 2690237)	EP003: Total Organic	Carbon (TOC) in Soil (QC	Lot: 2690237)							
EM1918482-001 Anonymous EP003: Total Organic Carbon 0.02 % 0.07 0.07 0.00 No Limit	EM1918482-001	Anonymous	EP003: Total Organic Carbon		0.02	%	0.07	0.07	0.00	No Limit

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Client	: GHD PTY LTD
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Sub-Matrix: SOIL			Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP003: Total Organic	Carbon (TOC) in Soil (QC L	.ot: 2690237) - continued							
ES1936183-041	VC13_0.0-0.1	EP003: Total Organic Carbon		0.02	%	1.45	1.40	3.22	0% - 20%
EP003: Total Organic	Carbon (TOC) in Soil (QC L	ot: 2693466)							
ES1936183-040	VC08_1.0-1.5	EP003: Total Organic Carbon		0.02	%	0.15	0.15	0.00	No Limit
EP066: Polychlorinate	ed Biphenyls (PCB) (QC Lo	: 2682735)							
ES1935800-011	Anonymous	EP066: Total Polychlorinated biphenyls		0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2682733)									
ES1935800-011	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophos	phorus Pesticides (OP) (Q	C Lot: 2682733)							
ES1935800-011	Anonymous	EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
EP071 SG: Total Petr	oleum Hydrocarbons - Silica	a gel cleanup (QC Lot: 2682734)							
ES1935800-011	Anonymous	EP071SG-S: C15 - C28 Fraction		100	mg/kg	<100	<100	0.00	No Limit
		EP071SG-S: C29 - C36 Fraction		100	mg/kg	<100	<100	0.00	No Limit
		EP071SG-S: C10 - C14 Fraction		50	mg/kg	<50	<50	0.00	No Limit
		EP071SG-S: C10 - C36 Fraction (sum)		50	mg/kg	<50	<50	0.00	No Limit
EP071 SG: Total Reco	overable Hydrocarbons - NE	PM 2013 Fractions - Silica gel cleanup (QC Lot: 268	2734)						
ES1935800-011	Anonymous	EP071SG-S: >C16 - C34 Fraction		100	mg/kg	150	150	0.00	No Limit
		EP071SG-S: >C34 - C40 Fraction		100	mg/kg	<100	<100	0.00	No Limit
		EP071SG-S: >C10 - C16 Fraction		50	mg/kg	<50	<50	0.00	No Limit
EP074A: Monocyclic	Aromatic Hyd <u>rocarbons (Q</u>	C Lot: 2684260)							
ES1935800-011	Anonymous	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Client	: GHD PTY LTD
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Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074A: Monocyclic	Aromatic Hydrocarbons (C	C Lot: 2684260) - continued							
ES1935800-011	Anonymous	EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EW1904707-002	Anonymous	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074B: Oxygenated	Compounds (QC Lot: 268	4260)							
ES1935800-011	Anonymous	EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.00	No Limit
EW1904707-002	Anonymous	EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.00	No Limit
EP074E: Halogenated	Aliphatic Compounds (QC	C Lot: 2684260)							
ES1935800-011	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<4	<4	0.00	No Limit
EW1904707-002	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<4	<4	0.00	No Limit
EP074F: Halogenated	Aromatic Compounds (Q	C Lot: 2684260)							
ES1935800-011	Anonymous	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Sub-Matrix: SOIL						Laboratory I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074F: Halogenate	d Aromatic Compoun	ds (QC Lot: 2684260) - continued							
EW1904707-002	Anonymous	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074G: Trihalomet	hanes (QC Lot: 2684	260)	·						
ES1935800-011	Anonymous	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EW1904707-002	Anonymous	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)A: Phene	olic Compounds (QC	Lot: 2682732)							
ES1935800-011	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)A: Phen	olic Compounds (QC	Lot: 2682755)							
ES1936232-001	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
ES1935800-001	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)		
EP075(SIM)A: Phenol	ic Compounds (QC Lot: 2	682755) - continued							
ES1935800-001	Anonymous	EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)B: Polynu	clear Aromatic Hydrocarbo	ons (QC Lot: 2682732)							
ES1935800-011	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynu	clear Aromatic Hydrocarbo	ons (QC Lot: 2682755)							
ES1936232-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	0.9	0.9	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.6	1.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.5	1.4	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.8	0.7	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	0.7	0.7	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	0.8	0.9	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.8	0.8	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
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Work Order	: ES1936183								
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Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polyn	uclear Aromatic Hydrocarbo	ons (QC Lot: 2682755) - continued							
ES1936232-001	Anonymous	EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.5	0.6	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	7.6	7.5	1.32	0% - 50%
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	1.0	1.0	0.00	No Limit
ES1935800-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075A: Phenolic Co	ompounds (QC Lot: 269063	36)							
ES1936183-029	VC12_0.0-0.5	EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	<1	0.00	No Limit
EP075B: Polynuclea	r Aromatic Hydrocarbons (QC Lot: 2690636)							
ES1936183-029	VC12 0.0-0.5	EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Methylnaphthalene	91-57-6	0.5	ma/ka	<0.5	<0.5	0.00	No Limit
1					5.5		1		1 1 1

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Sub-Matrix: SOIL						Laboratory L	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075B: Polynuclear	Aromatic Hydrocarbons (QC Lot: 2690636) - continued							
ES1936183-029	VC12_0.0-0.5	EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2	1	mg/kg	<1	<1	0.00	No Limit
			207-08-9						
EP075C: Phthalate Es	sters (QC Lot: 2690636)								
ES1936183-029	VC12_0.0-0.5	EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075D: Nitrosamine	s (QC Lot: 2690636)								
ES1936183-029	VC12_0.0-0.5	EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
			122-39-4						
		EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075E: Nitroaromat	ics and Ketones (QC Lot: 2	2690636)							
ES1936183-029	VC12_0.0-0.5	EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075E: Nitroaromat	tics and Ketones (QC L	ot: 2690636) - continued							
ES1936183-029	VC12_0.0-0.5	EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.6-Dinitrotoluene	606-20-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Azobenzene	103-33-3	1	mg/kg	<1	<1	0.00	No Limit
EP075F: Haloethers	(QC Lot: 2690636)								
ES1936183-029	VC12_0.0-0.5	EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075G: Chlorinated	Hydrocarbons (QC Lo	t: 2690636)							
ES1936183-029	VC12_0.0-0.5	EP075: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5	<2.5	0.00	No Limit
EP075H: Anilines an	d Benzidines (QC Lot: 2	2690636)							
ES1936183-029	VC12_0.0-0.5	EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 3.3 - Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075I: Organochlori	ne Pesticides (QC Lot: 269	0636)							
ES1936183-029	VC12_0.0-0.5	EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	0.6	22.1	No Limit
		EP075: 4.4`-DDE	72-55-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4.4`-DDD	72-54-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4.4`-DDT	50-29-3	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
EP075J: Organophos	phorus Pesticides (QC Lot	: 2690636)							
ES1936183-029	VC12_0.0-0.5	EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petr	oleum Hydrocarbons (QC	Lot: 2684261)							
ES1935800-011	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
EW1904707-002	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petr	oleum Hydrocarbons (QC	Lot: 2687451)				·			
ES1936325-001	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
ES1936325-005	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Rec	overable Hydrocarbons - N	EPM 2013 Fractions (QC Lot: 2684261)							
ES1935800-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EW1904707-002	Anonymous	EP080: C6 - C10 Fraction	 C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Tota <u>l Rec</u>	overable Hydrocarb <u>ons - N</u>	EPM 2013 Fractions (QC Lot: 2687451)	_				· · · · · ·		
ES1936325-001	Anonymous	EP080: C6 - C10 Fraction	C6 C10	10	mg/kg	<10	<10	0.00	No Limit
ES1936325-005	Anonymous	EP080: C6 - C10 Fraction	 C6_C10	10	mg/kg	<10	<10	0.00	No Limit

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Sub-Matrix: SOIL			Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC	Lot: 2684261)								
ES1935800-011	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EW1904707-002	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC	Lot: 2687451)								
ES1936325-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1936325-005	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080-SD / EP071-S	D: Total Petroleum Hy	drocarbons (QC Lot: 2685373)							
ES1936183-029	VC12_0.0-0.5	EP071-SD: C10 - C14 Fraction		3	mg/kg	<6	<6	0.00	No Limit
		EP071-SD: C15 - C28 Fraction		3	mg/kg	109	109	0.00	No Limit
		EP071-SD: C10 - C36 Fraction (sum)		3	mg/kg	221	222	0.451	0% - 50%
		EP071-SD: C29 - C36 Fraction		5	mg/kg	112	113	0.00	No Limit
EP080-SD / EP071-S	D: Total Petroleum Hy	drocarbons (QC Lot: 2687455)							
ES1936183-029	VC12_0.0-0.5	EP080-SD: C6 - C9 Fraction		3	mg/kg	<3	<3	0.00	No Limit
ES1936700-012	Anonymous	EP080-SD: C6 - C9 Fraction		3	mg/kg	<3	<3	0.00	No Limit
EP080-SD / EP071-S	D: Total Recover <u>able I</u>	Hydrocarbons (QC Lot: 2685373)							
ES1936183-029	VC12 0.0-0.5	EP071-SD: >C10 - C16 Fraction		3	mg/kg	<12	<12	0.00	No Limit
	-	EP071-SD: >C16 - C34 Fraction		3	mg/kg	185	184	0.00	0% - 50%

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Sub-Matrix: SOIL						Laboratory I	Duplicate (DUP) Repor	t	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080-SD / EP071-S	SD: Total Recoverable	Hydrocarbons (QC Lot: 2685373) - continued							
ES1936183-029	VC12_0.0-0.5	EP071-SD: >C10 - C40 Fraction (sum)		3	mg/kg	257	257	0.00	0% - 20%
		EP071-SD: >C34 - C40 Fraction		5	mg/kg	72	73	2.28	No Limit
EP080-SD: BTEXN	(QC Lot: 2687455)								
ES1936183-029	VC12 0.0-0.5	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
			106-42-3						
		EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1936700-012	Anonymous	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
			106-42-3						
		EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP090: Organotin C	ompounds (QC Lot: 2	2689830)							
ES1936183-040	VC08_1.0-1.5	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.00	No Limit
EP090: Organotin C	ompounds (QC Lot: 2	2698344)							
EM1919013-021	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	4.8	3.5	30.2	No Limit
ES1936183-029	VC12_0.0-0.5	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	6.9	5.3	26.4	0% - 50%
EP130A: Organoph	osphorus Pesticides (Ultra-trace) (QC Lot: 2685368)							
ES1936183-029	VC12_0.0-0.5	EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	<10.0	0.00	No Limit
		EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.00	No Limit

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Sub-Matrix: SOIL						Laboratory I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP130A: Organopho	sphorus Pesticides (UI	ltra-trace) (QC Lot: 2685368) - continued							
ES1936183-029	VC12_0.0-0.5	EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.00	No Limit
EP131A: Organochlo	rine Pesticides (QC Lo	ot: 2685370)							
ES1936183-029	VC12_0.0-0.5	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: Total Chlordane (sum)		0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Sum of DDD + DDE + DDT	72-54-8/72-55-	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
			9/50-2						
		EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
	EP131A: Endrin EP131A: Endrin aldehyde			0.5	µg/kg	<0.50	<0.50	0.00	No Limit
				0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
EP131B: Polychlorin	ated Biphenyls (as Aro	oclors) (QC Lot: 2685369)							
ES1936183-029	VC12_0.0-0.5	EP131B: Total Polychlorinated biphenyls		5	µg/kg	34.6	37.1	6.96	No Limit
		EP131B: Aroclor 1016	12674-11-2	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	<5.0	0.00	No Limit
		EP131B: Aroclor 1254	11097-69-1	5	µg/kg	34.6	37.1	6.90	No Limit
	11096-82-5	5	µg/kg	<5.0	<5.0	0.00	No Limit		
EP132B: Polynuclear	· Aromatic Hydrocarbo	ons (QC Lot: 2685372)							
ES1936183-029	VC12_0.0-0.5	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	60	73	19.2	0% - 50%
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	5	0.00	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	8	13	45.8	No Limit

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Sub-Matrix: SOIL						Laboratory	Duplicate (DUP) Repor	t	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP132B: Polynuclea	ar Aromatic Hydrocarbo	ons (QC Lot: 2685372) - continued							
ES1936183-029 VC12_0.0-0.5 EP132B-SD: Phenanthrene			85-01-8	4	µg/kg	96	102	6.92	0% - 20%
		EP132B-SD: Anthracene			µg/kg	37	49	28.0	0% - 50%
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	201	231	13.9	0% - 20%
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	217	244	12.1	0% - 20%
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	147	171	15.3	0% - 20%
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	122	133	8.70	0% - 20%
		EP132B-SD: Benzo(b+j)fluoranthene	205-99-2	4	µg/kg	226	268	16.9	0% - 20%
			205-82-3						
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	116	129	10.3	0% - 20%
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	117	132	12.6	0% - 20%
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	255	291	13.3	0% - 20%
		EP132B-SD: Perylene	198-55-0	4	µg/kg	55	63	12.8	0% - 50%
		EP132B-SD: Benzo(g.h.i)perylene	191-24-2	4	µg/kg	197	213	7.57	0% - 20%
	53-70-3	4	µg/kg	40	44	10.2	0% - 50%		
EP132B-SD: Indeno(1.2.3.cd)pyrene		193-39-5	4	µg/kg	155	168	8.27	0% - 20%	
		EP132B-SD: Sum of PAHs		4	µg/kg	2180	2460	11.7	0% - 20%
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	10	11	14.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.00	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	126	117	6.80	0% - 20%
Sub-Matrix: WATER						Laboratory	Duplicate (DUP) Repor	t	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Meta	Is by ICP-MS (QC Lot:	2682925)							
EP1911242-021	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.026	132	No Limit
ES1936242-004	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	1.47	1.49	1.35	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.027	0.026	0.00	No Limit
EG035T: Total Reco	overable Mercury by Fl	MS (QC Lot: 2687534)							
ES1936219-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP080/07 <u>1: Total Pe</u>	troleum Hydrocarbons	(QC Lot: 2683791)							
EP1911242-021	Anonymous	EP080: C6 - C9 Eraction		20	ua/L	<20	<20	0.00	No Limit

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Sub-Matrix: WATER						Laboratory L	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Pet	roleum Hydrocarbons (QC	Lot: 2683791) - continued							
EP1911368-002	Anonymous	EP080: C6 - C9 Fraction		20	μg/L	<20	<20	0.00	No Limit
EP080/071: Total Rec	overable Hydrocarbons - N	EPM 2013 Fractions (QC Lot: 2683791)							
EP1911242-021	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	μg/L	<20	<20	0.00	No Limit
EP1911368-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	μg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 2683791)									
EP1911242-021	Anonymous	EP080: Benzene	71-43-2	1	μg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1911368-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	μg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report					
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High		
EG005(ED093)-SD: Total Metals in Sediments by ICP-AES (QCLot: 2691340)										
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	102	88.2	136		
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	71.8	70.0	109		
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2691	EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2691120)									
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	101	86.0	126		
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	104	90.0	113		
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	85.7	83.0	113		
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	96.3	80.0	114		
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2						
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	100	87.0	123		
EG005T: Selenium	7782-49-2	5	mg/kg	<5	5.37 mg/kg	131	75.0	131		
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.1 mg/kg	94.2	77.0	117		
EG035T: Total Recoverable Mercury by FIMS (Low Lev	el) (QCLot: 269134	2)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.257 mg/kg	91.2	72.0	116		
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 2691341)										
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	4.6 mg/kg	82.6	70.0	130		
EG020-SD: Arsenic	7440-38-2	1	mg/kg	<1.00	21.7 mg/kg	90.5	80.0	139		
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	4.64 mg/kg	88.4	83.0	127		
EG020-SD: Chromium	7440-47-3	1	mg/kg	<1.0	43.9 mg/kg	73.9	73.0	130		
EG020-SD: Copper	7440-50-8	1	mg/kg	<1.0	32 mg/kg	89.7	76.0	130		
EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	16 mg/kg	94.4	81.0	130		
EG020-SD: Lead	7439-92-1	1	mg/kg	<1.0	40 mg/kg	91.0	74.0	130		
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	130 mg/kg	92.9	76.0	130		
EG020-SD: Nickel	7440-02-0	1	mg/kg	<1.0	55 mg/kg	86.3	83.0	130		
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	5.37 mg/kg	118	71.0	130		
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	4 mg/kg	81.8	64.0	148		
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	29.6 mg/kg	94.6	84.0	131		
EG020-SD: Zinc	7440-66-6	1	mg/kg	<1.0	60.8 mg/kg	93.4	82.0	137		
EG035T: Total Recoverable Mercury by FIMS (QCLot:)	2691119)									
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	82.0	70.0	105		
EG048: Hexavalent Chromium (Alkaline Digest) (QCLo	:: 2684699)									
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	20 mg/kg	101	68.0	114		
				<0.5	40 mg/kg	82.8	68.0	114		
EK026SF: Total CN by Segmented Flow Analyser (QCI	_ot: 2682540)									
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	40 mg/kg	107	81.0	129		

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QCLot: 2682539)									
EK028SF: Weak Acid Dissociable Cyanide		1	mg/kg	<1	40 mg/kg	107	70.0	130	
EK040T: Fluoride Total (OCLot: 2685561)									
EK040T: Fluoride	16984-48-8	40	mg/kg	<40	400 mg/kg	85.2	67.2	96.3	
EP003: Total Organic Carbon (TOC) in Soil (QCI o	t: 2690237)								
EP003: Total Organic Carbon		0.02	%	<0.02	8.4 %	101	70.0	130	
				<0.02	0.48 %	111	70.0	130	
EP003: Total Organic Carbon (TOC) in Soil (QCLo	t: 2693466)								
EP003: Total Organic Carbon		0.02	%	<0.02	0.44 %	97.8	70.0	130	
				<0.02	0.48 %	91.3	70.0	130	
EP066: Polychlorinated Biphenyls (PCB) (QCLot:	2682735)								
EP066: Total Polychlorinated biphenyls		0.1	mg/kg	<0.1	1 mg/kg	108	62.0	126	
EP068A: Organochlorine Pesticides (OC) (OCLot:	2682733)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	86.3	69.0	113	
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	88.6	65.0	117	
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	88.3	67.0	119	
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	86.1	68.0	116	
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.6	65.0	117	
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.4	67.0	115	
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	86.3	69.0	115	
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	87.6	62.0	118	
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.9	63.0	117	
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.6	66.0	116	
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	84.9	64.0	116	
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	78.9	66.0	116	
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	85.9	67.0	115	
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.5	67.0	123	
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	86.2	69.0	115	
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.0	69.0	121	
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	77.3	56.0	120	
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.0	62.0	124	
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	86.2	66.0	120	
EP068B: Organophosphorus Pesticides (OP) (QC	Lot: 2682733)								
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	81.0	76.0	118	
EP071 SG: Total Petroleum Hydrocarbons - Silica	gel cleanup (QCLot: 26	82734)							
EP071SG-S: C10 - C14 Fraction		50	mg/kg	<50	300 mg/kg	93.3	80.0	116	
EP071SG-S: C15 - C28 Fraction		100	mg/kg	<100	450 mg/kg	93.5	85.0	115	
EP071SG-S: C29 - C36 Fraction		100	mg/kg	<100	300 mg/kg	99.9	75.0	123	
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 2682734)									

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Sub-Matrix: SOIL			Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%) Recovery L		Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 2682734) - continued								
EP071SG-S: >C10 - C16 Fraction		50	mg/kg	<50	375 mg/kg	96.2	89.0	109
EP071SG-S: >C16 - C34 Fraction		100	mg/kg	<100	525 mg/kg	93.3	84.0	112
EP071SG-S: >C34 - C40 Fraction		100	mg/kg	<100	225 mg/kg	110	71.0	119
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot:	2684260)							
EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	96.2	71.0	121
EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	90.1	65.0	131
EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	89.1	72.0	114
EP074: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	89.6	70.0	116
EP074 [,] Styrene	100-42-5	0.5	ma/ka	<0.5	1 ma/ka	91.5	67.0	113
EP074: ortho-Xvlene	95-47-6	0.5	ma/ka	<0.5	1 mg/kg	88.9	75.0	115
EP074B: Oxygenated Compounds (OCL ot: 2684260)								
EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	10 mg/kg	96.8	58.0	136
EP074E: Halogenated Aliphatic Compounds (QCLot:	2684260)							
EP074: Vinvl chloride	75-01-4	5	mg/kg	<5	10 mg/kg	56.9	43.0	147
EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	1 mg/kg	89.0	54.0	126
EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	1 mg/kg	106	58.0	148
EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	1 mg/kg	80.2	65.0	117
EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	1 mg/kg	76.9	59.0	125
EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	1 mg/kg	76.3	65.0	125
EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	1 mg/kg	86.3	70.0	118
EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	1 mg/kg	95.2	64.0	126
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	81.8	67.0	143
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	1 mg/kg	86.3	62.0	122
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	1 mg/kg	91.0	65.0	121
EP074F: Halogenated Aromatic Compounds (QCLot: :	2684260)							
EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	1 mg/kg	89.2	68.0	116
EP074G: Trihalomethanes (QCLot: 2684260)								
EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	1 mg/kg	83.1	66.0	124
EP075(SIM)A: Phenolic Compounds (QCLot: 2682732))							
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	88.9	71.0	125
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	94.2	72.0	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	94.3	71.0	123
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	103	67.0	127
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	76.0	54.0	114
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	73.6	68.0	126
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	91.8	66.0	120
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	97.3	70.0	120

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 2682732) - continued									
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	90.3	70.0	116	
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	86.1	54.0	114	
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	86.2	60.0	114	
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	11.8	10.0	57.0	
EP075(SIM)A: Phenolic Compounds (QCLot: 268275	5)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	98.7	71.0	125	
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	99.5	72.0	124	
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	95.8	71.0	123	
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	98.1	67.0	127	
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	77.6	54.0	114	
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	79.0	68.0	126	
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	94.4	66.0	120	
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	98.6	70.0	120	
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	95.1	70.0	116	
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	87.3	54.0	114	
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	81.6	60.0	114	
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	28.3	10.0	57.0	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons(QCLot: 2682732)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	103	77.0	125	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	110	72.0	124	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	101	73.0	127	
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	109	72.0	126	
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	103	75.0	127	
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	103	77.0	127	
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	111	73.0	127	
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	110	74.0	128	
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	96.0	69.0	123	
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	94.0	75.0	127	
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	86.4	68.0	116	
	205-82-3								
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	101	74.0	126	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	102	70.0	126	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	88.0	61.0	121	
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	87.6	62.0	118	
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	81.3	63.0	121	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons(QCLot: 2682755)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	103	77.0	125	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	104	72.0	124	

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Sub-Matrix: SOIL		Method Blank (MB)	Laboratory Control Spike (LCS) Report					
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2682755) - co	ontinued						
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	103	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	104	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	108	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	108	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	106	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	105	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	103	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	106	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	90.0	68.0	116
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	106	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	106	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	92.5	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	86.6	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	102	63.0	121
EP075A: Phenolic Compounds (QCLot: 2690636)								
EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	1.5 mg/kg	93.2	64.0	114
EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	1.5 mg/kg	93.0	57.0	115
EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	1.5 mg/kg	90.7	55.0	117
EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	1.5 mg/kg	89.1	46.0	122
EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	1.5 mg/kg	82.4	47.0	117
EP075: 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	1.5 mg/kg	86.8	13.7	108
EP075: 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	1.5 mg/kg	84.4	47.0	105
EP075: 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	1.5 mg/kg	81.4	48.0	110
EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	1.5 mg/kg	95.1	57.0	113
EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	1.5 mg/kg	80.8	49.0	109
EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	1.5 mg/kg	82.3	49.0	107
EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	3 mg/kg	18.4	12.0	76.0
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 2690636)								
EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	92.5	62.0	118
EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	1.5 mg/kg	92.9	58.0	116
EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	1.5 mg/kg	92.0	54.0	112
EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	96.8	56.0	114
EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	94.9	62.0	112
EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	96.9	59.0	115
EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	89.1	63.0	113
EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	94.8	57.0	111
EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	92.8	58.0	114
EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	94.9	57.0	117

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Sub-Matrix: SOIL			Method Blank (MB)	Laboratory Control Spike (LCS) Report					
				Report	Spike	Spike Recovery (%) Recovery		∉ Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EP075B: Polynuclear Aromatic Hydrocarbons (QCLo	ot: 2690636) - continu	led							
EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	1.5 mg/kg	81.2	58.0	114	
EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	92.4	59.0	115	
EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	97.9	61.0	117	
EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2	1	mg/kg	<1	3 mg/kg	79.0	57.0	119	
EP075: 7 12-Dimethylbenz(a)anthracene	57-97-6	0.5	ma/ka	<0.5	1.5 ma/ka	81.8	48.1	106	
EP075: Benzo(a)pyrene	50-32-8	0.5	ma/ka	<0.5	1.5 mg/kg	75.6	56.0	116	
EP075: 3-Methylcholanthrene	56-49-5	0.5	ma/ka	<0.5	1.5 mg/kg	62.4	50.0	116	
EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	68.7	55.0	117	
EP075: Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	69.9	53.0	119	
EP075: Benzo(g.h.i)pervlene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	69.1	56.0	120	
EP075C: Phthalate Esters (QCLot: 2690636)									
EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	1.5 mg/kg	99.4	60.0	118	
EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	1.5 mg/kg	96.0	65.0	115	
EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	1.5 mg/kg	93.4	65.0	121	
EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	1.5 mg/kg	93.8	62.0	116	
EP075: bis(2-ethylhexyl) phthalate	117-81-7		mg/kg		1.5 mg/kg	83.9	69.0	133	
EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	1.5 mg/kg	80.7	62.0	124	
EP075D: Nitrosamines (QCLot: 2690636)									
EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	1.5 mg/kg	106	39.4	124	
EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	1.5 mg/kg	90.9	59.0	117	
EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<0.5	1.5 mg/kg	94.5	53.0	125	
EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	1.5 mg/kg	95.0	65.0	121	
EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	1.5 mg/kg	97.1	59.0	123	
EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	1.5 mg/kg	89.8	57.0	115	
EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	1.5 mg/kg	88.5	57.0	119	
EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<0.6	3 mg/kg	95.4	42.0	112	
EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	1.5 mg/kg	66.5	16.3	123	
EP075E: Nitroaromatics and Ketones (QCLot: 26906	36)								
EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	1.5 mg/kg	106	27.3	129	
EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	1.5 mg/kg	94.3	60.0	116	
EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	1.5 mg/kg	89.9	65.0	119	
EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	1.5 mg/kg	87.5	62.0	116	
EP075: 2.6-Dinitrotoluene	606-20-2	0.5	mg/kg	<0.5	1.5 mg/kg	96.6	58.0	118	
EP075: 2.4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	1.5 mg/kg	93.4	59.0	115	
EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	1.5 mg/kg	33.2	18.0	112	
EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	1.5 mg/kg	65.0	10.0	87.0	

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Sub-Matrix: SOIL		Method Blank (MB)	Laboratory Control Spike (LCS) Report					
				Report	Spike	Spike Recovery (%) Recovery		Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075E: Nitroaromatics and Ketones (QCLot: 2690636) - continued								
EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	1.5 mg/kg	93.1	48.3	98.5
EP075: Azobenzene	103-33-3	1	mg/kg	<1	1.5 mg/kg	94.0	62.0	118
EP075: 1.3.5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	1.5 mg/kg	63.6	36.0	114
EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	1.5 mg/kg	94.0	62.0	114
EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	1.5 mg/kg	82.3	36.1	102
EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	1.5 mg/kg	93.4	56.0	110
EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	1.5 mg/kg	87.2	54.0	110
EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	1.5 mg/kg	86.8	48.0	108
EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	1.5 mg/kg	87.7	57.4	112
EP075F: Haloethers (QCLot: 2690636)								
EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	1.5 mg/kg	75.2	63.0	121
EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	1.5 mg/kg	87.6	59.0	115
EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	1.5 mg/kg	96.1	58.0	112
EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	98.1	58.0	110
EP075G: Chlorinated Hydrocarbons (QCLot: 2690636)								
EP075: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	1.5 mg/kg	91.3	58.0	112
EP075: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1.5 mg/kg	94.5	58.0	116
EP075: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1.5 mg/kg	94.4	57.0	115
EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	1.5 mg/kg	91.3	54.0	116
EP075: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1.5 mg/kg	92.9	62.9	108
EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	1.5 mg/kg	72.2	39.1	110
EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	1.5 mg/kg	94.7	59.0	117
EP075: Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5	1.5 mg/kg	35.9	24.3	108
EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	1.5 mg/kg	91.0	57.0	109
EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<0.5	1.5 mg/kg	94.3	59.0	111
EP075H: Anilines and Benzidines (QCLot: 2690636)								
EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	1.5 mg/kg	82.8	13.2	108
EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	1.5 mg/kg	40.9	20.5	99.0
EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<0.5	1.5 mg/kg	95.8	52.0	112
EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<0.5	1.5 mg/kg	78.5	31.5	93.7
EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	1.5 mg/kg	94.6	60.0	110
EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	1.5 mg/kg	84.6	42.0	112
EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	1.5 mg/kg	90.7	59.0	111
EP075: 3.3'-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	1.5 mg/kg	71.9	23.1	113
EP075I: Organochlorine Pesticides (QCLot: 2690636)								
EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	1.5 mg/kg	96.3	63.0	113
EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	1.5 mg/kg	91.6	57.0	113
EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	1.5 mg/kg	84.3	61.0	117

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Sub-Matrix: SOIL		Method Blank (MB)	Laboratory Control Spike (LCS) Report					
	Report		Report	Spike	Spike Recovery (%)	Recovery	_imits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075I: Organochlorine Pesticides (QCLot: 269	90636) - continued							
EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	1.5 mg/kg	87.5	64.0	118
EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	1.5 mg/kg	83.3	55.0	115
EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	1.5 mg/kg	89.2	61.0	115
EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	1.5 mg/kg	81.9	56.0	118
EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	1.5 mg/kg	90.7	65.0	125
EP075: 4.4`-DDE	72-55-9	0.5	mg/kg	<0.5	1.5 mg/kg	96.1	60.0	116
EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	1.5 mg/kg	90.6	64.0	118
EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	1.5 mg/kg	85.9	53.0	117
EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	1.5 mg/kg	95.7	65.0	115
EP075: 4.4`-DDD	72-54-8	0.5	mg/kg	<0.5	1.5 mg/kg	104	62.0	118
EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	1.5 mg/kg	97.4	63.0	129
EP075: 4.4`-DDT	50-29-3	0.5	mg/kg	<0.5	1.5 mg/kg	64.4	46.0	122
EP075: Sum of DDD + DDE + DDT	72-54-8/72-5	0.5	mg/kg	<0.5				
ED075: Sum of Aldrin + Dioldrin	200 00 2/60	0.5	ma/ka	<0.5				
	57-1	0.0	ing/kg	-0.0				
EP075J: Organophosphorus Pesticides (QCLot	t: 2690636)							
EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	83.0	46.0	112
EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	1.5 mg/kg	92.4	63.0	119
EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	1.5 mg/kg	98.2	68.0	134
EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	1.5 mg/kg	93.6	60.0	130
EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	1.5 mg/kg	105	65.0	127
EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	1.5 mg/kg	95.4	60.0	116
EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	1.5 mg/kg	88.2	63.0	113
EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	1.5 mg/kg	92.1	65.0	115
EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	1.5 mg/kg	85.1	59.0	103
EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	1.5 mg/kg	91.6	59.0	119
EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	1.5 mg/kg	97.3	62.0	118
EP080/071: Total Petroleum Hydrocarbons (QC	Lot: 2684261)							
EP080: C6 - C9 Fraction		10	mg/kg	<10	26 mg/kg	74.2	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QC	Lot: 2687451)							
EP080: C6 - C9 Fraction		10	mg/kg	<10	26 mg/kg	86.8	68.4	128
EP080/071: Total Recoverable Hydrocarbons - N	NEPM 2013 Fractions (QCL	.ot: 2684261)						
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	74.1	68.4	128
EP080/071: Total Recoverable Hydrocarbons - N	NEPM 2013 Fractions (QCL	.ot: 2687451)						
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	86.0	68.4	128
EP080: BTEXN (QCLot: 2684261)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	97.0	62.0	116

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Sub-Matrix: SOIL Method		Method Blank (MB)	Laboratory Control Spike (LCS) Report						
		Report	Spike	Spike Recovery (%)	Recovery	Limits (%)			
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EP080: BTEXN (QCLot: 2684261) - continued									
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	93.1	67.0	121	
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	92.2	65.0	117	
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	91.7	66.0	118	
	106-42-3								
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	95.5	68.0	120	
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	99.6	63.0	119	
EP080: BTEXN (QCLot: 2687451)									
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	92.4	62.0	116	
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	87.1	67.0	121	
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	83.4	65.0	117	
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	82.4	66.0	118	
	106-42-3								
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	90.7	68.0	120	
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	82.0	63.0	119	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbo	ns (QCLot: 2685373)								
EP071-SD: C10 - C14 Fraction		3	mg/kg	<3	5 mg/kg	90.0	78.0	118	
EP071-SD: C15 - C28 Fraction		3	mg/kg	<3	7.5 mg/kg	94.6	84.0	118	
EP071-SD: C29 - C36 Fraction		5	mg/kg	<5	5 mg/kg	99.8	73.0	119	
EP071-SD: C10 - C36 Fraction (sum)		3	mg/kg	<3					
EP080-SD / EP071-SD: Total Petroleum Hydrocarbo	ns (QCLot: 2687455)								
EP080-SD: C6 - C9 Fraction		3	mg/kg	<3	6.2 mg/kg	73.8	61.0	133	
EP080-SD / EP071-SD: Total Recoverable Hydrocart	oons (QCLot: 2685373)								
EP071-SD: >C10 - C16 Fraction		3	mg/kg	<3	6.25 mg/kg	98.8	70.0	130	
EP071-SD: >C16 - C34 Fraction		3	mg/kg	<3	8.75 mg/kg	98.1	74.0	138	
EP071-SD: >C34 - C40 Fraction		5	mg/kg	<5	3.75 mg/kg	76.5	63.0	131	
EP071-SD: >C10 - C40 Fraction (sum)		3	mg/kg	<3					
EP080-SD: BTEXN (QCLot: 2687455)									
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	0.2 mg/kg	99.6	66.0	122	
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	0.2 mg/kg	95.8	70.0	130	
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.2 mg/kg	96.6	66.0	126	
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	0.4 mg/kg	98.3	59.0	129	
	106-42-3								
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.2 mg/kg	96.1	66.0	126	
EP090: Organotin Compounds (QCLot: 2689830)									
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	89.4	52.0	139	
EP090: Organotin Compounds (QCLot: 2698344)									
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	135	52.0	139	
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 2685368)								

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report			
				Report	Spike	Spike Recovery (%)	Recovery I	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP130A: Organophosphorus Pesticides (Ultra-trac	e) (QCLot: 2685368) -	continued						
EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	50 µg/kg	82.6	49.0	117
EP130: Carbophenothion	786-19-6	10	µg/kg	<10	50 µg/kg	79.3	54.0	104
EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	5 µg/kg	78.1	48.0	156
EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	50 µg/kg	84.7	53.0	119
EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	50 µg/kg	92.8	54.0	112
EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	50 µg/kg	97.2	52.0	108
EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	50 µg/kg	88.3	51.0	109
EP130: Diazinon	333-41-5	10	µg/kg	<10	50 µg/kg	95.8	57.0	121
EP130: Dichlorvos	62-73-7	10	µg/kg	<10	50 µg/kg	80.8	48.0	104
EP130: Dimethoate	60-51-5	10	µg/kg	<10	50 µg/kg	90.0	52.0	120
EP130: Ethion	563-12-2	10	µg/kg	<10	50 µg/kg	92.9	51.0	121
EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	50 µg/kg	89.1	50.0	120
EP130: Fenthion	55-38-9	10	µg/kg	<10	50 µg/kg	97.4	48.0	112
EP130: Malathion	121-75-5	10	µg/kg	<10	50 µg/kg	86.8	51.0	121
EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	50 µg/kg	94.6	45.0	127
EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	50 µg/kg	84.2	48.0	128
EP130: Parathion	56-38-2	10	µg/kg	<10	50 µg/kg	95.6	49.0	125
EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	50 µg/kg	98.8	51.0	119
EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	50 µg/kg	81.7	48.0	120
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	50 µg/kg	90.7	51.0	117
EP131A: Organochlorine Pesticides (QCLot: 2685	370)							
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	78.1	38.0	139
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	78.4	17.6	136
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	91.2	30.5	131
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	59.0	37.0	140
EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	73.9	25.9	141
EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	74.5	35.0	129
EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	68.3	23.4	138
EP131A: Sum of DDD + DDE + DDT	72-54-8/72-5	0.5	µg/kg	<0.50				
	5-9/50-2							
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 μg/kg	88.9	30.2	140
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 μg/kg	74.7	38.0	140
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 μg/kg	92.5	32.0	152
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	67.0	36.0	155
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50				
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	118	25.8	158
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	78.2	20.1	118
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	67.1	13.4	135
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	62.9	39.0	155

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report			
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP131A: Organochlorine Pesticides (QCLot: 268	5370) - continued							
EP131A: Heptachlor epoxide	1024-57-3	0.5	μg/kg	<0.50	5 µg/kg	90.6	34.0	148
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	μg/kg	<0.50	5 µg/kg	85.9	26.1	152
EP131A: gamma-BHC	58-89-9	0.25	μg/kg	<0.25	5 µg/kg	78.5	31.2	137
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	54.3	36.0	152
EP131A: cis-Chlordane	5103-71-9	0.25	μg/kg	<0.25	5 µg/kg	76.2	36.0	142
EP131A: trans-Chlordane	5103-74-2	0.25	μg/kg	<0.25	5 µg/kg	82.4	29.5	138
EP131A: Total Chlordane (sum)		0.25	µg/kg	<0.25				
EP131B: Polychlorinated Biphenyls (as Aroclors)) (QCLot: 2685369)							
EP131B: Total Polychlorinated biphenyls		5	μg/kg	<5.0	50 µg/kg	64.1	45.0	115
EP131B: Aroclor 1016	12674-11-2	5	μg/kg	<5.0				
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0				
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0				
EP131B: Aroclor 1242	53469-21-9	5	μg/kg	<5.0				
EP131B: Aroclor 1248	12672-29-6	5	μg/kg	<5.0				
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	64.1	45.0	115
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0				
EP132B: Polynuclear Aromatic Hydrocarbons(Q	CLot: 2685372)							
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	92.9	63.0	129
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	μg/kg	<5	25 µg/kg	80.8	64.0	128
EP132B-SD: Acenaphthylene	208-96-8	4	μg/kg	<4	25 µg/kg	81.5	65.0	129
EP132B-SD: Acenaphthene	83-32-9	4	μg/kg	<4	25 µg/kg	84.4	68.0	132
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	86.4	68.0	124
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	80.1	64.0	134
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	84.0	65.0	131
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	80.0	64.0	130
EP132B-SD: Pyrene	129-00-0	4	μg/kg	<4	25 µg/kg	88.3	67.0	133
EP132B-SD: Benz(a)anthracene	56-55-3	4	μg/kg	<4	25 µg/kg	78.4	62.0	130
EP132B-SD: Chrysene	218-01-9	4	μg/kg	<4	25 µg/kg	80.6	65.0	133
EP132B-SD: Benzo(b+j)fluoranthene	205-99-2	4	μg/kg	<4	25 µg/kg	96.3	68.0	120
	205-82-3						1	1
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	89.7	61.0	133
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	96.1	63.0	127
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	91.6	66.0	118
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	93.3	69.0	119
EP132B-SD: Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	94.8	66.0	120
EP132B-SD: Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	93.2	64.0	122
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	93.7	64.0	120
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	112	68.0	136
EP132B-SD: Sum of PAHs		4	µg/kg	<4				

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Sub-Matrix: WATER				Method Blank (MB)	Laboratory Control Spike (LCS) Report			
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 2682925)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.1	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.8	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.8	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.5	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.6	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.6	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.8	79.0	117
EG035T: Total Recoverable Mercury by FIMS (QCL	.ot: 2687534)							
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	97.3	77.0	111
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	(QCLot: 2681721)							
EP075(SIM): Naphthalene	91-20-3	1	μg/L	<1.0	5 µg/L	68.4	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	μg/L	<1.0	5 µg/L	75.1	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	μg/L	<1.0	5 µg/L	69.1	62.2	113
EP075(SIM): Fluorene	86-73-7	1	μg/L	<1.0	5 µg/L	75.8	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	μg/L	<1.0	5 µg/L	82.0	62.6	116
EP075(SIM): Anthracene	120-12-7	1	μg/L	<1.0	5 µg/L	76.8	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	μg/L	<1.0	5 µg/L	97.6	63.6	118
EP075(SIM): Pyrene	129-00-0	1	μg/L	<1.0	5 µg/L	100	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	μg/L	<1.0	5 µg/L	82.4	64.1	117
EP075(SIM): Chrysene	218-01-9	1	μg/L	<1.0	5 µg/L	82.2	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	77.7	61.7	119
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	μg/L	<1.0	5 µg/L	74.7	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	μg/L	<0.5	5 µg/L	95.9	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	μg/L	<1.0	5 µg/L	100	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	μg/L	<1.0	5 µg/L	93.3	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	μg/L	<1.0	5 µg/L	96.4	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot:	2681720)							
EP071: C10 - C14 Fraction		50	µg/L	<50	2000 µg/L	101	55.8	112
EP071: C15 - C28 Fraction		100	µg/L	<100	3000 µg/L	91.2	71.6	113
EP071: C29 - C36 Fraction		50	µg/L	<50	2000 µg/L	96.3	56.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot:	2683791)							
EP080: C6 - C9 Fraction		20	μg/L	<20	260 µg/L	80.6	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEP	M 2013 Fractions (QCL	.ot: 2681720)						
EP071: >C10 - C16 Fraction		100	μg/L	<100	2500 μg/L	66.5	57.9	119
EP071: >C16 - C34 Fraction		100	µg/L	<100	3500 μg/L	95.2	62.5	110
EP071: >C34 - C40 Fraction		100	µg/L	<100	1500 μg/L	81.7	61.5	121
EP080/071: Total Recoverable Hydrocarbons - NEP	M 2013 Fractions (QCL	.ot: 2683791)						

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Sub-Matrix: WATER				Method Blank (MB)	Laboratory Control Spike (LCS) Report						
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)			
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High			
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2683791) - continued											
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	82.6	75.0	127			
EP080: BTEXN (QCLot: 2683791)											
EP080: Benzene	71-43-2	1	μg/L	<1	10 µg/L	93.5	70.0	122			
EP080: Toluene	108-88-3	2	μg/L	<2	10 µg/L	95.5	69.0	123			
EP080: Ethylbenzene	100-41-4	2	μg/L	<2	10 µg/L	99.2	70.0	120			
EP080: meta- & para-Xylene	108-38-3	2	μg/L	<2	10 µg/L	100	69.0	121			
	106-42-3										
EP080: ortho-Xylene	95-47-6	2	μg/L	<2	10 µg/L	101	72.0	122			
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	105	70.0	120			

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL					Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery L	imits (%)		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High		
EG005(ED093)T: T	otal Metals by ICP-AES (QCLot: 2691120)								
ES1935800-002	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	94.3	70.0	130		
		EG005T: Cadmium	7440-43-9	50 mg/kg	101	70.0	130		
		EG005T: Lead	7439-92-1	250 mg/kg	99.1	70.0	130		
		EG005T: Nickel	7440-02-0	50 mg/kg	101	70.0	130		
EG035T: Total Red	coverable Mercury by FIMS (Low Level) (QCLot: 269134	2)							
ES1936183-029	VC12_0.0-0.5	EG035T-LL: Mercury	7439-97-6	0.05 mg/kg	128	70.0	130		
EG020-SD: Total M	etals in Sediments by ICPMS (QCLot: 2691341)								
ES1936183-040	VC08_1.0-1.5	EG020-SD: Arsenic	7440-38-2	50 mg/kg	93.5	70.0	130		
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	90.8	70.0	130		
		EG020-SD: Chromium	7440-47-3	50 mg/kg	92.3	70.0	130		
		EG020-SD: Copper	7440-50-8	250 mg/kg	94.8	70.0	130		
		EG020-SD: Lead	7439-92-1	250 mg/kg	99.3	70.0	130		
		EG020-SD: Nickel	7440-02-0	50 mg/kg	90.1	70.0	130		
		EG020-SD: Zinc	7440-66-6	250 mg/kg	91.8	70.0	130		
EG035T: Total Red	coverable Mercury by FIMS (QCLot: 2691119)								
ES1935800-002	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	100	70.0	130		
EG048: Hexavalent	t Chromium (Alkaline Digest) (QCLot: 2684699)								
ES1935800-022	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	# 2.00	70.0	130		
ES1935800-022	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	# 2.00	70.0	130		

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Sub-Matrix: SOIL				Ма	trix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Recovery Lin	nits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK026SF: Total CN	by Segmented Flow Analyser (QCLot: 2682540)						
ES1935800-011	Anonymous	EK026SF: Total Cyanide	57-12-5	40 mg/kg	115	70.0	130
EK028SF: Weak Ac	id Dissociable CN by Segmented Flow Analyser(QCLo	ot: 2682539)					
ES1935800-011	Anonymous	EK028SF: Weak Acid Dissociable Cyanide		40 mg/kg	109	70.0	130
EK040T: Fluoride To	otal (QCLot: 2685561)						
EB1928345-001	Anonymous	EK040T: Fluoride	16984-48-8	400 mg/kg	106	70.0	130
EP066: Polychlorina	ated Biphenyls (PCB) (QCLot: 2682735)		·				
ES1935800-011	Anonymous	EP066: Total Polychlorinated biphenyls		1 mg/kg	121	70.0	130
EP068A: Organochl	orine Pesticides (OC) (QCLot: 2682733)						
ES1935800-011	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	92.1	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	82.7	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	97.0	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	86.4	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	81.2	70.0	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	89.1	70.0	130
EP071 SG: Total Pet	troleum Hydrocarbons - Silica gel cleanup (QCLot: 268	2734)					
ES1935800-011	Anonymous	EP071SG-S: C10 - C14 Fraction		523 mg/kg	108	43.0	139
		EP071SG-S: C15 - C28 Fraction		2319 mg/kg	116	49.0	131
		EP071SG-S: C29 - C36 Fraction		1714 mg/kg	128	64.0	158
EP071 SG: Total Re	coverable Hydrocarbons - NEPM 2013 Fractions - Silica	gel cleanup (QCLot: 2682734)					
ES1935800-011	Anonymous	EP071SG-S: >C10 - C16 Fraction		860 mg/kg	108	33.0	137
		EP071SG-S: >C16 - C34 Fraction		3223 mg/kg	124	40.0	137
		EP071SG-S: >C34 - C40 Fraction		1058 mg/kg	110	30.0	190
EP074A: Monocyclic	c Aromatic Hydrocarbons (QCLot: 2684260)						
ES1935800-011	Anonymous	EP074: Benzene	71-43-2	2.5 mg/kg	101	70.0	130
		EP074: Toluene	108-88-3	2.5 mg/kg	99.5	70.0	130
EP074E: Halogenate	ed Aliphatic Compounds (QCLot: 2684260)						
ES1935800-011	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	2.5 mg/kg	97.9	70.0	130
		EP074: Trichloroethene	79-01-6	2.5 mg/kg	93.0	70.0	130
EP074F: Halogenate	ed Aromatic Compounds (QCLot: 2684260)						
ES1935800-011	Anonymous	EP074: Chlorobenzene	108-90-7	2.5 mg/kg	96.0	70.0	130
EP075(SIM)A: Phene	olic Compounds (QCLot: 2682732)						
ES1935800-011	Anonymous	EP075(SIM): Phenol	108-95-2	10 mg/kg	88.4	70.0	130
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	94.4	70.0	130
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	79.7	60.0	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	91.6	70.0	130

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Sub-Matrix: SOIL				Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery Li	mits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
EP075(SIM)A: Phe	nolic Compounds (QCLot: 2682732) - continued							
ES1935800-011	Anonymous	EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	21.4	20.0	130	
EP075(SIM)A: Phe	nolic Compounds (QCLot: 2682755)							
ES1935800-001	Anonymous	EP075(SIM): Phenol	108-95-2	10 mg/kg	89.4	70.0	130	
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	96.5	70.0	130	
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	98.1	60.0	130	
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	93.1	70.0	130	
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	94.9	20.0	130	
EP075(SIM)B: Poly	nuclear Aromatic Hydrocarbons (QCLot: 2682732)							
ES1935800-011	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	98.8	70.0	130	
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	110	70.0	130	
EP075(SIM)B: Poly	nuclear Aromatic Hydrocarbons (QCLot: 2682755)							
ES1935800-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	99.0	70.0	130	
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	114	70.0	130	
EP075A: Phenolic	Compounds (QCLot: 2690636)					İ		
ES1936183-029	VC12_0.0-0.5	EP075: Phenol	108-95-2	10 mg/kg	104	60.0	130	
		EP075: 2-Chlorophenol	95-57-8	10 mg/kg	108	60.0	130	
		EP075: 2-Nitrophenol	88-75-5	10 mg/kg	106	50.0	130	
		EP075: 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	113	50.0	130	
		EP075: Pentachlorophenol	87-86-5	10 mg/kg	60.2	10.0	130	
EP075B: Polynucle	ear Aromatic Hydrocarbons (QCLot: 2690636)							
ES1936183-029	VC12_0.0-0.5	EP075: Acenaphthene	83-32-9	10 mg/kg	101	50.0	130	
		EP075: Pyrene	129-00-0	10 mg/kg	106	50.0	130	
EP075D: Nitrosam	ines (QCLot: 2690636)							
ES1936183-029	VC12_0.0-0.5	EP075: N-Nitrosodi-n-propylamine	621-64-7	10 mg/kg	107	50.0	130	
EP075E: Nitroaron	natics and Ketones (QCLot: 2690636)							
ES1936183-029	VC12_0.0-0.5	EP075: 2.4-Dinitrotoluene	121-14-2	10 mg/kg	105	40.0	130	
EP075G: Chlorinat	ed Hydrocarbons (QCLot: 2690636)							
ES1936183-029	VC12_0.0-0.5	EP075: 1.4-Dichlorobenzene	106-46-7	10 mg/kg	107	60.0	130	
		EP075: 1.2.4-Trichlorobenzene	120-82-1	10 mg/kg	108	50.0	130	
EP080/071: Total P	Petroleum Hydrocarbons (QCLot: 2684261)					İ		
ES1935800-011	Anonymous	EP080: C6 - C9 Fraction		32.5 mg/kg	92.3	70.0	130	
EP080/071: Total P	Petroleum Hydrocarbons (QCLot: 2687451)							
ES1936325-001	Anonymous	EP080: C6 - C9 Fraction		32.5 mg/kg	93.2	70.0	130	
EP080/071: Total R	Recoverable Hydrocarbons - NEPM 2013 Fractions (QC	Lot: 2684261)						
ES1935800-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	89.0	70.0	130	

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Sub-Matrix: SOIL	ub-Matrix: SOIL			Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery L	imits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total R	ecoverable Hydrocarbons - NEPM 2013 Fractions(QC	Lot: 2687451)					
ES1936325-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	93.1	70.0	130
EP080: BTEXN (Q	CLot: 2684261)						
ES1935800-011	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	105	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	98.5	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	101	70.0	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	100	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	101	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	88.6	70.0	130
EP080: BTEXN (Q	CLot: 2687451)						
ES1936325-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	93.0	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	92.5	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	101	70.0	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	100	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	102	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	104	70.0	130
EP080-SD / EP071-	SD: Total Petroleum Hydrocarbons (QCLot: 2685373)						
ES1936183-029	VC12_0.0-0.5	EP071-SD: C10 - C14 Fraction		14 mg/kg	80.6	70.0	130
		EP071-SD: C15 - C28 Fraction		59 mg/kg	110	70.0	130
		EP071-SD: C29 - C36 Fraction		42 mg/kg	100	70.0	130
EP080-SD / EP071-	SD: Total Petroleum Hydrocarbons (QCLot: 2687455)						
ES1936183-029	VC12_0.0-0.5	EP080-SD: C6 - C9 Fraction		6.5 mg/kg	86.6	70.0	130
EP080-SD: BTEXN	(QCLot: 2687455)						
ES1936183-029	VC12_0.0-0.5	EP080-SD: Benzene	71-43-2	0.5 mg/kg	87.2	70.0	130
		EP080-SD: Toluene	108-88-3	0.5 mg/kg	87.9	70.0	130
		EP080-SD: Ethylbenzene	100-41-4	0.5 mg/kg	90.9	70.0	130
		EP080-SD: meta- & para-Xylene	108-38-3	0.5 mg/kg	89.5	70.0	130
			106-42-3				
		EP080-SD: ortho-Xylene	95-47-6	0.5 mg/kg	91.2	70.0	130
EP090: Organotin	Compounds (QCLot: 2698344)						
EM1919013-022	Anonymous	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	# 866	20.0	130
EP130A: Organoph	nosphorus Pesticides (Ultra-trace) (QCLot: 2685368)						
ES1936183-029	VC12_0.0-0.5	EP130: Bromophos-ethyl	4824-78-6	50 µg/kg	66.1	36.0	144
		EP130: Carbophenothion	786-19-6	50 µg/kg	54.0	38.0	120
		EP130: Chlorfenvinphos (E)	18708-86-6	5 µg/kg	63.6	49.0	157
		EP130: Chlorfenvinphos (Z)	18708-87-7	50 µg/kg	58.3	53.0	145

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ub-Matrix: SOIL			Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery L	imits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP130A: Organopl	nosphorus Pesticides (Ultra-trace) (QCLot: 2685368)	- continued					
ES1936183-029	VC12 0.0-0.5	EP130: Chlorpyrifos	2921-88-2	50 µg/kg	65.0	60.0	140
	_	EP130: Chlorpyrifos-methyl	5598-13-0	50 µg/kg	73.1	56.0	126
		EP130: Demeton-S-methyl	919-86-8	50 µg/kg	64.8	9.70	148
		EP130: Diazinon	333-41-5	50 µg/kg	67.7	60.0	122
		EP130: Dichlorvos	62-73-7	50 µg/kg	61.1	33.0	123
		EP130: Dimethoate	60-51-5	50 µg/kg	66.1	36.0	142
		EP130: Ethion	563-12-2	50 µg/kg	52.4	48.0	136
		EP130: Fenamiphos	22224-92-6	50 µg/kg	55.2	42.0	136
		EP130: Fenthion	55-38-9	50 µg/kg	65.4	35.0	131
		EP130: Malathion	121-75-5	50 µg/kg	59.5	55.0	141
		EP130: Azinphos Methyl	86-50-0	50 µg/kg	57.2	23.5	132
		EP130: Monocrotophos	6923-22-4	50 µg/kg	55.0	35.0	153
		EP130: Parathion	56-38-2	50 µg/kg	60.5	57.0	147
		EP130: Parathion-methyl	298-00-0	50 µg/kg	63.4	48.0	140
		EP130: Pirimphos-ethyl	23505-41-1	50 µg/kg	53.0	45.0	137
		EP130: Prothiofos	34643-46-4	50 µg/kg	57.0	51.0	137
EP131A: Organoch	lorine Pesticides (QCLot: 2685370)						
ES1936183-029	VC12_0.0-0.5	EP131A: Aldrin	309-00-2	5 µg/kg	66.5	23.4	153
		EP131A: alpha-BHC	319-84-6	5 µg/kg	52.8	17.6	156
		EP131A: beta-BHC	319-85-7	5 µg/kg	70.6	24.9	153
		EP131A: delta-BHC	319-86-8	5 µg/kg	63.4	25.2	147
		EP131A: 4.4`-DDD	72-54-8	5 µg/kg	55.5	25.9	150
		EP131A: 4.4`-DDE	72-55-9	5 µg/kg	65.4	31.2	125
		EP131A: 4.4`-DDT	50-29-3	5 µg/kg	89.0	23.4	163
		EP131A: Dieldrin	60-57-1	5 µg/kg	54.6	30.2	140
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	49.8	28.8	135
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	58.4	22.6	141
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	50.7	16.1	156
		EP131A: Endrin	72-20-8	5 µg/kg	86.4	17.7	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	56.8	20.1	116
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	45.1	13.4	151
		EP131A: Heptachlor	76-44-8	5 µg/kg	49.7	23.8	170
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	57.3	28.3	140
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	61.0	17.7	144
		EP131A: gamma-BHC	58-89-9	5 µg/kg	52.6	21.8	158
		EP131A: Methoxychlor	72-43-5	5 µg/kg	62.6	24.4	158
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	65.7	27.3	139
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	54.5	29.5	138
EP131B: Polychlor	inated Biphenyls (as Aroclors) (QCLot: 2685369)						

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Sub-Matrix: SOIL	-Matrix: SOIL			Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery L	imits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP131B: Polychlor	inated Biphenyls (as Aroclors) (QCLot: 26853	69) - continued					
ES1936183-040	VC08_1.0-1.5	EP131B: Total Polychlorinated biphenyls		50 µg/kg	66.4	44.0	136
		EP131B: Aroclor 1254	11097-69-1	50 µg/kg	66.4	44.0	136
EP132B: Polynucle	ear Aromatic Hydrocarbons (QCLot: 2685372)						
ES1936183-029	VC12 0.0-0.5	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	116	70.0	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	95.3	70.0	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	105	70.0	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	98.6	70.0	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	117	70.0	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	81.9	70.0	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	88.1	70.0	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	# Not	70.0	130
					Determined		
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	# Not	70.0	130
					Determined		
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	# Not	70.0	130
					Determined		
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	71.3	70.0	130
		EP132B-SD: Benzo(b+j)fluoranthene	205-99-2	25 µg/kg	# Not	70.0	130
			205-82-3		Determined		
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	82.7	70.0	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	93.0	70.0	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	# Not	70.0	130
					Determined		
		EP132B-SD: Perylene	198-55-0	25 µg/kg	101	70.0	130
		EP132B-SD: Benzo(g.h.i)perylene	191-24-2	25 µg/kg	# Not	70.0	130
			50 70 0	05	Determined	70.0	400
		EP132B-SD: Dibenz(a.h)anthracene	53-70-3	25 µg/kg	89.6	70.0	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	# Not	70.0	130
			101 07 1		Determined	70.0	120
		EP132B-SD: Coronene	191-07-1	25 µg/kg	123	70.0	130
Sub-Matrix: WATER				Ma	atrix Spike (MS) Repor	t	
Laboratoria anna la ID	Olivert commute ID		040 Number	<i>Spike</i>	SpikeRecovery(%)	Recovery L	imits (%)
Laboratory sample ID		Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Met	als by ICP-MS (QCLot: 2682925)						
ES1936183-062	RIN_02	EG020A-T: Arsenic	7440-38-2	1 mg/L	96.7	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	99.1	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	102	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	95.3	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	99.4	70.0	130

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Sub-Matrix: WATER		Γ	Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery Li	mits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Meta	Is by ICP-MS (QCLot: 2682925) - continued						
ES1936183-062	RIN_02	EG020A-T: Nickel	7440-02-0	1 mg/L	95.8	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	96.1	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2687534)							
EP1911242-021	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	90.3	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2683791)							
EP1911242-021	Anonymous	EP080: C6 - C9 Fraction		325 µg/L	97.4	70.0	130
EP080/071: Total R	ecoverable Hydrocarbons - NEPM 2013 Fractions (QCL	ot: 2683791)					
EP1911242-021	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	96.5	70.0	130
EP080: BTEXN (QC	CLot: 2683791)						
EP1911242-021	Anonymous	EP080: Benzene	71-43-2	25 µg/L	101	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	96.1	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	99.5	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	99.3	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	102	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	84.0	70.0	130

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2
	Cli	ent samplii	ng date / time	31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064
				Result	Result	Result	Result	Result
EP075J: Organophosphorus Pesticide	s - Continued							
Dichlorvos	62-73-7	0.5	mg/kg	<0.5				
Dimethoate	60-51-5	0.5	mg/kg	<0.5				
Diazinon	333-41-5	0.5	mg/kg	<0.5				
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5				
Malathion	121-75-5	0.5	mg/kg	<0.5				
Fenthion	55-38-9	0.5	mg/kg	<0.5				
Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5				
Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5				
Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5				
Prothiofos	34643-46-4	0.5	mg/kg	<0.5				
Ethion	563-12-2	0.5	mg/kg	<0.5				
EP080/071: Total Petroleum Hydrocart	oons							
C6 - C9 Fraction		10	mg/kg		<10	<10		<10
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3 Fractio	າຣ					
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10		<10
>C10 - C16 Fraction		3	mg/kg	<3				
[^] C6 - C10 Fraction minus BTEX	C6_C10-BTEX	10	mg/kg					<10
(F1)								
>C16 - C34 Fraction		3	mg/kg	66				
>C34 - C40 Fraction		5	mg/kg	48				
>C10 - C40 Fraction (sum)		3	mg/kg	114				
>C10 - C16 Fraction minus Naphthalene		3	mg/kg	<3				
(F2)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg				<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg				8.3	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg				1.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg				8.3	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg				3.6	<0.5
^ Total Xylenes		0.5	mg/kg				11.9	<0.5
^ Sum of BTEX		0.2	mg/kg				21.7	<0.2
Naphthalene	91-20-3	1	mg/kg				<1	<1
EP080-SD / EP071-SD: Total Petroleum	n Hydrocarbons							
C6 - C9 Fraction		3	mg/kg	<3				

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2	
	Cli	ient sampli	ng date / time	31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064	
				Result	Result	Result	Result	Result	
EP080-SD / EP071-SD: Total Petroleu	um Hydrocarbons - C	ontinued							
C10 - C14 Fraction		3	mg/kg	<3					
C15 - C28 Fraction		3	mg/kg	18					
C29 - C36 Fraction		5	mg/kg	70					
^ C10 - C36 Fraction (sum)		3	mg/kg	88					
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons									
C6 - C10 Fraction	C6_C10	3	mg/kg	<3					
C6 - C10 Fraction minus BTEX	C6_C10-BTEX	3.0	mg/kg	<3.0					
(F1)									
EP080-SD: BTEXN									
Benzene	71-43-2	0.2	mg/kg	<0.2					
Toluene	108-88-3	0.2	mg/kg	<0.2					
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2					
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2					
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2					
^ Total Xylenes		0.5	mg/kg	<0.5					
^ Sum of BTEX		0.2	mg/kg	<0.2					
Naphthalene	91-20-3	0.2	mg/kg	<0.2					
EP090: Organotin Compounds									
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5					
EP130A: Organophosphorus Pestici	des (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10					
Carbophenothion	786-19-6	10	µg/kg	<10					
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0					
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10					
Chlorpyrifos	2921-88-2	10	µg/kg	<10					
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10					
Demeton-S-methyl	919-86-8	10	µg/kg	<10					
Diazinon	333-41-5	10	µg/kg	<10					
Dichlorvos	62-73-7	10	µg/kg	<10					
Dimethoate	60-51-5	10	µg/kg	<10					
Ethion	563-12-2	10	µg/kg	<10					
Fenamiphos	22224-92-6	10	µg/kg	<10					
Fenthion	55-38-9	10	µg/kg	<10					
Malathion	121-75-5	10	µg/kg	<10					

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2		
	Cli	ient sampliı	ng date / time	31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064		
				Result	Result	Result	Result	Result		
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued										
Azinphos Methyl	86-50-0	10	µg/kg	<10						
Monocrotophos	6923-22-4	10	µg/kg	<10						
Parathion	56-38-2	10	µg/kg	<10						
Parathion-methyl	298-00-0	10	µg/kg	<10						
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10						
Prothiofos	34643-46-4	10	µg/kg	<10						
EP131A: Organochlorine Pesticides										
Aldrin	309-00-2	0.50	µg/kg	<0.50						
alpha-BHC	319-84-6	0.50	µg/kg	<0.50						
beta-BHC	319-85-7	0.50	µg/kg	<0.50						
delta-BHC	319-86-8	0.50	µg/kg	<0.50						
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50						
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50						
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50						
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5	0.50	µg/kg	<0.50						
	0-2									
Dieldrin	60-57-1	0.50	µg/kg	<0.50						
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50						
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50						
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50						
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50						
Endrin	72-20-8	0.50	µg/kg	<0.50						
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50						
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50						
Heptachlor	76-44-8	0.50	µg/kg	<0.50						
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50						
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50						
gamma-BHC	58-89-9	0.25	µg/kg	<0.25						
Methoxychlor	72-43-5	0.50	µg/kg	<0.50						
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25						
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25						
^ Total Chlordane (sum)		0.25	µg/kg	<0.25						
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50						
EP131B: Polychlorinated Biphenyls (a	s Aroclors)									
^ Total Polychlorinated biphenyls		5.0	µg/kg	<5.0						

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Work Order	ES1936183
Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2	
	Cli	ient samplii	ng date / time	31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064	
				Result	Result	Result	Result	Result	
EP131B: Polychlorinated Biphenyls (as Aroclors) - Continued									
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0					
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0					
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0					
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0					
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0					
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0					
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0					
EP132B: Polynuclear Aromatic Hyd	rocarbons								
Naphthalene	91-20-3	5	µg/kg	<5					
2-Methylnaphthalene	91-57-6	5	µg/kg	<5					
Acenaphthylene	208-96-8	4	µg/kg	<4					
Acenaphthene	83-32-9	4	µg/kg	<4					
Fluorene	86-73-7	4	µg/kg	<4					
Phenanthrene	85-01-8	4	µg/kg	16					
Anthracene	120-12-7	4	µg/kg	<4					
Fluoranthene	206-44-0	4	µg/kg	10					
Pyrene	129-00-0	4	µg/kg	11					
Benz(a)anthracene	56-55-3	4	µg/kg	6					
Chrysene	218-01-9	4	µg/kg	5					
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	9					
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4					
Benzo(e)pyrene	192-97-2	4	µg/kg	<4					
Benzo(a)pyrene	50-32-8	4	µg/kg	10					
Perylene	198-55-0	4	µg/kg	<4					
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	6					
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4					
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	6					
Coronene	191-07-1	5	µg/kg	<5					
^ Sum of PAHs		4	µg/kg	79					
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		84.9	86.7			
EP068S: Organochlorine Pesticide S	Surrogate								
Dibromo-DDE	21655-73-2	0.05	%		98.0	96.0			
EP068T: Organophosphorus Pestic	ide Surrogate								

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Client	: GHD PTY LTD
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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2		
	Cli	ient sampli	ng date / time	31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064		
				Result	Result	Result	Result	Result		
EP068T: Organophosphorus Pesticide Surrogate - Continued										
DEF	78-48-8	0.05	%		91.1	78.0				
EP074S: VOC Surrogates										
1.2-Dichloroethane-D4	17060-07-0	0.5	%		98.9	74.7				
Toluene-D8	2037-26-5	0.5	%		123	105				
4-Bromofluorobenzene	460-00-4	0.5	%		117	103				
EP075(SIM)S: Phenolic Compound Sur	rrogates									
Phenol-d6	13127-88-3	0.5	%	78.8	73.7	77.8				
2-Chlorophenol-D4	93951-73-6	0.5	%	80.5	82.4	87.0				
2.4.6-Tribromophenol	118-79-6	0.5	%	62.1	70.3	64.5				
EP075(SIM)T: PAH Surrogates										
2-Fluorobiphenyl	321-60-8	0.5	%	91.7	98.7	103				
Anthracene-d10	1719-06-8	0.5	%	86.6	92.0	95.8				
4-Terphenyl-d14	1718-51-0	0.5	%	97.5	81.8	86.2				
EP075S: Acid Extractable Surrogates										
2-Fluorophenol	367-12-4	0.5	%	101						
Phenol-d6	13127-88-3	0.5	%	104						
2-Chlorophenol-D4	93951-73-6	0.5	%	108						
2.4.6-Tribromophenol	118-79-6	0.5	%	72.1						
EP075T: Base/Neutral Extractable Surr	rogates									
Nitrobenzene-D5	4165-60-0	0.5	%	103						
1.2-Dichlorobenzene-D4	2199-69-1	0.5	%	99.8						
2-Fluorobiphenyl	321-60-8	0.5	%	96.1						
Anthracene-d10	1719-06-8	0.5	%	104						
4-Terphenyl-d14	1718-51-0	0.5	%	113						
EP080S: TPH(V)/BTEX Surrogates										
1.2-Dichloroethane-D4	17060-07-0	0.2	%		95.7	73.2	99.3	99.4		
Toluene-D8	2037-26-5	0.2	%		111	95.3	104	108		
4-Bromofluorobenzene	460-00-4	0.2	%		109	96.3	117	116		
EP080-SD: TPH(V)/BTEX Surrogates										
1.2-Dichloroethane-D4	17060-07-0	0.2	%	107						
Toluene-D8	2037-26-5	0.2	%	112						
4-Bromofluorobenzene	460-00-4	0.2	%	120						
EP090S: Organotin Surrogate										
Tripropyltin		0.5	%	89.9						

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_1.0-1.5	VC13_0.0-0.1	VC14_1.0-1.1	TS2	TB2
	Cli	ent sampli	ing date / time	31-Oct-2019 20:45	31-Oct-2019 21:45	31-Oct-2019 22:15	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1936183-040	ES1936183-041	ES1936183-052	ES1936183-063	ES1936183-064
				Result	Result	Result	Result	Result
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	10	%	55.3				
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.50	%	55.6				
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.5	%	56.9				
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	83.3				
Anthracene-d10	1719-06-8	10	%	91.2				
4-Terphenyl-d14	1718-51-0	10	%	86.4				

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			Trip Spike control	 	
	Cli	ient samplii	ng date / time	31-Oct-2019 00:00	 	
Compound	CAS Number	LOR	Unit	ES1936183-065	 	
				Result	 	
EP080: BTEXN						
Benzene	71-43-2	0.2	mg/kg	<0.2	 	
Toluene	108-88-3	0.5	mg/kg	10.9	 	
Ethylbenzene	100-41-4	0.5	mg/kg	1.9	 	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	10.4	 	
ortho-Xylene	95-47-6	0.5	mg/kg	4.5	 	
^ Total Xylenes		0.5	mg/kg	14.9	 	
^ Sum of BTEX		0.2	mg/kg	27.7	 	
Naphthalene	91-20-3	1	mg/kg	<1	 	
EP080S: TPH(V)/BTEX Surrogates						
1.2-Dichloroethane-D4	17060-07-0	0.2	%	102	 	
Toluene-D8	2037-26-5	0.2	%	109	 	
4-Bromofluorobenzene	460-00-4	0.2	%	115	 	

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Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			RIN_02	 	
	Cl	lient samplii	ng date / time	31-Oct-2019 00:00	 	
Compound	CAS Number	LOR	Unit	ES1936183-062	 	
				Result	 	
EG020T: Total Metals by ICP-MS						
Arsenic	7440-38-2	0.001	mg/L	<0.001	 	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	 	
Chromium	7440-47-3	0.001	mg/L	<0.001	 	
Copper	7440-50-8	0.001	mg/L	<0.001	 	
Lead	7439-92-1	0.001	mg/L	<0.001	 	
Nickel	7440-02-0	0.001	mg/L	<0.001	 	
Zinc	7440-66-6	0.005	mg/L	<0.005	 	
EG035T: Total Recoverable Mercury	by FIMS					
Mercury	7439-97-6	0.0001	mg/L	<0.0001	 	
EP075(SIM)B: Polynuclear Aromatic	Hydrocarbons					
Naphthalene	91-20-3	1.0	µg/L	<1.0	 	
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	 	
Acenaphthene	83-32-9	1.0	µg/L	<1.0	 	
Fluorene	86-73-7	1.0	µg/L	<1.0	 	
Phenanthrene	85-01-8	1.0	µg/L	<1.0	 	
Anthracene	120-12-7	1.0	µg/L	<1.0	 	
Fluoranthene	206-44-0	1.0	µg/L	<1.0	 	
Pyrene	129-00-0	1.0	µg/L	<1.0	 	
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	 	
Chrysene	218-01-9	1.0	µg/L	<1.0	 	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	 	
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	 	
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	 	
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	 	
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	 	
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	 	
^ Sum of polycyclic aromatic hydrocarbo	ons	0.5	µg/L	<0.5	 	
^ Benzo(a)pyrene TEQ (zero)		0.5	µg/L	<0.5	 	
EP080/071: Total Petroleum Hydroca	rbons					
C6 - C9 Fraction		20	µg/L	<20	 	
C10 - C14 Fraction		50	µg/L	<50	 	
C15 - C28 Fraction		100	µg/L	<100	 	
C29 - C36 Fraction		50	µg/L	<50	 	
^ C10 - C36 Fraction (sum)		50	µg/L	<50	 	
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Work Order	: ES1936183					
Client	: GHD PTY LTD					
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Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		RIN_02	 	 	
	Cli	Client sampling date / time		31-Oct-2019 00:00	 	
Compound	CAS Number	LOR	Unit	ES1936183-062	 	
				Result	 	
EP080/071: Total Recoverable Hydroca	arbons - NEPM 201	3 Fractio	าร			
C6 - C10 Fraction	C6_C10	20	µg/L	<20	 	
[^] C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	µg/L	<20	 	
(F1)						
>C10 - C16 Fraction		100	µg/L	<100	 	
>C16 - C34 Fraction		100	µg/L	<100	 	
>C34 - C40 Fraction		100	µg/L	<100	 	
^ >C10 - C40 Fraction (sum)		100	µg/L	<100	 	
^ >C10 - C16 Fraction minus Naphthalene		100	µg/L	<100	 	
(F2)						
EP080: BTEXN						
Benzene	71-43-2	1	µg/L	<1	 	
Toluene	108-88-3	2	µg/L	<2	 	
Ethylbenzene	100-41-4	2	µg/L	<2	 	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	 	
ortho-Xylene	95-47-6	2	µg/L	<2	 	
^ Total Xylenes		2	µg/L	<2	 	
^ Sum of BTEX		1	µg/L	<1	 	
Naphthalene	91-20-3	5	µg/L	<5	 	
EP075(SIM)S: Phenolic Compound Su	rrogates					
Phenol-d6	13127-88-3	1.0	%	19.2	 	
2-Chlorophenol-D4	93951-73-6	1.0	%	54.7	 	
2.4.6-Tribromophenol	118-79-6	1.0	%	47.8	 	
EP075(SIM)T: PAH Surrogates						
2-Fluorobiphenyl	321-60-8	1.0	%	94.4	 	
Anthracene-d10	1719-06-8	1.0	%	87.7	 	
4-Terphenyl-d14	1718-51-0	1.0	%	75.7	 	
EP080S: TPH(V)/BTEX Surrogates						
1.2-Dichloroethane-D4	17060-07-0	2	%	125	 	
Toluene-D8	2037-26-5	2	%	110	 	
4-Bromofluorobenzene	460-00-4	2	%	105	 	

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Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Limits (%)
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	64	130
Toluene-D8	2037-26-5	66	136
4-Bromofluorobenzene	460-00-4	60	122
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	29	149
Phenol-d6	13127-88-3	32	128
2-Chlorophenol-D4	93951-73-6	32	128
2.4.6-Tribromophenol	118-79-6	13	121
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	33	125
1.2-Dichlorobenzene-D4	2199-69-1	34	108
2-Fluorobiphenyl	321-60-8	35	121
Anthracene-d10	1719-06-8	35	123
4-Terphenyl-d14	1718-51-0	33	125
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
EP080-SD: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	67	137
Toluene-D8	2037-26-5	74	134
4-Bromofluorobenzene	460-00-4	73	137
EP090S: Organotin Surrogate			

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ub-Matrix: SOIL		Recovery Limits (%)			
Compound	CAS Number	Low	High		
EP090S: Organotin Surrogate - Continued					
Tripropyltin		35	130		
EP130S: Organophosphorus Pesticide Surrog	ate				
DEF	78-48-8	14	102		
EP131S: OC Pesticide Surrogate					
Dibromo-DDE	21655-73-2	10	119		
EP131T: PCB Surrogate					
Decachlorobiphenyl	2051-24-3	10	106		
EP132T: Base/Neutral Extractable Surrogates					
2-Fluorobiphenyl	321-60-8	55	135		
Anthracene-d10	1719-06-8	70	136		
4-Terphenyl-d14	1718-51-0	57	127		
Sub-Matrix: WATER		Recovery	Limits (%)		
Compound	CAS Number	Low	High		
EP075(SIM)S: Phenolic Compound Surrogates	;				
Phenol-d6	13127-88-3	10	44		
2-Chlorophenol-D4	93951-73-6	14	94		
2.4.6-Tribromophenol	118-79-6	17	125		
EP075(SIM)T: PAH Surrogates					
2-Fluorobiphenyl	321-60-8	20	104		
Anthracene-d10	1719-06-8	27	113		
4-Terphenyl-d14	1718-51-0	32	112		
EP080S: TPH(V)/BTEX Surrogates					
1.2-Dichloroethane-D4	17060-07-0	71	137		
Toluene-D8	2037-26-5	79	131		
4-Bromofluorobenzene	460-00-4	70	128		



QA/QC Compliance Assessment to assist with Quality Review						
Work Order	: ES1936183	Page	: 1 of 17			
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney			
Contact	: MS CARMEN YI	Telephone	: +61-2-8784 8555			
Project	: 12517046	Date Samples Received	: 01-Nov-2019			
Site	:	Issue Date	: 20-Nov-2019			
Sampler	: SARAH ECCLESHALL	No. of samples received	: 66			
Order number	:	No. of samples analysed	: 27			

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- NO Method Blank value outliers occur.
- <u>NO</u> Duplicate outliers occur.
- <u>NO</u> Laboratory Control outliers occur.
- Matrix Spike outliers exist please see following pages for full details.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

• <u>NO</u> Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

• Quality Control Sample Frequency Outliers exist - please see following pages for full details.

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Client	: GHD PTY LTD
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Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: SOIL

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG048: Hexavalent Chromium (Alkaline Digest)	ES1935800022	Anonymous	Hexavalent Chromium	18540-29-9	2.00 %	70.0-130%	Recovery less than lower data quality
							objective
EG048: Hexavalent Chromium (Alkaline Digest)	ES1935800022	Anonymous	Hexavalent Chromium	18540-29-9	2.00 %	70.0-130%	Recovery less than lower data quality
							objective
EP090: Organotin Compounds	EM1919013022	Anonymous	Tributyltin	56573-85-4	866 %	20.0-130%	Recovery greater than upper data
							quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES1936183029	VC12_0.0-0.5	Fluoranthene	206-44-0	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EP132B: Polynuclear Aromatic Hydrocarbons	ES1936183029	VC12_0.0-0.5	Pyrene	129-00-0	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EP132B: Polynuclear Aromatic Hydrocarbons	ES1936183029	VC12_0.0-0.5	Benz(a)anthracene	56-55-3	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EP132B: Polynuclear Aromatic Hydrocarbons	ES1936183029	VC12_0.0-0.5	Benzo(b+j)fluoranthene	205-99-2 205-82-3	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EP132B: Polynuclear Aromatic Hydrocarbons	ES1936183029	VC12_0.0-0.5	Benzo(a)pyrene	50-32-8	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EP132B: Polynuclear Aromatic Hydrocarbons	ES1936183029	VC12_0.0-0.5	Benzo(g.h.i)perylene	191-24-2	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EP132B: Polynuclear Aromatic Hydrocarbons	ES1936183029	VC12_0.0-0.5	Indeno(1.2.3.cd)pyrene	193-39-5	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: SOIL					
Quality Control Sample Type	Co	Count		e (%)	Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Moisture Content	2	21	9.52	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix: WATER					
Quality Control Sample Type	Co	ount	Rate	e (%)	Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
					1

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Matrix: WATER

Matrix: SOIL

Quality Control Sample Type	Co	unt	Rate	e (%)	Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP) - Continued					
TRH - Semivolatile Fraction	0	5	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	3	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	5	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for <u>VOC in soils</u> vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Evaluation: * = Holding time breach ; \checkmark = Within holding time.

							,	
Method		Sample Date Extraction / Preparation		Analysis				
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA037: Ass Field Screening Analysis								
Snap Lock Bag - frozen (EA037)								
VC13_0.5-0.6,	VC13_1.0-1.1	30-Oct-2019	06-Nov-2019	27-Apr-2020	1	07-Nov-2019	27-Apr-2020	✓
Snap Lock Bag - frozen (EA037)								
VC06_0.0-0.1,	VC06_0.5-0.6,	31-Oct-2019	06-Nov-2019	28-Apr-2020	1	07-Nov-2019	28-Apr-2020	✓
VC12_0.0-0.1,	VC12_0.5-0.6,							
VC12_1.0-1.1,	VC08_0.0-0.1,							
VC08_0.5-0.6,	VC08_1.0-1.1,							
VC08_1.5-1.6,	VC13_0.0-0.1,							
VC14_0.0-0.1,	VC14_0.5-0.6,							
VC14_1.0-1.1,	VC14_1.3-1.4							
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)								
VC06_0.0-0.1,	VC12_1.0-1.1,	31-Oct-2019				05-Nov-2019	14-Nov-2019	✓
VC12_0.0-0.5,	VC0S_0.0-0.1,							
VC08_1.0-1.5,	VC13_0.0-0.1,							
VC14_1.0-1.1								
EA150: Particle Sizing								
Snap Lock Bag (EA150H)								
VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019				11-Nov-2019	28-Apr-2020	\checkmark
EA150: Soil Classification based on Particle Size								
Snap Lock Bag (EA150H)								
VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019				11-Nov-2019	28-Apr-2020	\checkmark

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Matrix: SOIL					Evaluation	n: × = Holding time	breach ; ✓ = With	in holding time.
Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005(ED093)-SD: Total Metals in Sediments by	y ICP-AES							
Soil Glass Jar - Unpreserved (EG005-SD)					_			_
VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	28-Apr-2020	~	08-Nov-2019	28-Apr-2020	✓
EG005(ED093)T: Total Metals by ICP-AES			1					
Soil Glass Jar - Unpreserved (EG005T)		24.0-+ 2040	00 Nov 0040	29 Apr 2020		00 Nov 0040	29 Apr 2020	
VC06_0.0-0.1,	VC12_1.0-1.1,	31-Oct-2019	08-NOV-2019	20-Api-2020	~	08-NOV-2019	20-Api-2020	✓
VC0S_0.0-0.1,	VC13_0.0-0.1,							
VC14_1.0-1.1								
EG020-SD: Total Metals in Sediments by ICPMS						1	I	
Soil Glass Jar - Unpreserved (EG020-SD)		31-Oct-2019	08-Nov-2019	28-Apr-2020		08-Nov-2019	28-Apr-2020	
VC12_0.0-0.3,	VC06_1.0-1.5	31-000-2013	00-1404-2013	20-Api-2020	~	00-1107-2013	20-Api-2020	v
EG035T: Total Recoverable Mercury by FIMS						1		
Soli Glass Jar - Unpreserved (EG0351)	VC12 1011	31-Oct-2019	08-Nov-2019	28-Nov-2019		11-Nov-2019	28-Nov-2019	
VC12 0.0.05	VC12_1.0-1.1,	01-000-2010	00-1107-2013	201101 2010	~	11-1101-2013	201101 2010	•
VC12_0.0-0.3,	VC13_0.0_0.1							
VC14_1_0-1_1	VC13_0.0-0.1,							
V014_1.0-1.1								
EG048: Hexavalent Chromium (Alkaline Digest)								
VC06_0_0_0_1	VC12 10-11	31-Oct-2019	06-Nov-2019	28-Nov-2019		06-Nov-2019	13-Nov-2019	
VC0S_0.0_01	VC13_0.0-0_1							•
VC14 1 0-1 1	vo to_0.0 0.1,							
EK026SEL Total CN by Segmented Elevy Analys						1		
Soil Glass Jar - Unpreserved (EK026SE)	ei							
VC06 0.0-0.1.	VC12 1.0-1.1.	31-Oct-2019	05-Nov-2019	14-Nov-2019	1	06-Nov-2019	19-Nov-2019	1
VC12 0.0-0.5.	VC0S_0.0-0.1.				_			
VC08 1.0-1.5.	VC13 0.0-0.1.							
VC14 1.0-1.1								
EK028SF: Weak Acid Dissociable CN by Segme	ented Flow Analyser							
Soil Glass Jar - Unpreserved (EK028SF)								
VC06_0.0-0.1,	VC12_1.0-1.1,	31-Oct-2019	05-Nov-2019	14-Nov-2019	1	06-Nov-2019	19-Nov-2019	✓
VC0S_0.0-0.1,	VC13_0.0-0.1,							
VC14_1.0-1.1								
EK040T: Fluoride Total								
Snap Lock Bag (EK040T)								
VC06_0.0-0.1,	VC12_1.0-1.1,	31-Oct-2019	05-Nov-2019	28-Nov-2019	1	08-Nov-2019	28-Nov-2019	✓
VC0S_0.0-0.1,	VC13_0.0-0.1,							
VC14 1.0-1.1								

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Matrix: SOIL						Evaluation	: × = Holding time	breach ; ✓ = Withi	n holding time
Method			Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)				Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP003: Total Organic Carbon (TOC) in Soil									
Pulp Bag (EP003) VC06_0.0-0.1, VC12_0.0-0.5, VC13_0.0-0.1,	VC12_1.0-1.1, VC0S_0.0-0.1, VC14_1.0-1.1		31-Oct-2019	08-Nov-2019	28-Nov-2019	~	08-Nov-2019	28-Nov-2019	~
Pulp Bag (EP003) VC08_1.0-1.5			31-Oct-2019	11-Nov-2019	28-Nov-2019	~	11-Nov-2019	28-Nov-2019	1
EP066: Polychlorinated Biphenyls (PCB)									
Soil Glass Jar - Unpreserved (EP066) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,		31-Oct-2019	06-Nov-2019	14-Nov-2019	~	08-Nov-2019	16-Dec-2019	~
EP068A: Organochlorine Pesticides (OC)									
Soil Glass Jar - Unpreserved (EP068) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,		31-Oct-2019	06-Nov-2019	14-Nov-2019	1	08-Nov-2019	16-Dec-2019	1
EP068B: Organophosphorus Pesticides (OP)									
Soil Glass Jar - Unpreserved (EP068) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,		31-Oct-2019	06-Nov-2019	14-Nov-2019	1	08-Nov-2019	16-Dec-2019	~
EP071 SG: Total Recoverable Hydrocarbons - NE	EPM 2013 Fractions - Silica gel cleanun								
Soil Glass Jar - Unpreserved (EP071SG-S) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,		31-Oct-2019	06-Nov-2019	14-Nov-2019	1	08-Nov-2019	16-Dec-2019	~
EP071 SG-S: Total Petroleum Hydrocarbons in S	Soil - Silica gel cleanup								
Soil Glass Jar - Unpreserved (EP071SG-S) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,		31-Oct-2019	06-Nov-2019	14-Nov-2019	1	08-Nov-2019	16-Dec-2019	~
EP074A: Monocyclic Aromatic Hydrocarbons									
Soil Glass Jar - Unpreserved (EP074) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,		31-Oct-2019	05-Nov-2019	07-Nov-2019	~	06-Nov-2019	07-Nov-2019	~
EP074B: Oxygenated Compounds									
Soil Glass Jar - Unpreserved (EP074) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,		31-Oct-2019	05-Nov-2019	07-Nov-2019	1	06-Nov-2019	07-Nov-2019	~

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Matrix: SOIL					Evaluation	n: × = Holding time	breach ; ✓ = With	in holding time	
Method		Sample Date	E	xtraction / Preparation		Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP074E: Halogenated Aliphatic Compounds									
Soil Glass Jar - Unpreserved (EP074) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,	31-Oct-2019	05-Nov-2019	07-Nov-2019	~	06-Nov-2019	07-Nov-2019	~	
EP074F: Halogenated Aromatic Compounds									
Soil Glass Jar - Unpreserved (EP074) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,	31-Oct-2019	05-Nov-2019	07-Nov-2019	1	06-Nov-2019	07-Nov-2019	~	
EP074G: Trihalomethanes									
Soil Glass Jar - Unpreserved (EP074) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,	31-Oct-2019	05-Nov-2019	07-Nov-2019	1	06-Nov-2019	07-Nov-2019	~	
EP075(SIM)A: Phenolic Compounds									
Soil Glass Jar - Unpreserved (EP075(SIM)) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,	31-Oct-2019	06-Nov-2019	14-Nov-2019	1	07-Nov-2019	16-Dec-2019	~	
Soil Glass Jar - Unpreserved (EP075(SIM)) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	07-Nov-2019	14-Nov-2019	1	08-Nov-2019	17-Dec-2019	1	
EP075(SIM)B: Polynuclear Aromatic Hydrocart	bons								
Soil Glass Jar - Unpreserved (EP075(SIM)) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,	31-Oct-2019	06-Nov-2019	14-Nov-2019	~	07-Nov-2019	16-Dec-2019	~	
EP075A: Phenolic Compounds									
Soil Glass Jar - Unpreserved (EP075) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	14-Nov-2019	1	08-Nov-2019	18-Dec-2019	1	
EP075B: Polynuclear Aromatic Hydrocarbons									
Soil Glass Jar - Unpreserved (EP075) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	14-Nov-2019	1	08-Nov-2019	18-Dec-2019	~	
EP075C: Phthalate Esters			1						
Soil Glass Jar - Unpreserved (EP075) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	14-Nov-2019	1	08-Nov-2019	18-Dec-2019	~	
EP075D: Nitrosamines			I						
Soil Glass Jar - Unpreserved (EP075) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	14-Nov-2019	1	08-Nov-2019	18-Dec-2019	~	
EP075E: Nitroaromatics and Ketones									
Soil Glass Jar - Unpreserved (EP075) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	14-Nov-2019	~	08-Nov-2019	18-Dec-2019	 ✓ 	

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Matrix: SOIL					Evaluation	i: × = Holding time	breach ; ✓ = Withi	n holding time	a.
Method			Extraction / Preparation						
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP075F: Haloethers									
Soil Glass Jar - Unpreserved (EP075) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	14-Nov-2019	1	08-Nov-2019	18-Dec-2019	~	
EP075G: Chlorinated Hydrocarbons									
Soil Glass Jar - Unpreserved (EP075) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	14-Nov-2019	~	08-Nov-2019	18-Dec-2019	✓	
EP075H: Anilines and Benzidines									
Soil Glass Jar - Unpreserved (EP075) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	14-Nov-2019	1	08-Nov-2019	18-Dec-2019	~	
EP075I: Organochlorine Pesticides									
Soil Glass Jar - Unpreserved (EP075) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	14-Nov-2019	1	08-Nov-2019	18-Dec-2019	1	
EP075J: Organophosphorus Pesticides									
Soil Glass Jar - Unpreserved (EP075) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	08-Nov-2019	14-Nov-2019	1	08-Nov-2019	18-Dec-2019	1	
EP080/071: Total Petroleum Hydrocarbons									
Soil Glass Jar - Unpreserved (EP080) VC06_0.0-0.1, VC0S_0.0-0.1, VC14 1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,	31-Oct-2019	05-Nov-2019	14-Nov-2019	✓	06-Nov-2019	14-Nov-2019	~	
Soil Glass Jar - Unpreserved (EP080) TB2		31-Oct-2019	07-Nov-2019	14-Nov-2019	1	09-Nov-2019	14-Nov-2019	1	-
EP080/071: Total Recoverable Hydrocarbons - NEPM	2013 Fractions								
Soil Glass Jar - Unpreserved (EP080) VC06_0.0-0.1, VC0S_0.0-0.1, VC14_1.0-1.1	VC12_1.0-1.1, VC13_0.0-0.1,	31-Oct-2019	05-Nov-2019	14-Nov-2019	1	06-Nov-2019	14-Nov-2019	~	
Soil Glass Jar - Unpreserved (EP071-SD) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	06-Nov-2019	14-Nov-2019	1	11-Nov-2019	16-Dec-2019	~	
Soil Glass Jar - Unpreserved (EP080) TB2		31-Oct-2019	07-Nov-2019	14-Nov-2019	1	09-Nov-2019	14-Nov-2019	1	
EP080: BTEXN									
Soil Glass Jar - Unpreserved (EP080) TS2, Trip Spike control	TB2,	31-Oct-2019	07-Nov-2019	14-Nov-2019	~	09-Nov-2019	14-Nov-2019	~	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbon	s								-
Soil Glass Jar - Unpreserved (EP071-SD) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	06-Nov-2019	14-Nov-2019	1	11-Nov-2019	16-Dec-2019	~	_
Soil Glass Jar - Unpreserved (EP080-SD) VC12 0.0-0.5,	VC08 1.0-1.5	31-Oct-2019	07-Nov-2019	14-Nov-2019	1	09-Nov-2019	14-Nov-2019	1	

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Matrix: SOIL					Evaluation	: × = Holding time	breach ; ✓ = Withi	n holding time.
Method			E	ktraction / Preparation				
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080-SD) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	07-Nov-2019	14-Nov-2019	1	09-Nov-2019	14-Nov-2019	~
EP080-SD: BTEXN								
Soil Glass Jar - Unpreserved (EP080-SD) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	07-Nov-2019	14-Nov-2019	1	09-Nov-2019	14-Nov-2019	✓
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved (EP090) VC08_1.0-1.5		31-Oct-2019	08-Nov-2019	14-Nov-2019	1	11-Nov-2019	18-Dec-2019	✓
Soil Glass Jar - Unpreserved (EP090) VC12_0.0-0.5		31-Oct-2019	14-Nov-2019	14-Nov-2019	1	15-Nov-2019	24-Dec-2019	✓
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Soil Glass Jar - Unpreserved (EP130) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	07-Nov-2019	14-Nov-2019	1	11-Nov-2019	17-Dec-2019	~
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved (EP131A) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	07-Nov-2019	14-Nov-2019	1	11-Nov-2019	17-Dec-2019	✓
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved (EP131B) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	07-Nov-2019	14-Nov-2019	1	11-Nov-2019	17-Dec-2019	✓
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP132B-SD) VC12_0.0-0.5,	VC08_1.0-1.5	31-Oct-2019	06-Nov-2019	14-Nov-2019	1	07-Nov-2019	16-Dec-2019	✓
Matrix: WATER					Evaluation	: × = Holding time	breach ; ✓ = Withi	in holding time.
Method		Sample Date	E	ktraction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) RIN_02		31-Oct-2019	05-Nov-2019	28-Apr-2020	1	05-Nov-2019	28-Apr-2020	✓
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) RIN_02		31-Oct-2019				07-Nov-2019	28-Nov-2019	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM)) RIN_02		31-Oct-2019	05-Nov-2019	07-Nov-2019	4	06-Nov-2019	15-Dec-2019	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) RIN_02		31-Oct-2019	05-Nov-2019	07-Nov-2019	1	06-Nov-2019	15-Dec-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080) RIN_02		31-Oct-2019	06-Nov-2019	14-Nov-2019	~	06-Nov-2019	14-Nov-2019	1

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Matrix: WATER				Evaluation	: × = Holding time	breach ; ✓ = With	n holding time
Method	Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) RIN_02	31-Oct-2019	05-Nov-2019	07-Nov-2019	~	06-Nov-2019	15-Dec-2019	~
Amber VOC Vial - Sulfuric Acid (EP080) RIN_02	31-Oct-2019	06-Nov-2019	14-Nov-2019	1	06-Nov-2019	14-Nov-2019	1
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) RIN_02	31-Oct-2019	06-Nov-2019	14-Nov-2019	1	06-Nov-2019	14-Nov-2019	✓

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Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Vlatrix: SOIL Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification							
Quality Control Sample Type		С	ount	Rate (%)			Quality Control Specification
Analvtical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	3	25	12.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	10.00	10.00	\checkmark	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	21	9.52	10.00	×	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	3	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	1	3	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	3	12	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	3	25	12.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	3	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Fe and AI in Sediments by ICPAES	EG005-SD	1	2	50.00	10.00	\checkmark	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	2	19	10.53	10.00	\checkmark	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	20	15.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	3	15	20.00	10.00	\checkmark	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fraction	EP071-SD	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	9	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	32	12.50	10.00	\checkmark	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	2	12	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard

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Matrix: SOIL		Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.							
Quality Control Sample Type		Сс	ount		Rate (%)		Quality Control Specification		
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation			
Laboratory Control Samples (LCS) - Continued									
Semivolatile Organic Compounds	EP075	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Cyanide by Segmented Flow Analyser	EK026SF	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Fe and AI in Sediments by ICPAES	EG005-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Fluoride	EK040T	1	19	5.26	5.00	\checkmark	NEPM 2013 B3 & ALS QC Standard		
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Mercury by FIMS (Low Level)	EG035T-LL	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	\checkmark	NEPM 2013 B3 & ALS QC Standard		
Total Metals in Sediments by ICPMS	EG020-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Organic Carbon	EP003	4	15	26.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard		
TPH - Semivolatile Fraction	EP071-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
TRH Volatiles/BTEX	EP080	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
TRH Volatiles/BTEX in Sediments	EP080-SD	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Volatile Organic Compounds	EP074	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Method Blanks (MB)									
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Organochlorine Pesticides (Ultra-trace)	EP131A	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Organophosphorus Pesticides (Ultra-trace)	EP130	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Organotin Analysis	EP090	2	12	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
PAH/Phenols (SIM)	EP075(SIM)	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
PCB's (Ultra-trace)	EP131B	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Semivolatile Organic Compounds	EP075	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Cyanide by Segmented Flow Analyser	EK026SF	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Fe and AI in Sediments by ICPAES	EG005-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Fluoride	EK040T	1	19	5.26	5.00	\checkmark	NEPM 2013 B3 & ALS QC Standard		
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Mercury by FIMS (Low Level)	EG035T-LL	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Metals in Sediments by ICPMS	EG020-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Organic Carbon	EP003	2	15	13.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
TPH - Semivolatile Fraction	EP071-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
TRH Volatiles/BTEX	EP080	2	32	6.25	5.00	~	NEPM 2013 B3 & ALS QC Standard		
TRH Volatiles/BTEX in Sediments	EP080-SD	1	11	9.09	5.00	~	NEPM 2013 B3 & ALS QC Standard		
Volatile Organic Compounds	EP074	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard		

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Matrix: SOIL				Evaluatio	n: × = Quality Co	ntrol frequency	not within specification ; ✓ = Quality Control frequency within specification.
Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual Expected Evaluation		Evaluation	
Matrix Spikes (MS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organophosphorus Pesticides (Ultra-trace)	EP130	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TPH - Semivolatile Fraction	EP071-SD	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX in Sediments	EP080-SD	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard

atrix: WATER Evaluation: * = Quality Control frequency not within specification; = Quality Control frequency within specification;</th								
Quality Control Sample Type		Count		Rate (%)		Quality Control Specification		
Method	QC	Reaular	Actual	Expected	Evaluation			
EP075(SIM)	0	3	0.00	10.00	×	NEPM 2013 B3 & ALS QC Standard		
EG035T	1	7	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard		
EG020A-T	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard		
EP071	0	5	0.00	10.00	×	NEPM 2013 B3 & ALS QC Standard		
EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard		
EP075(SIM)	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
EG035T	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
EG020A-T	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
EP071	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
EP075(SIM)	1	3	33.33	5.00	~	NEPM 2013 B3 & ALS QC Standard		
	Method EP075(SIM) EG035T EG020A-T EP071 EP075 EP075 EP075 EP075 EP075 EP075 EP075 EP075 EP075 EP071 EP075 EP075	Method C Method QC EP075(SIM) 0 EG035T 1 EG020A-T 2 EP071 0 EP0780 2 EP075(SIM) 1 EG035T 1 EP075(SIM) 1 EG035T 1 EG035T 1 EG035T 1 EG020A-T 1 EG020A-T 1 EP071 1 EP080 1 EP075(SIM) 1	Method Count Method QC Reaular EP075(SIM) 0 3 EG035T 1 7 EG020A-T 2 15 EP071 0 5 EP080 2 20 EE0035T 1 7 EG0305T 1 7 EE0075(SIM) 1 3 EE0035T 1 7 EG020A-T 1 15 EP071 1 5 EP080 1 20 EP075(SIM) 1 3	Evaluation Method OC Reaular Actual Method OC Reaular Actual EP075(SIM) 0 3 0.00 EG035T 1 7 14.29 EG020A-T 2 15 13.33 EP071 0 5 0.00 EP080 2 20 10.00 EP075(SIM) 1 3 33.33 EP075(SIM) 1 3 33.33 EG020A-T 1 15 6.67 EP071 1 5 20.00 EP080 1 20 5.00 EP080 1 3 33.33	Evaluation: * = Quality Colspan="2">Rate (%) Method QC Recular Actual Expected EP075(SIM) 0 3 0.00 10.00 EG035T 1 7 14.29 10.00 EG020A-T 2 15 13.33 10.00 EP071 0 5 0.00 10.00 EP071 0 5 0.00 10.00 EP075(SIM) 1 3 33.33 5.00 EP075(SIM) 1 3 33.33 5.00 EP075(SIM) 1 5 20.00 5.00 EG020A-T 1 15 6.67 5.00 EG020A-T 1 20 5.00 5.00 EP071 1 5 20.00 5.00 EP080 1 20 5.00 5.00 EP075(SIM) 1 3 33.33 5.00	Evaluation: * = Quality Control frequency i Count Rate (%) Rate (%) Method QC Reaular Actual Expected Evaluation EP075(SIM) 0 3 0.00 10.00 * EG035T 1 7 14.29 10.00 * EG035T 1 7 14.29 10.00 ✓ EG020A-T 2 15 13.33 10.00 ✓ EF071 0 5 0.00 10.00 ✓ EP075(SIM) 1 3 33.33 5.00 ✓ EP075(SIM) 1 3 33.33 5.00 ✓ EG020A-T 1 15 6.67 5.00 ✓ EG020A-T 1 20 5.00 ✓ ✓ EP075(SIM) 1 3 33.33 5.00 ✓ EP075(SIM) 1 3 33.33 5.00 ✓		

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Matrix: WATER	not within specification ; \checkmark = Quality Control frequency within specification.						
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Total Mercury by FIMS	EG035T	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	3	0.00	5.00	32	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	5	0.00	5.00	£	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard

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Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
ASS Field Screening Analysis	* EA037	SOIL	In house: Referenced to Acid Sulfate Soils Laboratory Methods Guidelines, version 2.1 June 2004. As received
			samples are tested for pH field and pH fox and assessed for a reaction rating.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C.
			This method is compliant with NEPM (2013) Schedule B(3) Section 6.1 and Table 1 (14 day holding time).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Total Fe and Al in Sediments by ICPAES	EG005-SD	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate
			acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic
			spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix
			matched standards. This method is compliant with NEPM (2013) Schedule B(3). LORs per NODG
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate
			acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic
			spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix
			matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes
			a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass
			spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their
			measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS)
			FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an
			appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then
			purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This
			method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS)
			FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an
			appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then
			purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This
			method is compliant with NEPM (2013) Schedule B(3)
Hexavalent Chromium by Alkaline	EG048G	SOIL	In house: Referenced to USEPA SW846, Method 3060A. Hexavalent chromium is extracted by alkaline digestion.
Digestion and DA Finish			The digest is determined by photometrically by automatic discrete analyser, following pH adjustment. The
			instrument uses colour development using dephenylcarbazide. Each run of samples is measured against a
			five-point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)

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Analytical Methods	Method	Matrix	Method Descriptions
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN C / ASTM D7511. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
WAD Cyanide by Segmented Flow Analyser	EK028SF	SOIL	In house: Referenced to APHA 4500-CN-O. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Hydrogen cyanide is liberated from a slightly acidified (pH 4.5) and is dialysed. Tight cyanide complexes that would not be amenable to oxidation by chlorine are not converted. Iron cyanide complexes are precipitated with zinc acetate. Liberated HCN diffuses through a membrane into a stream of sodium hydroxide where it is carried as CN-The cyanide in caustic solution is buffered to pH 5.2 and further converted to cyanogen chloride by reaction with chloramine-T. Cyanogen chloride subsequently reacts with 4 ¿pyridine carboxylic and 1,3 - dimethylbarbituric acids to give a red colour complex. This colour is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Total Fluoride	EK040T	SOIL	(In-house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium Carbonate / Potassium Carbonate fusion dissolution.
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector.
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TPH - Semivolatile Fraction	EP071-SD	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	SOIL	In house: Referenced to USEPA SW 846 - 8015A. Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
Volatile Organic Compounds	EP074	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)
Semivolatile Organic Compounds	EP075	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 502)

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Analytical Methods	Method	Matrix	Method Descriptions
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion
			Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is
			compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS.
			Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM
TDU Valatilas/DTEX in Sadimanta	50000.00	801	
TRH Volatiles/BTEX III Sediments	EP080-SD	SUIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS.
Organotin Analysis	EDUOU	SOIL	Qualitinication is by comparison against an established 5 point calibration curve.
	LF 090	SOIL	with high volume injection, and quanitified against an established calibration curve
Organophosphorus Pesticides	EP130	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup) 8141 (GC/EPD - Capillary Column) This technique
(Ultra-trace)	2. 100	0011	is compliant with NEPM (2013) Schedule B(3).
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup).3620 (Florisil). 8081/8082 (GC/uECD/uECD) This
			technique is compliant with NEPM (2013) Schedule B(3)
PCB's (Ultra-trace)	EP131B	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/µECD/µECD) This
			technique is compliant with NEPM (2013) Schedule B(3)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	In house: Referenced to USEPA 8270D GCMS Capillary column, SIM mode using large volume programmed
			temperature vaporisation injection.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes
			a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass
			spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their
			measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG0351	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS)
			FIM-AAS is an automated fiameless atomic absorption technique. A bromate/bromide reagent is used to oxidise
			any organic mercury compounds in the unilitered sample. The ionic mercury is reduced online to atomic mercury is reduced online to atomic
			absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A. The sample extract is analysed by Capillary GC/FID and
			quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This
			method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode
			and quantification is by comparison against an established 5 point calibration curve. This method is compliant
			with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by
			Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve.
			Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS
			analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
NaOH leach for CN in Soils	CN-PR	SOIL	In house: APHA 4500 CN. Samples are extracted by end-over-end tumbling with NaOH.
Alkaline digestion for Hexavalent	EG048PR	SOIL	In house: Referenced to USEPA SW846, Method 3060A.
Chromium			

Page	: 17 of 17
Work Order	: ES1936183
Client	: GHD PTY LTD
Project	: 12517046



Preparation Methods	Method	Matrix	Method Descriptions
Total Fluoride	EK040T-PR	SOIL	In house: Samples are fused with Sodium Carbonate / Potassium Carbonate flux.
Drying only	EN020D	SOIL	In house
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Tumbler Extraction of Solids/ Sample Cleanup	ORG17A-UTP	SOIL	In house: Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na2SO4 and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.
Organotin Sample Preparation	ORG35	SOIL	In house: 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3). ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

Certificate of Analysis

ALS Laboratory Group Pty Ltd 5/585 Maitland Road Mayfield West, NSW 2304 pH 02 4014 2500 fax 02 4968 0349 samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



% Passing

CLIENT:	CARMEN YI	DATE REPORTED:	11-Nov-2019
COMPANY:	GHD PTY LTD	DATE RECEIVED:	1-Nov-2019
ADDRESS:	Level 15, 133 Castlereagh Street Sydney	REPORT NO:	ES1936183-029 / PSD
PROJECT:	12517046	SAMPLE ID:	VC12_0.0-0.5

Particle Size Distribution



Analysis Notes

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1-2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: SAND, FINES

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) #N/A

NATA Accreditation: 825 Site: Newcastle This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

<u>Analysed:</u>	7-Nov-1
Limit of Reporting:	1%
Dispersion Method	Shaker
A Dola	

NALE SECONA

CREDITATION

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A	00

Dianne Blane Laboratory Coordinator Authorised Signatory

Page 1 of 1

2.36	100%
1.18	99%
0.600	90%
0.425	71%
0.300	48%
0.150	25%
0.075	19%
Particle Size (microns)	
55	19%
39	17%
27	17%
19	17%
14	17%
10	17%
7	16%
5	15%
	4 5 0 (

Particle Size (mm)

Median Particle Size (mm)*	0.311

:

7-Nov-19

Certificate of Analysis

ALS Laboratory Group Pty Ltd 5/585 Maitland Road Mayfield West, NSW 2304 pH 02 4014 2500 fax 02 4968 0349 samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT:	CARMEN YI	DATE REPORTED:	11-Nov-2019
COMPANY:	GHD PTY LTD	DATE RECEIVED:	1-Nov-2019
ADDRESS:	Level 15, 133 Castlereagh Street Sydney NSW Australia	REPORT NO:	ES1936183-040 / PSD
PROJECT:	12517046	SAMPLE ID:	VC08_1.0-1.5

Particle Size Distribution



Analysis Notes

Samples analysed as received.

* Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client . Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:

Loss on Pretreatment NA

Sample Description: FINES, SAND

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density (<2.36mm) #N/A

NATA Accreditation: 825 Site: Newcastle This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Particle Size (mm)	% Passing
1.18	100%
0.600	97%
0.425	90%
0.300	82%
0.150	65%
0.075	56%
Particle Size (microns)	
50	48%
35	44%
25	43%
18	41%
13	38%
10	36%
7	36%
5	35%
1	32%

Median Particle Size (mm)*	0.056

Analysed:

7-Nov-19

Limit of Reporting: 1%

Dispersion Method Shaker

Dianne Blane

Laboratory Coordinator Authorised Signatory

Enu	ALS	CHAIN OF CUSTODY ALS Laboratory: please lick →	HAIN OF LADELAIDE 21 Etimo Rootd Foorara SA \$195 Last Philos Sa \$195 Last Philos Sa \$195 JSTODY LINRISBANE 32 Shard Street Street Street Street OLD a053 LinrisBane 32 Shard Street Street Street Street OLD a053 LinrisBane 32 Shard Street Stree			LIMCKAY 75 Harbour Road Mackay OLD 4/40 Ph-07 4944 0177 El mackay@elsgisbal.com Ph-02 4014 UMLDCUENE 74 Westel Road Sovingvate VIC 317 - UN Skilkay Ph-03 5543 550 El samples melhouma@atsgtsbal.com Ph-06 4302 ULLUCGES 71 Sydrey Road Mudgee NSV CK00 ULFER TH - Ph-02 6372 5735 El mudgee mat@atsgtobal.com Ph-06 4302			2ASTLE 5/531 Maikanu 014 2500 Er samples ne 23 A/13 Geary Place Ma 23 2063 Er novra@a si HITS hoe Way Maloga 1 2097550 Er tampres pe	Rd Mayfield (Vientin SW 2003) www.astre@atsgrobal.com dh Newra NS&b 2543 g) stal.com WK 6230 wh (@alsglobal.com	List/DHEY 271-XA Meedigark Read Smith fett MSN, 2184 Ph. 02 A734 8755 E. san slez symek @alsgbbail.01 LITOWNDS LEF "4-15 Desma Co. # Puntur.310 4916 Ph. 07 4756 0400 E. LKV0LLCK-SD11 507 Kenny Sireet Woll sny: 19 MSN, 2500 Ph. 32 4226 4121 E. poneensta@alsgle.af.con		
CLIENT:	IENT: GHD TURNAROUND REQUIREMENTS :				🗹 Stenda	rd TAT (List	due date):						
OFFICE:	FFICE: Level 19, 133 Castlereagh Street Sydney NSW (Slandard TAT may be longer for some lesis e.g., Ultra Trace Organics)		Non S	tanderd or ur	gent TAT (Li	st due date)	:						
PROJECT	ROJĘCT: 12517046 ALS QUOTE NO.: SY-522-			2-19 GHD V2				COC SEQ	JENCENUMBER	(Circle)			
ORDER N	UMBER: 12517046								600	* 12	345	6 7	
PROJECT	MANAGER: Carmen Yi		CONTACT F	PH: 9239	7530				OF	1 2	3 4 1 ⁵	5 7	
SAMPLER	t: Carmen Yl		SAMPLER N	OBILE:		RELINQUE	SHED BY: C	armen Yi	REC	ENED BY:	D	RELINQUISHED BY	RECEIVED BY:
COC emai	lied to ALS? (<u>YES</u>)	·	EDD FORM/	AT (or de	fault):		19	27	t	74,52	T		
Email Rep	orts to (will default to PM	f no other addresses	are listed) Sarah Ecclesh	all@ghd	com .		2: 7/11/2019		DAT	ATE/TIME: DATE/TIME:		DATE/TIME:	DATE/TIME-
Email invo	Dice to (will default to PM if	no other addresses a	are listed):						81	ulla	((,))~	-	
COMMEN	TS/SPECIAL HANDLING/	STORAGE OR DISP	OSAL: Please freeze zip	lock baç	ł								
								ANA Where Met	LYSIS REQU als are require	RED Includined, specify Tot	ig SUITES (NB - Suite al (unfiltered bottle re	e Codes must be listed to attract sa quired) or Dissofved (field fittered	ile price) Bottle required). Additional information
LABID	SAMPLE	: ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	(refer to	TOTAL	ASS Field Screening Analysis	NSW DECCW Waste Classification (SCC) - Short Suite	8 Metals + PAH	Hold		Comments on likely contaminant levels, dilutions, or samples requiring specific OC analysis etc.
1	BH05_4.6-4.7		7.11.2019	s	Jar, ZLB		2	x	×				
٢	RIN_03	······································	7.11.2019	w	V, AG		3	·	·				
3	SW04		7.11.2019	w	P		1	1			×		Sydney
۲	SW05		7.11.2019	w	P		1			-	x		Work Order Reference
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		1			LL - 4 20 ಹಂತಿ ಆರುನ್ತಿಂಗ್	TOTAL		1	1	1	2		



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: ES1936922						
Client Contact Address	: GHD PTY LTD : Jessica Watson : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Laboratory Contact Address	 Environmental Division Sydney Customer Services ES 277-289 Woodpark Road Smithfie NSW Australia 2164 				
E-mail Telephone Facsimile	: jessica.watson@ghd.com : :	E-mail Telephone Facsimile	: ALSEnviro : +61-2-878 : +61-2-878	.Sydney@ALSGlobal.com 4 8555 4 8500			
Project Order number C-O-C number Site Sampler	: 12517046 : 12517046 : : : CARMEN YI	Page Quote number QC Level	: 1 of 2 : ES2019GHDSER0030 (SY/522/19) : NEPM 2013 B3 & ALS QC Standard				
Dates Date Samples Received : 08-Nov-2019 11:30 Client Requested Due : 14-Nov-2019 Date		Issue Date Scheduled Reportir	ng Date	: 08-Nov-2019 : 14-Nov-2019			
Delivery Details Mode of Delivery No. of coolers/boxes Receipt Detail	: Carrier : 2 :	Security Seal : Not Available Temperature : 6.3 - Ice present No. of samples received / analysed : 4 / 2					

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- 8 metals analysis has not been added for sample RIN_03 as no red nitric acid preserved bottle was received.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).
- ASS analysis to be conducted by ALS Brisbane.
- Total Fluoride analysis to be conducted by ALS Newcastle.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: SOIL

Laboratory sample	Client sampling	Client sample ID	SOIL - E/	SOIL - E/	SOIL - P-
ID	date / time		ASS Field	Moisture	NSW DE
ES1936922-001	07-Nov-2019 00:00	BH05_4.6-4.7	✓	✓	✓

7/4 - Short Suite CW Waste Classification (SCC) -

Screening Analysis

037

Content



Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
SARAH ECCLESHALL		
 *AU Certificate of Analysis - NATA (COA) 	Email	sarah.eccleshall@ghd.com
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	sarah.eccleshall@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	sarah.eccleshall@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sarah.eccleshall@ghd.com
- A4 - AU Tax Invoice (INV)	Email	sarah.eccleshall@ghd.com
- Chain of Custody (CoC) (COC)	Email	sarah.eccleshall@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	sarah.eccleshall@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	sarah.eccleshall@ghd.com



CERTIFICATE OF ANALYSIS

Work Order	ES1936922	Page	: 1 of 9
Client	: GHD PTY LTD	Laboratory	Environmental Division Sydney
Contact	: Jessica Watson	Contact	Customer Services ES
Address	ELEVEL 15, 133 CASTLEREAGH STREET	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	SYDNEY NSW, AUSTRALIA 2000		
Telephone	:	Telephone	: +61-2-8784 8555
Project	: 12517046	Date Samples Received	: 08-Nov-2019 11:30
Order number	: 12517046	Date Analysis Commenced	: 11-Nov-2019
C-O-C number	:	Issue Date	: 15-Nov-2019 15:15
Sampler	: CARMEN YI		Hac-MRA NATA
Site	:		
Quote number	: SY/522/19		Accreditation No. 925
No. of samples received	: 4		Accredited for compliance with
No. of samples analysed	: 2		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

Page	: 2 of 9
Work Order	: ES1936922
Client	: GHD PTY LTD
Project	12517046



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

 Key :
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

 LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EG048G: Poor spike recovery for ALkyl Hexavalent Chromium due to matrix interferences(confirmed by re-analysis).
- EG035: Positive Hg result ES1936922 #1 has been confirmed by reanalysis.
- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 Slight; 2 Moderate; 3 Strong; 4 Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.

Page	: 3 of 9
Work Order	ES1936922
Client	: GHD PTY LTD
Project	: 12517046



Compound CAS Number LOR UR Parkov 2019 00:00 Compound CAS Number LOR VIII Result	Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	BH05_4.6-4.7	 	
CompoundCAS NumberLORURILES1939822.001CAD37: Ass Field Screening Analysise PH (F)0.1PH Unit6.1		Cli	ient samplii	ng date / time	07-Nov-2019 00:00	 	
LAD37: ASS field Screening Analysis Result Re	Compound	CAS Number	LOR	Unit	ES1936922-001	 	
Berleid Screening Analysis opht (r) 0.1 oph Unit 8.1					Result	 	
op H (F) 0.1 0.	EA037: Ass Field Screening Analysis						
op pH (pso) 0.1 pH Unit 6.3	øpH (F)		0.1	pH Unit	8.1	 	
o Rate I.o. I.o. I.o. IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	ø pH (Fox)		0.1	pH Unit	6.3	 	
EA055: Molsture Content (Dried @ 105-110°C) Moisure Content 1.0 % 47.0 EG005/EF0093/T: Total Metals by (DP.AES T	ø Reaction Rate		1	-	4	 	
Moisture Content 1.0 % 47.0 EG005(ED093)T: Total Metals by ICP-AES 7440-38-2 5 mg/kg 10 <td>EA055: Moisture Content (Dried @ 105-110</td> <td>°C)</td> <td></td> <td></td> <td></td> <td></td> <td></td>	EA055: Moisture Content (Dried @ 105-110	°C)					
Berolitis by ICP-AES Arsenic 7440-38-2 5 mg/kg 10 Beryllium 7440-41-7 1 mg/kg <1	Moisture Content		1.0	%	47.0	 	
Arsenic 7440-38-2 5 mg/kg 10 Beryllum 7440-41-7 1 mg/kg <1	EG005(ED093)T: Total Metals by ICP-AES						
Beryllium 7440-41-7 1 mg/kg <1 Cadmium 7440-41-7 1 mg/kg <1	Arsenic	7440-38-2	5	mg/kg	10	 	
Cadmium T440-43-9 1 mg/kg <1 Lead 7439-92-1 5 mg/kg 127 .	Beryllium	7440-41-7	1	mg/kg	<1	 	
Lead 7439-92-1 5 mg/kg 127 Molybdenum 7439-92-1 2 mg/kg <2	Cadmium	7440-43-9	1	mg/kg	<1	 	
Molybdenum 7439-98-7 2 mg/kg <2 Nickel 7440-02-0 2 mg/kg 5	Lead	7439-92-1	5	mg/kg	127	 	
Nickel 7440-02-0 2 mg/kg 5 Selenium 7782-49-2 5 mg/kg <5 Silver 7440-22-4 2 mg/kg <5	Molybdenum	7439-98-7	2	mg/kg	<2	 	
Selenium 7782-49-2 5 mg/kg <5	Nickel	7440-02-0	2	mg/kg	5	 	
Silver 7440-22-4 2 mg/kg <2 EG035T: Total Recoverable Mercury by FIMS Mercury 7439-97-6 0.1 mg/kg 1.1 <	Selenium	7782-49-2	5	mg/kg	<5	 	
EG035T: Total Recoverable Mercury by FIMS Mercury 7439-97-6 0.1 mg/kg 1.1	Silver	7440-22-4	2	mg/kg	<2	 	
Mercury7439-97-60.1mg/kg1.1EG048: Hexavalent Chromium (Alkaline Digest)Hexavalent Chromium18540-29-90.5mg/kg<0.5Hexavalent Chromium18540-29-90.5mg/kg<0.5EK026SF: Total CN by Segmented Flow AnalyserEK028SF: Weak Acid Dissociable CN by Segmented Flow AnalyseWeak Acid Dissociable Cyanide1mg/kg<1EK040T: Fluoride TotalHexa Acid Dissociable Cyanide1mg/kg<160Hexa Acid Dissociable Cyanide1mg/kg160Hexa Acid Dissociable Cyanide1mg/kg160Hexa Acid Dissociable Cyanide	EG035T: Total Recoverable Mercury by Fil	MS					
EG048: Hexavalent Chromium (Alkaline Digest)Hexavalent Chromium18540-29-90.5mg/kg<0.5	Mercury	7439-97-6	0.1	mg/kg	1.1	 	
Hexavalent Chromium18540-29-90.5mg/kg<0.5EK026SF: Total CN by Segmented Flow Analyser57-12-51mg/kg<1	EG048: Hexavalent Chromium (Alkaline Dig	gest)					
EK026SF: Total CN by Segmented Flow AnalyserTotal Cyanide57-12-51mg/kg<1	Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	 	
Total Cyanide57-12-51mg/kg<1EK028SF: Weak Acid Dissociable CN by Segmented Flow AnalyserWeak Acid Dissociable Cyanide1mg/kg<1	EK026SF: Total CN by Segmented Flow A	nalyser					
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser Weak Acid Dissociable Cyanide 1 mg/kg <1	Total Cyanide	57-12-5	1	mg/kg	<1	 	
Weak Acid Dissociable Cyanide 1 mg/kg <1 EK040T: Fluoride Total </td <td>EK028SF: Weak Acid Dissociable CN by S</td> <td>eamented Flov</td> <td>w Analvse</td> <td>ər</td> <td></td> <td></td> <td></td>	EK028SF: Weak Acid Dissociable CN by S	eamented Flov	w Analvse	ər			
EK040T: Fluoride Total 16984-48-8 40 mg/kg 160 <	Weak Acid Dissociable Cyanide		1	mg/kg	<1	 	
Fluoride 16984-48-8 40 mg/kg 160	EK040T: Fluoride Total						
	Fluoride	16984-48-8	40	mg/kg	160	 	
EP066: Polychlorinated Binhenvis (PCB)	EP066: Polychlorinated Binhenyls (PCB)						
Total Polychlorinated biphenyls 0.1 mg/kg <0.1	Total Polychlorinated biphenyls		0.1	mg/kg	<0.1	 	
EP068A: Organochlorine Pesticides (OC)	FP068A: Organochlorine Pesticides (OC)						
alpha-BHC 319-84-6 0.05 mg/kg <0.05	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	 	
Hexachlorobenzene (HCB) 118-74-1 0.05 mg/kg <0.05	Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	 	
beta-BHC 319-85-7 0.05 mg/kg <0.05	beta-BHC	319-85-7	0.05	mg/kg	<0.05	 	
gamma-BHC 58-89-9 0.05 mg/kg <0.05	gamma-BHC	58-89-9	0.05	mg/kg	<0.05	 	
delta-BHC 319-86-8 0.05 mg/kg <0.05	delta-BHC	319-86-8	0.05	mg/kg	<0.05	 	
Heptachlor 76-44-8 0.05 mg/kg <0.05	Heptachlor	76-44-8	0.05	mg/kg	<0.05	 	
Aldrin 309-00-2 0.05 mg/kg <0.05	Aldrin	309-00-2	0.05	mg/kg	<0.05	 	

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Work Order	: ES1936922
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			BH05_4.6-4.7	 	
	Client sampling date / time			07-Nov-2019 00:00	 	
Compound	CAS Number	LOR	Unit	ES1936922-001	 	
				Result	 	
EP068A: Organochlorine Pesticides (OC) - Continued					
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	 	
^ Total Chlordane (sum)		0.05	mg/kg	<0.05	 	
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	 	
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	 	
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	 	
Dieldrin	60-57-1	0.05	mg/kg	<0.05	 	
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	 	
Endrin	72-20-8	0.05	mg/kg	<0.05	 	
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	 	
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	 	
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	 	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	 	
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	 	
EP068B: Organophosphorus Pesticid	es (OP)					
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	 	
EP071 SG: Total Recoverable Hydroca	arbons - NEPM 201	3 Fraction	s - Silica gel o	leanup		
>C10 - C16 Fraction		50	mg/kg	<50	 	
>C16 - C34 Fraction		100	mg/kg	320	 	
>C34 - C40 Fraction		100	mg/kg	<100	 	
^ >C10 - C40 Fraction (sum)		50	mg/kg	320	 	
EP071 SG-S: Total Petroleum Hydroca	arbons in Soil - Silio	ca gel clea	nup			
C10 - C14 Fraction		50	mg/kg	<50	 	
C15 - C28 Fraction		100	mg/kg	220	 	
C29 - C36 Fraction		100	mg/kg	140	 	
^ C10 - C36 Fraction (sum)		50	mg/kg	360	 	
EP074A: Monocyclic Aromatic Hydroc	arbons					
Benzene	71-43-2	0.2	mg/kg	<0.2	 	
Toluene	108-88-3	0.5	mg/kg	<0.5	 	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	 	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	 	
Styrene	100-42-5	0.5	mg/kg	<0.5	 	
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	 	
EP074B: Oxygenated Compounds						
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	 	

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Work Order	ES1936922
Client	: GHD PTY LTD
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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			BH05_4.6-4.7				
	Client sampling date / time			07-Nov-2019 00:00				
Compound	CAS Number	LOR	Unit	ES1936922-001				
				Result				
EP074E: Halogenated Aliphatic Compou	nds							
Vinyl chloride	75-01-4	4	mg/kg	<4				
1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5				
Methylene chloride	75-09-2	0.5	mg/kg	<0.5				
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5				
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5				
1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5				
Trichloroethene	79-01-6	0.5	mg/kg	<0.5				
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5				
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5				
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5				
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5				
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	0.5	mg/kg	<0.5				
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	<0.5				
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5				
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5				
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1				
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5				
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5				
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5				
Pentachlorophenol	87-86-5	2	mg/kg	<2				
EP075(SIM)B: Polynuclear Aromatic Hyd	Irocarbons							
Naphthalene	91-20-3	0.5	mg/kg	<0.5				
Acenaphthylene	208-96-8	0.5	mg/kg	0.5				
Acenaphthene	83-32-9	0.5	mg/kg	<0.5				
Fluorene	86-73-7	0.5	mg/kg	<0.5				
Phenanthrene	85-01-8	0.5	mg/kg	1.4				
Anthracene	120-12-7	0.5	mg/kg	0.6				
Fluoranthene	206-44-0	0.5	mg/kg	4.9				
Pyrene	129-00-0	0.5	mg/kg	5.7				
Benz(a)anthracene	56-55-3	0.5	mg/kg	2.4				
Chrysene	218-01-9	0.5	mg/kg	2.2				

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Work Order	ES1936922
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	BH05_4.6-4.7			
	Cli	ient sampli	ng date / time	07-Nov-2019 00:00			
Compound	CAS Number	LOR	Unit	ES1936922-001			
				Result			
EP075(SIM)B: Polynuclear Aromatic I	Hydrocarbons - Cont	inued					
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	4.2			
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	1.7			
Benzo(a)pyrene	50-32-8	0.5	mg/kg	4.0			
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	1.5			
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5			
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	1.8			
^ Sum of polycyclic aromatic hydrocarbo	ns	0.5	mg/kg	30.9			
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	5.0			
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	5.3			
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	5.5			
EP080/071: Total Petroleum Hydroca	rbons						
C6 - C9 Fraction		10	mg/kg	<10			
EP080/071: Total Recoverable Hydrod	3 Fractio	ns					
C6 - C10 Fraction	C6_C10	10	mg/kg	<10			
EP066S: PCB Surrogate							
Decachlorobiphenyl	2051-24-3	0.1	%	116			
EP068S: Organochlorine Pesticide St	urrogate						
Dibromo-DDE	21655-73-2	0.05	%	105			
EP068T: Organophosphorus Pesticid	e Surrogate						
DEF	78-48-8	0.05	%	69.5			
EP074S: VOC Surrogates							
1.2-Dichloroethane-D4	17060-07-0	0.5	%	104			
Toluene-D8	2037-26-5	0.5	%	114			
4-Bromofluorobenzene	460-00-4	0.5	%	108			
EP075(SIM)S: Phenolic Compound S	urrogates						
Phenol-d6	13127-88-3	0.5	%	83.8			
2-Chlorophenol-D4	93951-73-6	0.5	%	102			
2.4.6-Tribromophenol	118-79-6	0.5	%	72.2			
EP075(SIM)T: PAH Surrogates							
2-Fluorobiphenyl	321-60-8	0.5	%	111			
Anthracene-d10	1719-06-8	0.5	%	104			
4-Terphenyl-d14	1718-51-0	0.5	%	103			
EP080S: TPH(V)/BTEX Surrogates							
1.2-Dichloroethane-D4	17060-07-0	0.2	%	105			
					1	1	

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Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	BH05_4.6-4.7				
Client sampling date / time				07-Nov-2019 00:00				
Compound	CAS Number	LOR	Unit	ES1936922-001				
				Result				
EP080S: TPH(V)/BTEX Surrogates - Continued								
Toluene-D8	2037-26-5	0.2	%	113				
4-Bromofluorobenzene	460-00-4	0.2	%	100				

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Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			RIN_03				
	Cl	ient sampli	ng date / time	07-Nov-2019 00:00				
Compound	CAS Number	LOR	Unit	ES1936922-002				
				Result				
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0				
Acenaphthylene	208-96-8	1.0	µg/L	<1.0				
Acenaphthene	83-32-9	1.0	µg/L	<1.0				
Fluorene	86-73-7	1.0	µg/L	<1.0				
Phenanthrene	85-01-8	1.0	µg/L	<1.0				
Anthracene	120-12-7	1.0	µg/L	<1.0				
Fluoranthene	206-44-0	1.0	µg/L	<1.0				
Pyrene	129-00-0	1.0	µg/L	<1.0				
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0				
Chrysene	218-01-9	1.0	µg/L	<1.0				
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0				
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0				
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5				
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0				
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0				
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0				
^ Sum of polycyclic aromatic hydrocarbo	ons	0.5	µg/L	<0.5				
^ Benzo(a)pyrene TEQ (zero)		0.5	µg/L	<0.5				
EP075(SIM)S: Phenolic Compound S	urrogates							
Phenol-d6	13127-88-3	1.0	%	22.4				
2-Chlorophenol-D4	93951-73-6	1.0	%	44.2				
2.4.6-Tribromophenol	118-79-6	1.0	%	46.7				
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	71.3				
Anthracene-d10	1719-06-8	1.0	%	64.7				
4-Terphenyl-d14	1718-51-0	1.0	%	62.1				

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Client	: GHD PTY LTD
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Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Limits (%)
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	64	130
Toluene-D8	2037-26-5	66	136
4-Bromofluorobenzene	460-00-4	60	122
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
Sub-Matrix: WATER		Recoverv	Limits (%)
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			·
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112



QUALITY CONTROL REPORT

Work Order	: ES1936922	Page	: 1 of 11	
Client	: GHD PTY LTD	Laboratory	: Environmental Division Syd	dney
Contact	: Jessica Watson	Contact	: Customer Services ES	
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road S	Smithfield NSW Australia 2164
Telephone	:	Telephone	: +61-2-8784 8555	
Project	: 12517046	Date Samples Received	: 08-Nov-2019	AMUUD.
Order number	: 12517046	Date Analysis Commenced	: 11-Nov-2019	
C-O-C number	:	Issue Date	: 15-Nov-2019	NATA
Sampler	: CARMEN YI			Hac-MRA NAIA
Site	:			
Quote number	: SY/522/19			Accreditation No. 825
No. of samples received	: 4			Accredited for compliance with
No. of samples analysed	: 2			ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category			
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, NSW			
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW			
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD			
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW			
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW			
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW			

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Work Order	: ES1936922
Client	: GHD PTY LTD
Project	12517046



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key: Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

- CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
- LOR = Limit of reporting
- RPD = Relative Percentage Difference
- # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL			Laboratory Duplicate (DUP) Report								
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)		
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 2697194)											
ES1936824-003	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit		
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit		
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.00	No Limit		
		EG005T: Nickel	7440-02-0	2	mg/kg	9	9	0.00	No Limit		
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit		
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	9	0.00	No Limit		
		EG005T: Lead	7439-92-1	5	mg/kg	17	21	23.1	No Limit		
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit		
EW1904851-002	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit		
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit		
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.00	No Limit		
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit		
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit		
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit		
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit		
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit		
EA037: Ass Field So	reening Analysis (QC	C Lot: 2697697)									
EB1929956-008	Anonymous	EA037: pH (F)		0.1	pH Unit	9.2	9.2	0.00	0% - 20%		
		EA037: pH (Fox)		0.1	pH Unit	6.8	6.8	0.00	0% - 20%		
EA055: Moisture Co	ntent (Dried @ 105-110	0°C) (QC Lot: 2695861)									
ES1936738-020	Anonymous	EA055: Moisture Content		0.1	%	17.8	17.4	2.67	0% - 50%		
ES1936939-005	Anonymous	EA055: Moisture Content		0.1	%	14.1	14.4	2.12	0% - 50%		
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2697195)											
ES1936824-003	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
Page	: 3 of 11										
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Work Order	: ES1936922										
Client	: GHD PTY LTD										
Project	: 12517046										



Sub-Matrix: SOIL			Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2697195) - continued									
EW1904851-002	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG048: Hexavalent C	hromium (Alkaline Digest)	(QC Lot: 2698222)							
ES1936420-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1936738-005	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EK026SF: Total CN t	y Segmented Flow Analyse	r (QC Lot: 2695855)							
ES1936731-001	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
ES1936921-001	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
EK028SF: Weak Acid	Dissociable CN by Segme	nted Flow Analyser (QC Lot: 2695854)							
ES1936420-001	Anonymous	EK028SF: Weak Acid Dissociable Cyanide		1	mg/kg	<1	<1	0.00	No Limit
EK040T: Fluoride Tot	al (QC Lot: 2700730)								
EB1928929-001	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	800	760	4.62	0% - 50%
ES1936922-001	BH05_4.6-4.7	EK040T: Fluoride	16984-48-8	40	mg/kg	160	150	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 2694921)									
ES1936922-001	BH05_4.6-4.7	EP066: Total Polychlorinated biphenyls		0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlo	rine Pesticides (OC) (QC Lo	ot: 2694919)							
ES1936922-001	BH05_4.6-4.7	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophos	phorus Pesticides (OP) (Q	C Lot: 2694919)							
ES1936922-001	BH05_4.6-4.7	EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
EP071 SG: Total Petr	oleum Hydrocarbons - Silica	a gel cleanup (QC Lot: 2694920)							
ES1936922-001	BH05_4.6-4.7	EP071SG-S: C15 - C28 Fraction		100	mg/kg	220	210	6.76	No Limit
		EP071SG-S: C29 - C36 Fraction		100	mg/kg	140	130	8.38	No Limit

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Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP071 SG: Total Pet	troleum Hydrocarbor	ns - Silica gel cleanup (QC Lot: 2694920) - continued							
ES1936922-001	BH05_4.6-4.7	EP071SG-S: C10 - C14 Fraction		50	mg/kg	<50	<50	0.00	No Limit
		EP071SG-S: C10 - C36 Fraction (sum)		50	mg/kg	360	340	5.71	No Limit
EP071 SG: Total Re	coverable Hydrocarb	oons - NEPM 2013 Fractions - Silica gel cleanup (QC Lo	ot: 2694920)			·			
ES1936922-001	BH05_4.6-4.7	EP071SG-S: >C16 - C34 Fraction		100	mg/kg	320	300	6.10	No Limit
		EP071SG-S: >C34 - C40 Fraction		100	mg/kg	<100	<100	0.00	No Limit
		EP071SG-S: >C10 - C16 Fraction		50	mg/kg	<50	<50	0.00	No Limit
EP074A: Monocyclic	c Aromatic Hydrocar	bons (QC Lot: 2696391)							
ES1937243-002	Anonymous	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074B: Oxygenated Compounds (QC Lot: 2696391)									
ES1937243-002	Anonymous	EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.00	No Limit
EP074E: Halogenate	ed Aliphatic Compou	nds (QC Lot: 2696391)							
ES1937243-002 Anonymous	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
	EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	<5	0.00	No Limit
EP074F: Halogenate	ed Aromatic Compou	nds (QC Lot: 2696391)							
ES1937243-002	Anonymous	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074G: Trihalomet	hanes (QC Lot: 2696	6391)							
ES1937243-002	Anonymous	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)A: Pheno	olic Compounds (QC	C Lot: 2694918)							
ES1936922-001	BH05_4.6-4.7	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit

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Sub-Matrix: SOIL						Laboratory L	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number LOR Unit Original Result Duplicate Result RPD (%) Reco					Recovery Limits (%)	
EP075(SIM)A: Pheno	lic Compounds (QC Lot: 26	94918) - continued							
ES1936922-001	BH05_4.6-4.7	EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)B: Polynu	clear Aromatic Hydrocarbo	ns (QC Lot: 2694918)							
ES1936922-001	BH05_4.6-4.7	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	1.4	1.4	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	0.6	0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	4.9	4.5	7.90	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	5.7	5.2	9.59	0% - 50%
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	2.4	2.2	4.52	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	2.2	2.1	8.54	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	4.2	3.8	10.6	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	1.7	1.8	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	4.0	3.8	5.58	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	1.5	1.4	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	1.8	1.8	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	30.9	28.5	8.08	0% - 20%
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	5.0	4.8	5.34	0% - 50%
EP080/071: Total Pet	roleum Hydrocarbons (QC	Lot: 2696392)							
ES1937243-002	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Rec	overable Hydrocarbons - N	EPM 2013 Fractions (QC Lot: 2696392)							
ES1937243-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
	Report		Report	Spike	Spike Recovery (%)	Recovery	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2	2697194)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	105	86.0	126	
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	107	90.0	113	
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	92.3	83.0	113	
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	99.1	80.0	114	
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2					
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	111	87.0	123	
EG005T: Selenium	7782-49-2	5	mg/kg	<5	5.37 mg/kg	123	75.0	131	
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.1 mg/kg	105	77.0	117	
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2697195)									
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	78.0	70.0	105	
EG048: Hexavalent Chromium (Alkaline Digest) (Q0	CLot: 2698222)								
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	20 mg/kg	101	68.0	114	
				<0.5	40 mg/kg	70.7	68.0	114	
EK026SF: Total CN by Segmented Flow Analyser(QCLot: 2695855)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	40 mg/kg	106	81.0	129	
EK028SF: Weak Acid Dissociable CN by Segmente	d Flow Analyser (QCLo	t: 2695854)							
EK028SF: Weak Acid Dissociable Cyanide		1	mg/kg	<1	40 mg/kg	106	70.0	130	
EK040T: Fluoride Total (QCLot: 2700730)									
EK040T: Fluoride	16984-48-8	40	mg/kg	<40	400 mg/kg	74.0	67.2	96.3	
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2	694921)								
EP066: Total Polychlorinated biphenyls		0.1	mg/kg	<0.1	1 mg/kg	97.0	62.0	126	
EP068A: Organochlorine Pesticides (OC) (QCLot: 2	2694919)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.5	69.0	113	
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	87.9	65.0	117	
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	92.4	67.0	119	
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	88.6	68.0	116	
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.3	65.0	117	
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.6	67.0	115	
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	86.0	69.0	115	
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	92.4	62.0	118	
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	91.5	63.0	117	
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.4	66.0	116	
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.6	64.0	116	

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Sub-Matrix: SOIL		Method Blank (MB)	Laboratory Control Spike (LCS) Report					
		Report	Spike	Spike Recovery (%)	Recovery	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 26	94919) - continued							
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	84.0	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	92.5	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	87.4	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	93.7	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	94.8	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	86.4	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	96.0	62.0	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	97.3	66.0	120
EP068B: Organophosphorus Pesticides (OP) (QCLo	t: 2694919)							
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	86.5	76.0	118
EP071 SG: Total Petroleum Hydrocarbons - Silica ge	l cleanup (QCLot: 26	94920)						
EP071SG-S: C10 - C14 Fraction		50	mg/kg	<50	300 mg/kg	97.1	80.0	116
EP071SG-S: C15 - C28 Fraction		100	mg/kg	<100	450 mg/kg	96.4	85.0	115
EP071SG-S: C29 - C36 Fraction		100	mg/kg	<100	300 mg/kg	98.6	75.0	123
EP071 SG: Total Recoverable Hydrocarbons - NEPM	2013 Fractions - Silic	a gel cleanup (Q	CLot: 2694920)					
EP071SG-S: >C10 - C16 Fraction		50	mg/kg	<50	375 mg/kg	94.1	89.0	109
EP071SG-S: >C16 - C34 Fraction		100	mg/kg	<100	525 mg/kg	97.7	84.0	112
EP071SG-S: >C34 - C40 Fraction		100	mg/kg	<100	225 mg/kg	95.1	71.0	119
EP074A: Monocyclic Aromatic Hydrocarbons (QCLo	t: 2696391)							
EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	95.7	71.0	121
EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	96.8	65.0	131
EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	95.6	72.0	114
EP074: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	93.9	70.0	116
	106-42-3							
EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	1 mg/kg	93.6	67.0	113
EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	96.1	75.0	115
EP074B: Oxygenated Compounds (QCLot: 2696391)								
EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	10 mg/kg	94.3	58.0	136
EP074E: Halogenated Aliphatic Compounds (QCLot:	: 2696391)							
EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	10 mg/kg	99.3	43.0	147
EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	1 mg/kg	97.8	54.0	126
EP074: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	1 mg/kg	99.2	58.0	148
EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	1 mg/kg	93.9	65.0	117
EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	1 mg/kg	93.6	59.0	125
EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	1 mg/kg	96.8	65.0	125
EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	1 mg/kg	94.0	70.0	118
EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	1 mg/kg	99.2	64.0	126
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	97.5	67.0	143

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Sub-Matrix: SOIL		Method Blank (MB)	Laboratory Control Spike (LCS) Report					
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot:	2696391) - continued							
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	1 mg/kg	93.4	62.0	122
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	1 mg/kg	95.2	65.0	121
EP074F: Halogenated Aromatic Compounds (QCLot:	2696391)							
EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	1 mg/kg	96.0	68.0	116
EP074G: Trihalomethanes (QCLot: 2696391)								
EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	1 mg/kg	94.3	66.0	124
EP075(SIM)A: Phenolic Compounds (QCLot: 2694918)							
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	104	71.0	125
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	104	71.0	123
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	113	67.0	127
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	112	70.0	116
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	101	54.0	114
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	102	60.0	114
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	50.2	10.0	57.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (C	CLot: 2694918)							
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	119	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	120	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	115	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	122	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	98.6	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	96.8	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	108	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	105	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	107	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	103	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	98.2	68.0	116
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	105	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	115	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	108	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	102	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	110	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2	596392)							
EP080: C6 - C9 Fraction		10	mg/kg	<10	26 mg/kg	98.1	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM :	2013 Fractions (QCL	ot: 2696392)						
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	97.9	68.4	128
Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LC	S) Report	
			Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	

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Sub-Matrix: WATER	Method Blank (MB)	Laboratory Control Spike (LCS) Report						
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	(QCLot: 2692989)							
EP075(SIM): Naphthalene	91-20-3	1	μg/L	<1.0	5 µg/L	74.0	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	μg/L	<1.0	5 µg/L	74.1	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	μg/L	<1.0	5 µg/L	68.6	62.2	113
EP075(SIM): Fluorene	86-73-7	1	μg/L	<1.0	5 µg/L	73.8	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	μg/L	<1.0	5 µg/L	67.3	62.6	116
EP075(SIM): Anthracene	120-12-7	1	μg/L	<1.0	5 µg/L	66.4	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	μg/L	<1.0	5 µg/L	66.8	63.6	118
EP075(SIM): Pyrene	129-00-0	1	μg/L	<1.0	5 µg/L	74.1	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	μg/L	<1.0	5 µg/L	72.8	64.1	117
EP075(SIM): Chrysene	218-01-9	1	μg/L	<1.0	5 µg/L	79.2	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	μg/L	<1.0	5 µg/L	78.7	61.7	119
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	μg/L	<1.0	5 µg/L	76.4	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	μg/L	<0.5	5 µg/L	78.9	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	73.4	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	71.8	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 μg/L	75.6	59.1	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL					Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery L	mits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
EG005(ED093)T: To	tal Metals by ICP-AES (QCLot: 2697194)							
ES1936824-003	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	96.8	70.0	130	
		EG005T: Cadmium	7440-43-9	50 mg/kg	95.2	70.0	130	
		EG005T: Lead	7439-92-1	250 mg/kg	95.4	70.0	130	
		EG005T: Nickel	7440-02-0	50 mg/kg	93.8	70.0	130	
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2697195)								
ES1936824-003	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	83.8	70.0	130	
EG048: Hexavalent	Chromium (Alkaline Digest) (QCLot: 2698222)							
ES1936560-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	40 mg/kg	# 5.00	70.0	130	
ES1936560-001	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	40 mg/kg	# 2.60	70.0	130	
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 2695855)								
ES1936731-001	Anonymous	EK026SF: Total Cyanide	57-12-5	40 mg/kg	130	70.0	130	
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser (QCLot: 2695854)								

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Sub-Matrix: SOIL			Matrix Spike (MS) Report					
				Spike	SpikeRecovery(%)	Recovery Li	mits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
EK028SF: Weak A	cid Dissociable CN by Segmented Flow Analyser (QCL	ot: 2695854) - continued						
ES1936420-001	Anonymous	EK028SF: Weak Acid Dissociable Cyanide		40 mg/kg	119	70.0	130	
EK040T: Fluoride	Гоtal (QCLot: 2700730)							
EB1928929-001	Anonymous	EK040T: Fluoride	16984-48-8	400 mg/kg	104	70.0	130	
EP066: Polychlorin	nated Biphenyls (PCB) (QCLot: 2694921)							
ES1936922-001	BH05_4.6-4.7	EP066: Total Polychlorinated biphenyls		1 mg/kg	94.0	70.0	130	
EP068A: Organoch	nlorine Pesticides (OC) (QCLot: 2694919)							
ES1936922-001	BH05_4.6-4.7	EP068: gamma-BHC	58-89-9	0.5 mg/kg	78.8	70.0	130	
		EP068: Heptachlor	76-44-8	0.5 mg/kg	83.1	70.0	130	
		EP068: Aldrin	309-00-2	0.5 mg/kg	76.1	70.0	130	
		EP068: Dieldrin	60-57-1	0.5 mg/kg	99.2	70.0	130	
		EP068: Endrin	72-20-8	2 mg/kg	89.5	70.0	130	
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	81.9	70.0	130	
EP071 SG: Total P	etroleum Hydrocarbons - Silica gel cleanup (QCLot: 26	94920)						
ES1936922-001	BH05_4.6-4.7	EP071SG-S: C10 - C14 Fraction		523 mg/kg	106	43.0	139	
		EP071SG-S: C15 - C28 Fraction		2319 mg/kg	118	49.0	131	
		EP071SG-S: C29 - C36 Fraction		1714 mg/kg	130	64.0	158	
EP071 SG: Total R	ecoverable Hydrocarbons - NEPM 2013 Fractions - Silic	a gel cleanup (QCLot: 2694920)						
ES1936922-001	BH05_4.6-4.7	EP071SG-S: >C10 - C16 Fraction		860 mg/kg	110	33.0	137	
		EP071SG-S: >C16 - C34 Fraction		3223 mg/kg	122	40.0	137	
		EP071SG-S: >C34 - C40 Fraction		1058 mg/kg	118	30.0	190	
EP074A: Monocyc	lic Aromatic Hydrocarbons (QCLot: 2696391)							
ES1937243-002	Anonymous	EP074: Benzene	71-43-2	2.5 mg/kg	98.4	70.0	130	
		EP074: Toluene	108-88-3	2.5 mg/kg	101	70.0	130	
EP074E: Halogena	ted Aliphatic Compounds (QCLot: 2696391)				· · · ·			
ES1937243-002	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	2.5 mg/kg	94.0	70.0	130	
		EP074: Trichloroethene	79-01-6	2.5 mg/kg	95.2	70.0	130	
EP074F: Halogena	ted Aromatic Compounds (QCLot: 2696391)							
ES1937243-002	Anonymous	EP074: Chlorobenzene	108-90-7	2.5 mg/kg	102	70.0	130	
EP075(SIM)A: Phe	nolic Compounds (QCLot: 2694918)							
ES1936922-001	BH05_4.6-4.7	EP075(SIM): Phenol	108-95-2	10 mg/kg	102	70.0	130	
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	112	70.0	130	
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	84.8	20.0	130	
EP075(SIM)B: Poly	nuclear Aromatic Hydrocarbons (QCLot: 2694918)							
ES1936922-001	BH05_4.6-4.7	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	109	70.0	130	
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	109	70.0	130	
-								

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Sub-Matrix: SOIL	Matrix Spike (MS) Report						
				Spike	SpikeRecovery(%)	Recovery L	imits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total P	etroleum Hydrocarbons (QCLot: 2696392)						
ES1937243-002	Anonymous	EP080: C6 - C9 Fraction		32.5 mg/kg	108	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2696392)							
ES1937243-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	97.0	70.0	130



QA/QC Compliance Assessment to assist with Quality Review						
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Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney			
Contact	: Jessica Watson	Telephone	: +61-2-8784 8555			
Project	: 12517046	Date Samples Received	: 08-Nov-2019			
Site	:	Issue Date	: 15-Nov-2019			
Sampler	: CARMEN YI	No. of samples received	: 4			
Order number	: 12517046	No. of samples analysed	: 2			

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- NO Method Blank value outliers occur.
- <u>NO</u> Duplicate outliers occur.
- <u>NO</u> Laboratory Control outliers occur.
- Matrix Spike outliers exist please see following pages for full details.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

• <u>NO</u> Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

• Quality Control Sample Frequency Outliers exist - please see following pages for full details.

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Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: SOIL

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG048: Hexavalent Chromium (Alkaline Digest)	ES1936560001	Anonymous	Hexavalent Chromium	18540-29-9	5.00 %	70.0-130%	Recovery less than lower data quality
							objective
EG048: Hexavalent Chromium (Alkaline Digest)	ES1936560001	Anonymous	Hexavalent Chromium	18540-29-9	2.60 %	70.0-130%	Recovery less than lower data quality
							objective

Outliers : Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	Count Rate (%)		(%)	Quality Control Specification	
Method	QC	Regular	Actual Expected		
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)			`		
PAH/Phenols (GC/MS - SIM)	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern

$\underline{\mathbf{v}}$ $\mathbf{$							
Matrix: SOIL				Evaluation	: × = Holding time	breach ; ✓ = Withi	n holding time
Method	Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA037: Ass Field Screening Analysis							
Snap Lock Bag - frozen (EA037) BH05_4.6-4.7	07-Nov-2019	14-Nov-2019	05-May-2020	1	14-Nov-2019	05-May-2020	✓
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) BH05_4.6-4.7	07-Nov-2019				12-Nov-2019	21-Nov-2019	~
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	05-May-2020	1	13-Nov-2019	05-May-2020	~
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	05-Dec-2019	1	13-Nov-2019	05-Dec-2019	1

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Matrix: SOIL				Evaluation	: × = Holding time	breach ; ✓ = Withi	n holding time.
Method	Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG048: Hexavalent Chromium (Alkaline Digest)							
Soil Glass Jar - Unpreserved (EG048G) BH05_4.6-4.7	07-Nov-2019	13-Nov-2019	05-Dec-2019	1	13-Nov-2019	20-Nov-2019	~
EK026SF: Total CN by Segmented Flow Analyser							
Soil Glass Jar - Unpreserved (EK026SF) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	14-Nov-2019	26-Nov-2019	1
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser							
Soil Glass Jar - Unpreserved (EK028SF) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	14-Nov-2019	26-Nov-2019	1
EK040T: Fluoride Total							
Snap Lock Bag (EK040T) BH05_4.6-4.7	07-Nov-2019	11-Nov-2019	05-Dec-2019	1	14-Nov-2019	05-Dec-2019	1
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	13-Nov-2019	22-Dec-2019	~
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	13-Nov-2019	22-Dec-2019	~
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	13-Nov-2019	22-Dec-2019	~
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup							
Soil Glass Jar - Unpreserved (EP071SG-S) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	14-Nov-2019	22-Dec-2019	~
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup							
Soil Glass Jar - Unpreserved (EP071SG-S) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	14-Nov-2019	22-Dec-2019	~
EP074A: Monocyclic Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP074) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	14-Nov-2019	1	12-Nov-2019	14-Nov-2019	~
EP074B: Oxygenated Compounds							
Soil Glass Jar - Unpreserved (EP074) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	14-Nov-2019	~	12-Nov-2019	14-Nov-2019	~
EP074E: Halogenated Aliphatic Compounds							
Soil Glass Jar - Unpreserved (EP074) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	14-Nov-2019	~	12-Nov-2019	14-Nov-2019	~
EP074F: Halogenated Aromatic Compounds							
Soil Glass Jar - Unpreserved (EP074) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	14-Nov-2019	1	12-Nov-2019	14-Nov-2019	1

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Matrix: SOIL				Evaluation	i: × = Holding time	breach ; ✓ = Withi	in holding time
Method	Sample Date	E>	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074G: Trihalomethanes							
Soil Glass Jar - Unpreserved (EP074) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	14-Nov-2019	1	12-Nov-2019	14-Nov-2019	✓
EP075(SIM)A: Phenolic Compounds							
Soil Glass Jar - Unpreserved (EP075(SIM)) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	13-Nov-2019	22-Dec-2019	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	13-Nov-2019	22-Dec-2019	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	12-Nov-2019	21-Nov-2019	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) BH05_4.6-4.7	07-Nov-2019	12-Nov-2019	21-Nov-2019	1	12-Nov-2019	21-Nov-2019	✓
Matrix: WATER				Evaluation	: × = Holding time	breach ; ✓ = Withi	in holding time
Method	Sample Date	E>	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) RIN_03	07-Nov-2019	11-Nov-2019	14-Nov-2019	1	12-Nov-2019	21-Dec-2019	✓

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Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: SOIL				Evaluatio	n: × = Quality Co	ntrol frequency	not within specification ; \checkmark = Quality Control frequency within specification.
Quality Control Sample Type		С	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	1	5	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	3	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard

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Work Order	: ES1936922
Client	: GHD PTY LTD
Project	: 12517046

PAH/Phenols (GC/MS - SIM)

Method Blanks (MB) PAH/Phenols (GC/MS - SIM)

Matrix Spikes (MS) PAH/Phenols (GC/MS - SIM)



Matrix: SOIL				Evaluatio	n: × = Quality Co	ontrol frequency	not within specification ; \checkmark = Quality Control frequency within specification.
Quality Control Sample Type		C	Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	1	100.00	5.00	~	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix: WATER				Evaluatio	n: × = Quality Co	ontrol frequency	not within specification ; 🖌 = Quality Control frequency within specification.
Quality Control Sample Type		C	Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	13	0.00	10.00	x	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							

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NEPM 2013 B3 & ALS QC Standard

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EP075(SIM)

EP075(SIM)

EP075(SIM)

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Work Order	: ES1936922
Client	: GHD PTY LTD
Project	12517046



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
ASS Field Screening Analysis	* EA037	SOIL	In house: Referenced to Acid Sulfate Soils Laboratory Methods Guidelines, version 2.1 June 2004. As received samples are tested for pH field and pH fox and assessed for a reaction rating.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C.
			This method is compliant with NEPM (2013) Schedule B(3) Section 6.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate
			acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic
			spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix
			matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS)
			FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an
			appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then
			purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This
			method is compliant with NEPM (2013) Schedule B(3)
Hexavalent Chromium by Alkaline	EG048G	SOIL	In house: Referenced to USEPA SW846, Method 3060A. Hexavalent chromium is extracted by alkaline digestion.
Digestion and DA Finish			The digest is determined by photometrically by automatic discrete analyser, following pH adjustment. The
			instrument uses colour development using dephenylcarbazide. Each run of samples is measured against a
			five-point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Cyanide by Segmented Flow	EK026SF	SOIL	In house: Referenced to APHA 4500-CN C / ASTM D7511. Caustic leachates of soil samples are introduced into
Analyser			an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing
			stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate
			glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of
			thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen
			cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form
			cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red
	FLOODOF	2011	colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
WAD Cyanide by Segmented Flow	EK028SF	SOIL	In house: Referenced to APHA 4500-CN-O. Caustic leachates of soil samples are introduced into an automated
Analyser			segmented flow analyser. Hydrogen cyanide is liberated from a slightly acidified (pH 4.5) and is dialysed. Fight
			cyanide complexes that would not be amenable to oxidation by chlorine are not converted. Iron cyanide
			complexes are precipitated with zinc acetate.
			Liberated HCN diffuses through a membrane into a stream of sodium hydroxide where it is carried as CN-
			The cyanide in causic solution is bulleted to pH 5.2 and further converted to cyanogen chloride by reaction with
			chioranine-1. Cyanogen chiorde subsequently feacts with 4 2pynomic carboxylic and 1,3 - dimethyloarbitume
			This method is compliant with NEDM (2013) Schedule B(3)
Total Eluoride	EK040T	SOIL	(In house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium
		OOIL	(in-nouse) rotal nuonue is determined by for specific electrode (ISE) in a solution obtained aller a Soulum



Analytical Methods	Method	Matrix	Method Descriptions
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	SOIL	In house: Referenced to USEPA SW 846 - 8015A. Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
Volatile Organic Compounds	EP074	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
NaOH leach for CN in Soils	CN-PR	SOIL	In house: APHA 4500 CN. Samples are extracted by end-over-end tumbling with NaOH.
Alkaline digestion for Hexavalent Chromium	EG048PR	SOIL	In house: Referenced to USEPA SW846, Method 3060A.
Total Fluoride	EK040T-PR	SOIL	In house: Samples are fused with Sodium Carbonate / Potassium Carbonate flux.
Drying only	EN020D	SOIL	In house
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3). ALS default excludes sediment which may be resident in the container.

UPDATED COC

Loren Schiavon

From:	Carmen Yi <carmen.yi@ghd.com></carmen.yi@ghd.com>
Sent:	Tuesday, 19 November 2019 1:56 PM
To:	Loren Schiavon
Cc:	Sarah.Eccleshall@ghd.com; ALSEnviro Sydney
Subject:	[EXTERNAL] - RE: ALS samples received on hold
Attachments:	11112019112559-0001.pdf

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi Loren,

Thank you for following up on these.

Please proceed analysis for the following samples listed in the attached COC on standard TAT and have these samples extracted on time to meet the relevant holding time requirements:

BH06_1.2-1.45 and BH07_2.5-2.95: P-7/4 short suite, and TCLP for B(a)P

RB: 8 Metals and PAH

Trip blank and Trip spike: BTEX

Any questions please do not hesitate to contact me.

Kind Regards,

Carmen Yi Senior Environmental Engineer – Contamination and Environment Management

GHD

Proudly employee owned T: +61 2 9239 7630 | M: +61 451 962 988 | E: carmen.vi@ghd.com Level 15, 133 Castlereagh Street, Sydney NSW 2000 Australia | <u>www.qhd.com</u>



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Please consider our environment before printing this email

From: Loren Schiavon <loren.schiavon@alsglobal.com> Sent: Tuesday, 19 November 2019 10:59 AM To: Sarah Eccleshall <Sarah.Eccleshall@ghd.com>; Carmen Yi <Carmen.Yi@ghd.com> Subject: RE: ALS samples received on hold

Hi Sarah and Carmen,

ALS still has the attached samples on hold. Are you able to confirm if analysis will be require don these samples?

Thanks.



Environmental Division

Svdney

Telephone : + 61-2-8764 6555

Kind Regards

Loren Schiavon Sample Administration Coordinator, Environmental



<u>T</u> +61 2 8784 8555 <u>F</u> +61 2 8784 8500 <u>Loren.schiavon@alsglobal.com</u> 277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA

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From: Loren Schiavon Sent: Monday, 11 November 2019 11:50 AM To: sarah.eccleshall@ghd.com; carmen.yi@ghd.com Subject: ALS samples received on hold

Hi Sarah and Carmen,

Please see attached a COC for samples received this morning on hold.

If you could provide me with an updated COC at your earliest convenience, I will be able to make the necessary arrangements for you.

Cheers.

P.S. Sorry to have called you at a bad time Carmen! I'll try calling again later if I don't hear back from you.

Kind Regards

Loren Schiavon Sample Administration Coordinator, Environmental



<u>T</u> +61 2 8784 8555 <u>F</u> +61 2 8784 8500 <u>Loren.schiavon@alsglobal.com</u> 277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA

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LAB ID	Sample ID	DATE / TIME	MATRIX	TYPE & PRESER (refer to codes b	/ATIVE elow)	TOTAL CONTAINERS	ASS Floid Screen (EA037)	Phenols [EP075A]	TRHIBTEXN (EP080-	ист оцра цасе п sediments (EP071- SD)	FOC EP003)	ICN EK0265F)	⊃C/OP/PCB(PAH SD-02)	CMPS Metals (15 netals + Iow level Hg), SD03)	² article Size distribution (EA150H)	-7/4 Short Suite		BT (EP090)	lloxins/Furnas EP300)	
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2	BH06_4.0-4.45	7/11/2019 0:00	s	Jar		1	<u> </u>						<u> </u>	<u> </u>					+	
3	BH06_1.2-1.45	7/11/2019 0:00	s			1		1							† '			+	+	
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CERTIFICATE OF ANALYSIS

Work Order	ES1937111	Page	: 1 of 12
Client	: GHD PTY LTD	Laboratory	Environmental Division Sydney
Contact	: Jessica Watson	Contact	Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	:	Telephone	: +61-2-8784 8555
Project	: 12517046	Date Samples Received	: 11-Nov-2019 11:00
Order number	:	Date Analysis Commenced	: 22-Nov-2019
C-O-C number	:	Issue Date	: 26-Nov-2019 18:46
Sampler	: JAMES TOMLINSON		Hac-MRA NATA
Site	:		
Quote number	: SY/522/19		Accreditation No. 825
No. of samples received	: 10		Accredited for compliance with
No. of samples analysed	: 6		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, NSW

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Work Order	: ES1937111
Client	: GHD PTY LTD
Project	: 12517046



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

 Key :
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

 LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EG048G: Poor spike recovery for Alkyl Hexavalent Chromium due to matrix interferences..
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EG005: Poor precision was obtained for Iron on sample ES1937111-1. Results have been confirmed by re-extraction and reanalysis.
- EG035: Positive Hg result ES1937111 #3 has been confirmed by reanalysis.

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Work Order	: ES1937111
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			BH07_2.5-2.95	BH06_1.2-1.45	Trip blank	Trip spike	TSC	
	Cli	ent samplii	ng date / time	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937111-001	ES1937111-003	ES1937111-008	ES1937111-009	ES1937111-010	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-110	°C)								
Moisture Content		1.0	%	18.2	23.7				
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg	<5	6				
Beryllium	7440-41-7	1	mg/kg	<1	<1				
Cadmium	7440-43-9	1	mg/kg	<1	<1				
Lead	7439-92-1	5	mg/kg	<5	68				
Molybdenum	7439-98-7	2	mg/kg	<2	<2				
Nickel	7440-02-0	2	mg/kg	5	2				
Selenium	7782-49-2	5	mg/kg	<5	<5				
Silver	7440-22-4	2	mg/kg	<2	<2				
EG035T: Total Recoverable Mercury by FIM	IS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	0.2				
EG048: Hexavalent Chromium (Alkaline Dig	jest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5				
EK026SF: Total CN by Segmented Flow An	nalyser								
Total Cyanide	57-12-5	1	mg/kg	<1	<1				
EK028SF: Weak Acid Dissociable CN by Se	egmented Flov	w Analyse	ər						
Weak Acid Dissociable Cyanide		1	mg/kg	<1	<1				
EK040T: Fluoride Total									
Fluoride	16984-48-8	40	mg/kg	40	170				
EN33: TCLP Leach									
Initial pH		0.1	pH Unit	5.4	9.2				
After HCI pH		0.1	pH Unit	1.4	5.2				
Extraction Fluid Number		1	-	1	2				
Final pH		0.1	pH Unit	5.1	5.8				
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls		0.1	mg/kg	<0.1	<0.1				
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05				
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05				
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05				
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05				
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05				
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05				

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID		BH07_2.5-2.95	BH06_1.2-1.45	Trip blank	Trip spike	TSC	
	Cl	ient samplii	ng date / time	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937111-001	ES1937111-003	ES1937111-008	ES1937111-009	ES1937111-010
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued							
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05			
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05			
^ Total Chlordane (sum)		0.05	mg/kg	<0.05	<0.05			
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05			
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05			
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05			
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05			
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05			
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05			
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05			
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05			
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05			
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05			
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2			
EP068B: Organophosphorus Pesticid	es (OP)							
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05			
EP071 SG: Total Recoverable Hydroca	arbons - NEPM 201	3 Fraction	s - Silica gel o	cleanup				
>C10 - C16 Fraction		50	mg/kg	<50	<50			
>C16 - C34 Fraction		100	mg/kg	<100	850			
>C34 - C40 Fraction		100	mg/kg	<100	170			
^ >C10 - C40 Fraction (sum)		50	mg/kg	<50	1020			
EP071 SG-S: Total Petroleum Hydroca	arbons in Soil - Silio	ca gel clea	anup					
C10 - C14 Fraction		50	mg/kg	<50	<50			
C15 - C28 Fraction		100	mg/kg	<100	560			
C29 - C36 Fraction		100	mg/kg	<100	400			
^ C10 - C36 Fraction (sum)		50	mg/kg	<50	960			
EP074A: Monocyclic Aromatic Hydrod	carbons							
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2			
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5			
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5			
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5			
Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5			
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5			
EP074B: Oxygenated Compounds								

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Work Order	ES1937111
Client	: GHD PTY LTD
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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			BH07_2.5-2.95	BH06_1.2-1.45	Trip blank	Trip spike	TSC
	Cli	ent sampli	ng date / time	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937111-001	ES1937111-003	ES1937111-008	ES1937111-009	ES1937111-010
				Result	Result	Result	Result	Result
EP074B: Oxygenated Compounds - Conti	nued							
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5			
EP074E: Halogenated Aliphatic Compour	nds							
Vinyl chloride	75-01-4	4	mg/kg	<4	<4			
1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5			
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5			
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5			
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5			
1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5			
Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5			
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5			
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5			
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5			
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5			
EP074F: Halogenated Aromatic Compoun	nds							
Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5			
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5			
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5			
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5			
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1			
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5			
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5			
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5			
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2			
EP075(SIM)B: Polynuclear Aromatic Hyd	rocarbons							
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5			
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5			
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5			
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5			
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5			
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5			
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.4			
Pyrene	129-00-0	0.5	mg/kg	<0.5	1.6			

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Work Order	: ES1937111
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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	BH07_2.5-2.95	BH06_1.2-1.45	Trip blank	Trip spike	TSC
	Cli	ient sampli	ng date / time	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937111-001	ES1937111-003	ES1937111-008	ES1937111-009	ES1937111-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic	Hydrocarbons - Cont	inued						
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	0.8			
Chrysene	218-01-9	0.5	mg/kg	<0.5	0.7			
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	1.4			
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	0.7			
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.1			
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	0.6			
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5			
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	0.8			
^ Sum of polycyclic aromatic hydrocarb	ons	0.5	mg/kg	<0.5	9.1			
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	1.5			
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	1.7			
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	2.0			
EP080/071: Total Petroleum Hydroca	arbons							
C6 - C9 Fraction		10	mg/kg	<10	<10	<10	72	78
EP080/071: Total Recoverable Hydro	ocarbons - NEPM 201	3 Fractio	ns					
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	86	92
[^] C6 - C10 Fraction minus BTEX	C6_C10-BTEX	10	mg/kg			<10	43	48
(F1)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg			<0.2	0.3	0.4
Toluene	108-88-3	0.5	mg/kg			<0.5	19.9	20.7
Ethylbenzene	100-41-4	0.5	mg/kg			<0.5	2.9	2.8
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg			<0.5	14.5	14.6
ortho-Xylene	95-47-6	0.5	mg/kg			<0.5	5.8	6.0
^ Sum of BTEX		0.2	mg/kg			<0.2	43.4	44.5
^ Total Xylenes		0.5	mg/kg			<0.5	20.3	20.6
Naphthalene	91-20-3	1	mg/kg			<1	<1	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	86.8	84.1			
EP068S: Organochlorine Pesticide S	Surrogate							
Dibromo-DDE	21655-73-2	0.05	%	105	105			
EP068T: Organophosphorus Pestici	ide Surrogate							
DEF	78-48-8	0.05	%	73.4	68.5			
EP074S: VOC Surrogates								

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Work Order	: ES1937111
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			BH07_2.5-2.95	BH06_1.2-1.45	Trip blank	Trip spike	TSC
	Client sampling date / time			07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00	07-Nov-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937111-001	ES1937111-003	ES1937111-008	ES1937111-009	ES1937111-010
				Result	Result	Result	Result	Result
EP074S: VOC Surrogates - Continued								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	101	86.3			
Toluene-D8	2037-26-5	0.5	%	90.0	94.6			
4-Bromofluorobenzene	460-00-4	0.5	%	98.3	99.2			
EP075(SIM)S: Phenolic Compound Surro	gates							
Phenol-d6	13127-88-3	0.5	%	107	107			
2-Chlorophenol-D4	93951-73-6	0.5	%	111	113			
2.4.6-Tribromophenol	118-79-6	0.5	%	74.5	76.4			
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	114	111			
Anthracene-d10	1719-06-8	0.5	%	119	120			
4-Terphenyl-d14	1718-51-0	0.5	%	122	125			
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	99.5	76.1	102	93.8	102
Toluene-D8	2037-26-5	0.2	%	109	86.7	106	119	116
4-Bromofluorobenzene	460-00-4	0.2	%	93.7	79.9	93.5	105	101

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Work Order	ES1937111
Client	: GHD PTY LTD
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Sub-Matrix: TCLP LEACHATE (Matrix: WATER)		Cli	ent sample ID	BH07_2.5-2.95	BH06_1.2-1.45	 	
	Cli	ient sampli	ng date / time	07-Nov-2019 00:00	07-Nov-2019 00:00	 	
Compound	CAS Number	LOR	Unit	ES1937111-001	ES1937111-003	 	
				Result	Result	 	
EP075(SIM)B: Polynuclear Aromatic	Hydrocarbons						
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	 	
EP075(SIM)S: Phenolic Compound S	Surrogates						
Phenol-d6	13127-88-3	1.0	%	21.9	19.2	 	
2-Chlorophenol-D4	93951-73-6	1.0	%	56.9	51.2	 	
2.4.6-Tribromophenol	118-79-6	1.0	%	57.6	47.9	 	
EP075(SIM)T: PAH Surrogates							
2-Fluorobiphenyl	321-60-8	1.0	%	86.4	88.0	 	
Anthracene-d10	1719-06-8	1.0	%	83.9	88.1	 	
4-Terphenyl-d14	1718-51-0	1.0	%	89.7	89.3	 	

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Work Order	: ES1937111
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	RB	 	
	Cl	lient samplii	ng date / time	07-Nov-2019 00:00	 	
Compound	CAS Number	LOR	Unit	ES1937111-007	 	
				Result	 	
EG020T: Total Metals by ICP-MS						
Arsenic	7440-38-2	0.001	mg/L	<0.001	 	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	 	
Chromium	7440-47-3	0.001	mg/L	<0.001	 	
Copper	7440-50-8	0.001	mg/L	<0.001	 	
Nickel	7440-02-0	0.001	mg/L	<0.001	 	
Lead	7439-92-1	0.001	mg/L	<0.001	 	
Zinc	7440-66-6	0.005	mg/L	<0.005	 	
EG035T: Total Recoverable Mercury	by FIMS					
Mercury	7439-97-6	0.0001	mg/L	<0.0001	 	
EP075(SIM)B: Polynuclear Aromatic	Hydrocarbons					
Naphthalene	91-20-3	1.0	µg/L	<1.0	 	
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	 	
Acenaphthene	83-32-9	1.0	µg/L	<1.0	 	
Fluorene	86-73-7	1.0	µg/L	<1.0	 	
Phenanthrene	85-01-8	1.0	µg/L	<1.0	 	
Anthracene	120-12-7	1.0	µg/L	<1.0	 	
Fluoranthene	206-44-0	1.0	µg/L	<1.0	 	
Pyrene	129-00-0	1.0	µg/L	<1.0	 	
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	 	
Chrysene	218-01-9	1.0	µg/L	<1.0	 	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	 	
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	 	
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	 	
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	 	
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	 	
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	 	
^ Sum of polycyclic aromatic hydrocarbo	ons	0.5	µg/L	<0.5	 	
^ Benzo(a)pyrene TEQ (zero)		0.5	µg/L	<0.5	 	
EP075(SIM)S: Phenolic Compound S	urrogates					
Phenol-d6	13127-88-3	1.0	%	20.4	 	
2-Chlorophenol-D4	93951-73-6	1.0	%	45.3	 	
2.4.6-Tribromophenol	118-79-6	1.0	%	38.5	 	
EP075(SIM)T: PAH Surrogates						
2-Fluorobiphenyl	321-60-8	1.0	%	91.1	 	

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Work Order	ES1937111
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	RB	 	
	Cli	ent samplii	ng date / time	07-Nov-2019 00:00	 	
Compound	CAS Number	LOR	Unit	ES1937111-007	 	
				Result	 	
EP075(SIM)T: PAH Surrogates - Continued						
Anthracene-d10	1719-06-8	1.0	%	69.8	 	
4-Terphenyl-d14	1718-51-0	1.0	%	82.4	 	

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Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Limits (%)
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	64	130
Toluene-D8	2037-26-5	66	136
4-Bromofluorobenzene	460-00-4	60	122
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
Sub-Matrix: TCLP FACHATE		Recovery	l imits (%)
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates	er te r ta not		
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
Sub-Matrix: WATER		Recovery	l imits (%)
Compound	CAS Number	Low	Hiah
EP075/SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
= oniorophonor-b+	0000170-0	тт т	57

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Sub-Matrix: WATER		Recovery	Limits (%)			
Compound	CAS Number	Low	High			
EP075(SIM)S: Phenolic Compound Surrogates - Continued						
2.4.6-Tribromophenol	118-79-6	17	125			
EP075(SIM)T: PAH Surrogates						
2-Fluorobiphenyl	321-60-8	20	104			
Anthracene-d10	1719-06-8	27	113			
4-Terphenyl-d14	1718-51-0	32	112			



QA/QC Compliance Assessment to assist with Quality Review				
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Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney	
Contact	: Jessica Watson	Telephone	: +61-2-8784 8555	
Project	: 12517046	Date Samples Received	: 11-Nov-2019	
Site	:	Issue Date	: 26-Nov-2019	
Sampler	: JAMES TOMLINSON	No. of samples received	: 10	
Order number	:	No. of samples analysed	: 6	

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- NO Method Blank value outliers occur.
- <u>NO</u> Duplicate outliers occur.
- <u>NO</u> Laboratory Control outliers occur.
- Matrix Spike outliers exist please see following pages for full details.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

• Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

• Quality Control Sample Frequency Outliers exist - please see following pages for full details.

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Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: SOIL

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG048: Hexavalent Chromium (Alkaline Digest)	ES1937111003	BH06_1.2-1.45	Hexavalent Chromium	18540-29-9	0.0206 %	70.0-130%	Recovery less than lower data quality
							objective
EG048: Hexavalent Chromium (Alkaline Digest)	ES1937111003	BH06_1.2-1.45	Hexavalent Chromium	18540-29-9	0.0426 %	70.0-130%	Recovery less than lower data quality
							objective

Outliers : Analysis Holding Time Compliance

Matrix: SOIL					-				
Method	od			Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue		
EA055: Moisture Content (Dried @ 105-110°C	;)								
Soil Glass Jar - Unpreserved BH07_2.5-2.95,	BH06_1.2-1.45				22-Nov-2019	21-Nov-2019	1		
EK026SF: Total CN by Segmented Flow Ana	lyser								
Soil Glass Jar - Unpreserved BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	21-Nov-2019	1					
EK028SF: Weak Acid Dissociable CN by Sec	mented Flow Analyser								
Soil Glass Jar - Unpreserved BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	21-Nov-2019	1					
EN33: TCLP Leach									
Non-Volatile Leach: 14 day HT(e.g. SV organ BH07_2.5-2.95,	nics) BH06_1.2-1.45	22-Nov-2019	21-Nov-2019	1					
EP066: Polychlorinated Biphenyls (PCB)									
Soil Glass Jar - Unpreserved BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	21-Nov-2019	1					
EP068A: Organochlorine Pesticides (OC)									
Soil Glass Jar - Unpreserved BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	21-Nov-2019	1					
EP068B: Organophosphorus Pesticides (OP)									
Soil Glass Jar - Unpreserved BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	21-Nov-2019	1					
EP071 SG: Total Recoverable Hydrocarbons	- NEPM 2013 Fractions - Silica gel cleanup								
Soil Glass Jar - Unpreserved BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	21-Nov-2019	1					
EP071 SG-S: Total Petroleum Hydrocarbons	in Soil - Silica gel cleanup								
Soil Glass Jar - Unpreserved BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	21-Nov-2019	1					
EP074A: Monocyclic Aromatic Hydrocarbons	;								

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Matrix: SOIL								
Method		Ex	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue	
EP074A: Monocyclic Aromatic Hydrocarbon	s - Analysis Holding Time Compliance							
Soil Glass Jar - Unpreserved								
BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	14-Nov-2019	8	22-Nov-2019	14-Nov-2019	8	
EP074B: Oxygenated Compounds								
Soil Glass Jar - Unpreserved								
BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	14-Nov-2019	8	22-Nov-2019	14-Nov-2019	8	
EP074E: Halogenated Aliphatic Compounds								
Soil Glass Jar - Unpreserved								
BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	14-Nov-2019	8	22-Nov-2019	14-Nov-2019	8	
EP074F: Halogenated Aromatic Compounds								
Soil Glass Jar - Unpreserved								
BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	14-Nov-2019	8	22-Nov-2019	14-Nov-2019	8	
EP074G: Trihalomethanes								
Soil Glass Jar - Unpreserved								
BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	14-Nov-2019	8	22-Nov-2019	14-Nov-2019	8	
EP075(SIM)A: Phenolic Compounds								
Soil Glass Jar - Unpreserved								
BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	21-Nov-2019	1				
EP075(SIM)B: Polynuclear Aromatic Hydroca	arbons							
Soil Glass Jar - Unpreserved								
BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	21-Nov-2019	1				
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved								
BH07_2.5-2.95,	BH06_1.2-1.45,	22-Nov-2019	21-Nov-2019	1	22-Nov-2019	21-Nov-2019	1	
Trip blank,	Trip spike,							
TSC								
EP080/071: Total Recoverable Hydrocarbons	s - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved								
BH07_2.5-2.95,	BH06_1.2-1.45,	22-Nov-2019	21-Nov-2019	1	22-Nov-2019	21-Nov-2019	1	
Trip blank,	Trip spike,							
ISC								
EP080: BTEXN					1			
Soil Glass Jar - Unpreserved	- · · ·		04 No. 0040		00 No. 00 10	04 No. 0040		
i rip blank,	I rip spike,	22-Nov-2019	21-NOV-2019	1	22-NOV-2019	21-NOV-2019	1	
150					1			

Matrix: WATER

Method	Extraction / Preparation		Analysis			
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days
			overdue			overdue
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
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Matrix: WATER

Method	Ex	traction / Preparation		Analysis				
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days		
			overdue			overdue		
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Analysis Holding Time Compliance								
Amber Glass Bottle - Unpreserved								
RB	22-Nov-2019	14-Nov-2019	8					

Outliers : Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	C	Count	Rate (%)		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected			
Laboratory Duplicates (DUP)							
PAH/Phenols (GC/MS - SIM)	0	35	0.00	10.00	NEPM 2013 B3 & ALS QC Standard		
Matrix Spikes (MS)							
PAH/Phenols (GC/MS - SIM)	0	35	0.00	5.00	NEPM 2013 B3 & ALS QC Standard		

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: SOIL					Evaluation	: × = Holding time	breach ; ✓ = Withi	n holding time.
Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019				22-Nov-2019	21-Nov-2019	z
EG005(ED093)T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	05-May-2020	1	25-Nov-2019	05-May-2020	✓
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	05-Dec-2019	1	25-Nov-2019	05-Dec-2019	✓
EG048: Hexavalent Chromium (Alkaline Digest)								
Soil Glass Jar - Unpreserved (EG048G) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	05-Dec-2019	1	22-Nov-2019	29-Nov-2019	~
EK026SF: Total CN by Segmented Flow Analyser								
Soil Glass Jar - Unpreserved (EK026SF) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	21-Nov-2019	×	25-Nov-2019	06-Dec-2019	~

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Matrix: SOIL					Evaluation	: × = Holding time	breach ; ✓ = Withi	in holding time	
Method			Ex	traction / Preparation		Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK028SF: Weak Acid Dissociable CN by Segmer	nted Flow Analyser								
Soil Glass Jar - Unpreserved (EK028SF) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	21-Nov-2019	٤	25-Nov-2019	06-Dec-2019	~	
EK040T: Fluoride Total									
Soil Glass Jar - Unpreserved (EK040T) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	05-Dec-2019	1	26-Nov-2019	05-Dec-2019	✓	
EN33: TCLP Leach									
Non-Volatile Leach: 14 day HT(e.g. SV organics) (I BH07_2.5-2.95,	EN33a) BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	21-Nov-2019	¥				
EP066: Polychlorinated Biphenyls (PCB)									
Soil Glass Jar - Unpreserved (EP066) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	21-Nov-2019	<u>k</u>	23-Nov-2019	01-Jan-2020	✓	
EP068A: Organochlorine Pesticides (OC)									
Soil Glass Jar - Unpreserved (EP068) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	21-Nov-2019	×	23-Nov-2019	01-Jan-2020	1	
EP068B: Organophosphorus Pesticides (OP)									
Soil Glass Jar - Unpreserved (EP068) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	21-Nov-2019	¥	23-Nov-2019	01-Jan-2020	~	
EP071 SG: Total Recoverable Hydrocarbons - NE	PM 2013 Fractions - Silica gel cleanup								
Soil Glass Jar - Unpreserved (EP071SG-S) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	21-Nov-2019	¥	23-Nov-2019	01-Jan-2020	~	
EP071 SG-S: Total Petroleum Hydrocarbons in S	oil - Silica gel cleanup								
Soil Glass Jar - Unpreserved (EP071SG-S) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	21-Nov-2019	×	23-Nov-2019	01-Jan-2020	~	
EP074A: Monocyclic Aromatic Hydrocarbons									
Soil Glass Jar - Unpreserved (EP074) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	14-Nov-2019	¥	22-Nov-2019	14-Nov-2019	×	
EP074B: Oxygenated Compounds									
Soil Glass Jar - Unpreserved (EP074) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	14-Nov-2019	×	22-Nov-2019	14-Nov-2019	×	
EP074E: Halogenated Aliphatic Compounds									
Soil Glass Jar - Unpreserved (EP074) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	14-Nov-2019	×	22-Nov-2019	14-Nov-2019	×	
EP074F: Halogenated Aromatic Compounds									
Soil Glass Jar - Unpreserved (EP074) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	14-Nov-2019	*	22-Nov-2019	14-Nov-2019	*	
EP074G: Trihalomethanes									
Soil Glass Jar - Unpreserved (EP074) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	14-Nov-2019	×	22-Nov-2019	14-Nov-2019	×	

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Matrix: SOIL					Evaluation	: × = Holding time	breach ; 🗸 = Withi	in holding time.
Method		Sample Date	Ex	traction / Preparation		Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)A: Phenolic Compounds								
Soil Glass Jar - Unpreserved (EP075(SIM)) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	21-Nov-2019	×	22-Nov-2019	01-Jan-2020	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM)) BH07_2.5-2.95,	BH06_1.2-1.45	07-Nov-2019	22-Nov-2019	21-Nov-2019	×	22-Nov-2019	01-Jan-2020	✓
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080) BH07_2.5-2.95, Trip blank, TSC	BH06_1.2-1.45, Trip spike,	07-Nov-2019	22-Nov-2019	21-Nov-2019	¥	22-Nov-2019	21-Nov-2019	×
EP080/071: Total Recoverable Hydrocarbons - NEPM 20	13 Fractions							
Soil Glass Jar - Unpreserved (EP080) BH07_2.5-2.95, Trip blank, TSC	BH06_1.2-1.45, Trip spike,	07-Nov-2019	22-Nov-2019	21-Nov-2019	×	22-Nov-2019	21-Nov-2019	×
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080) Trip blank, TSC	Trip spike,	07-Nov-2019	22-Nov-2019	21-Nov-2019	×	22-Nov-2019	21-Nov-2019	×
Matrix: WATER					Evaluation	· × = Holding time	breach : ✓ = Withi	in holding time
Method		Sample Date	Ex	traction / Preparation			Analysis	<u> </u>
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) RB		07-Nov-2019	22-Nov-2019	05-May-2020	~	22-Nov-2019	05-May-2020	✓
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) RB		07-Nov-2019				22-Nov-2019	05-Dec-2019	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM)) RB		07-Nov-2019	22-Nov-2019	14-Nov-2019	¥	22-Nov-2019	01-Jan-2020	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) BH07_2.5-2.95,	BH06_1.2-1.45	22-Nov-2019	25-Nov-2019	29-Nov-2019	1	25-Nov-2019	04-Jan-2020	~

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Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: SOIL				Evaluatio	n: × = Quality Co	ntrol frequency	not within specification ; \checkmark = Quality Control frequency within specification.
Quality Control Sample Type		С	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	30	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	5	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	5	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	7	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TCLP for Non & Semivolatile Analytes	EN33a	1	3	33.33	9.09	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	√	NEPM 2013 B3 & ALS QC Standard

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Matrix: SOIL				Evaluation	n: × = Quality Co	ntrol frequency	not within specification ; \checkmark = Quality Control frequency within specification.
Quality Control Sample Type		Co	ount	Rate (%)			Quality Control Specification
Analytical Methods	Method	00	Reaular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Fluoride	EK040T	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction (Silica Gel Clean Up)	EP071SG-S	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
WAD Cyanide by Segmented Flow Analyser	EK028SF	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: WATER		Evaluation: * = Quality Control frequency n					not within specification ; \checkmark = Quality Control frequency within specification.
Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	35	0.00	10.00	5	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	35	0.00	5.00	×	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	14	7.14	5.00	~	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard

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Client	: GHD PTY LTD
Project	: 12517046



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 6.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	SOIL	In house: Referenced to USEPA SW846, Method 3060A. Hexavalent chromium is extracted by alkaline digestion. The digest is determined by photometrically by automatic discrete analyser, following pH adjustment. The instrument uses colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN C / ASTM D7511. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
WAD Cyanide by Segmented Flow Analyser	EK028SF	SOIL	In house: Referenced to APHA 4500-CN-O. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Hydrogen cyanide is liberated from a slightly acidified (pH 4.5) and is dialysed. Tight cyanide complexes that would not be amenable to oxidation by chlorine are not converted. Iron cyanide complexes are precipitated with zinc acetate. Liberated HCN diffuses through a membrane into a stream of sodium hydroxide where it is carried as CN-The cyanide in caustic solution is buffered to pH 5.2 and further converted to cyanogen chloride by reaction with chloramine-T. Cyanogen chloride subsequently reacts with 4 ¿pyridine carboxylic and 1,3 - dimethylbarbituric acids to give a red colour complex. This colour is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Total Fluoride	EK040T	SOIL	(In-house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium Carbonate / Potassium Carbonate fusion dissolution.
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)

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Analytical Methods	Method	Matrix	Method Descriptions
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction (Silica Gel	EP071SG-S	SOIL	In house: Referenced to USEPA SW 846 - 8015A. Sample extracts are analysed by Capillary GC/FID and
Volatile Organic Compounds	EP074	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
NaOH leach for CN in Soils	CN-PR	SOIL	In house: APHA 4500 CN. Samples are extracted by end-over-end tumbling with NaOH.
Alkaline digestion for Hexavalent Chromium	EG048PR	SOIL	In house: Referenced to USEPA SW846, Method 3060A.
Total Fluoride	EK040T-PR	SOIL	In house: Samples are fused with Sodium Carbonate / Potassium Carbonate flux.
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)

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Work Order	ES1937111
Client	: GHD PTY LTD
Project	: 12517046



Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	SOIL	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3). ALS default excludes sediment which may be resident in the container.
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3). ALS default excludes sediment which may be resident in the container.

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cal Patel

From:Angus HardingSent:Wednesday, 13 November 2019 8:34 AMTo:Vishal PatelCc:Loren SchiavonSubject:FW: [EXTERNAL] - Additional analyses for project 12517046

Hey Vishal,

Some slight changes to that re-batch:

- We will need VC12_0.0-0.5 instead of VC03_0.0-0.5
- **★** PCBs on VC12_1.0-1.1

Let me know when you are getting to it and I shall help.

Cheers.

Kind Regards,

Angus Harding

Client Services Officer, Environmental Sydney



 $\frac{T}{D} + 61 2 8784 8555$ F + 61 2 8784 8500 D + 61 2 8784 8503 angus.harding@alsglobal.com

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From: Sarah.Eccleshall@ghd.com [mailto:Sarah.Eccleshall@ghd.com] Sent: Tuesday, 12 November 2019 5:25 PM To: Angus Harding <angus.harding@ALSGlobal.com>; Brenda Hong <Brenda.Hong@alsglobal.com> Cc: Carmen Yi <Carmen.Yi@ghd.com> Subject: RE: [EXTERNAL] - Additional analyses for project 12517046

Hi Angus,

A couple of modifications to the additional analyses based on the results we just received, sorry about that.

Can we also get PCB analyses on sample VC12_1.0-1.1

Can sample VC03_0.0-0.5 be removed from the PVS and elutriate analyses and VC12_0.0-0.5 be analysed in its place._____

Thanks

Sarah Eccleshall PhD MSc BSc Hons Graduate Environmental Scientist Contamination & Environmental Management

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From: Angus Harding <<u>angus.harding@ALSGlobal.com</u>> Sent: Tuesday, 12 November 2019 3:55 PM To: Sarah Eccleshall <<u>Sarah.Eccleshall@ghd.com</u>>; Brenda Hong (InTouch) <<u>brenda.hong@alsglobal.com</u>> Cc: Carmen Yi <<u>Carmen.Yi@ghd.com</u>> Subject: RE: [EXTERNAL] - Additional analyses for project 12517046

No worries Sarah 🕲

Kind Regards,

Angus Harding

Client Services Officer, Environmental Sydney



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From: <u>Sarah.Eccleshall@ghd.com {mailto:Sarah.Eccleshall@ghd.com</u>] Sent: Tuesday, 12 November 2019 3:46 PM To: Angus Harding <<u>angus.harding@ALSGlobal.com</u>>; Brenda Hong <<u>Brenda.Hong@alsglobal.com</u>> Cc: Carmen Yi <<u>Carmen.Yi@ghd.com</u>> Subject: RE: [EXTERNAL] - Additional analyses for project 12517046

Hi Angus,

One work order will be fine.

Thanks,

Sarah Eccleshall _____ ___ ___ PhD MSc BSc Hons Graduate Environmental Scientist Contamination & Environmental Management T: +61 2 9739 7715 | M: +61 459 546 332 | E: <u>sarah.eccleshall@ghd.com</u> Level 15 133 Castlereagh Street Sydney NSW 2000 Australia | <u>www.ghd.com</u>



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From: Angus Harding <<u>angus.harding@ALSGlobal.com</u>> Sent: Tuesday, 12 November 2019 3:41 PM To: Sarah Eccleshall <<u>Sarah.Eccleshall@ghd.com</u>>; Brenda Hong (InTouch) <<u>brenda.hong@alsglobal.com</u>> Cc: Carmen Yi <<u>Carmen.Yi@ghd.com</u>> Subject: RE: [EXTERNAL] - Additional analyses for project 12517046

Hey Sarah,

Thanks for sending this one through, we shall get it organised for you. Will it be okay for us to re-batch all of these samples into one workorder? Or did you need it separated into two?

Thank you.

Kind Regards,

Angus Harding

Client Services Officer, Environmental Sydney



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From: <u>Sarah.Eccleshall@ghd.com</u> [mailto:Sarah.Eccleshall@ghd.com] Sent: Tuesday, 12 November 2019 3:17 PM To: Brenda Hong <<u>Brenda.Hong@alsglobal.com</u>> Cc: Angus Harding <<u>angus.harding@ALSGlobal.com</u>>; Carmen Yi <<u>Carmen.Yi@ghd.com</u>> Subject: [EXTERNAL] - Additional analyses for project 12517046

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Hi Brenda,

We'd like to schedule the additional analyses in the tables below. Any queries please give myself or Carmen a call, thanks.

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E\$1936029	VC05_0.8- 0.9	30/10/2019							T
E\$1936029	VC05_0.0- 0.5	30/10/2019							T
ES1936029	VC05_0.5- 0.9	30/10/2019					x		
ES1936029	VC03_0.0- 0.2	30/10/2019			x	x	x		
ES1936029	VC03_0.3- 0.4	30/10/2019							Τ
ES1936029	VC03_0.4- 0.6	30/10/2019					x	9	T
ES1936029	VC03_0.6- 0.7	30/10/2019					x		T
ES1936029	VC03_1.0- 1.2	30/10/2019					x		T
E\$1936029	VC03_0.0- 0.5	30/10/2019	·····						T
ES1936029	VC03_0.5- 1.0	30/10/2019					x		Γ
ES1936029	VC04_0.0- 0.1	31/10/2019			x	x	x	x	T
ES1936029	VC04_0.4- 0.5	31/10/2019	················						T
ES1936029	VC04_0.5- 0.6	31/10/2019					x		T
ES1936029	VC04_0.7- 0.8	31/10/2019			x	x	X		
E51936029	VC04_0.9- 1.0	31/10/2019					 x		T
ES1936029	VC04_0.0- 0.5	31/10/2019							1
ES1936029	VC04_0.5- 1.0	31/10/2019	<u>, , , , , , , , , , , , , , , , , , , </u>						Ť

ES1936029	VC02_0.0- 0.2	30/10/2019			x	×		×		
E\$1936029	VC02_0.5- 0.6	30/10/2019						x	x	
ES1936029	VC02_1.0- 1.2	30/10/2019			x	x		x	x	T
ES1936029	VC02_1.5- 1.6	30/10/2019								<u> </u>
ES1936029	VC02_1.0- 1.5	30/10/2019						x		-
ES1936029	VC01_0.0- 0.2	30/10/2019		i	x	x		x	x	-
ES1936029	vc01_0.4- 0.6	30/10/2019						x		
ES1936029	VC01_1.0- 1.1	30/10/2019								
ES1936029	VC01_0.0- 0.5	30/10/2019								
ES1936029	VC01_0.5- 1.0	30/10/2019								
ES1936029	VC10_0.0- 0.2	31/10/2019			x	x		x	x	
ES1936029	VC10_0.5- 0.6	31/10/2019						x		
ES1936029	VC10_0.7- 0.8	31/10/2019								
E\$1936029	VC10_0.0- 0.5	31/10/2019	_	:						
ES1936029	VC10_0.5-	31/10/2019								 -
ES1936029	VC02_0.0- 0.5	30/10/2019			x	x	x			
ES1936029	VC02_0.5- 1.0	30/10/2019			├ ──			x		
ES1936183	VC06_0.0- 0.1	31/10/2019			x	x				F

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ES1936183	VC06_0.3-	31/10/2019		[x	x	
ES1936183	VC06_0.5- 0.6	31/10/2019	1				x	_	+
ES1936183	VC06_0.7- 0.8	31/10/2019					×		
E\$1936183	VC06_0.8- 0.9	31/10/2019					x		
ES1936183	VC06_0.0- 0.5	31/10/2019					×		
ES1936183	VC06_0.5- 1.0	31/10/2019		ĺ			 x		T
ES1936183	VC12_0.0- 0.1	31/10/2019					:		1
ES1936183	VC12_0.3- 0.4	31/10/2019					X		×
ES1936183	VC12_0.5-	31/10/2019					×		<u> </u>
ES1936183	VC12_0.8- 0.9	31/10/2019			x	x	x		1
E\$1936183	VC12_1.0- 1.1	31/10/2019			1		×		T
ES1936183	VC12_0.0- 0.5	31/10/2019							T
ES1936183	VC12_0.5- 1.0	31/10/2019							-
ES1936183	VC08_0.0- 0.1	31/10/2019	Note: this is ES1936183-031. Logged erroneously as VCOS_0.0-0.1		x	X			
ES1936183	VC08_0.3- 0.4	31/10/2019		1			 x	x	×
E\$1936183	VC08_0.5- 0.6	31/10/2019			1		×		\uparrow
E\$1936183	VC08_0.7- 0.8	31/10/2019					 x		

ES1936183	VC08_1.0- 1.1	31/10/2019					×		
ES1936183	VC08_1.3- _1.4	31/10/2019		 			x		<u> </u>
ES1936183	VC08_1.5- 1.6	31/10/2019				•	x		T
ES1936183	VC08_0.0- 0.5	31/10/2019					x		
ES1936183	VC08_0.5- 1.0	31/10/2019					×		
ES1936183	VC08_1.0- 1.5	31/10/2019							T
ES1936183	VC13_0.0- 0.1	31/10/2019		X	×				
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ES1936183	VC13_0.7- 0.8	31/10/2019					x		Γ
ES1936183	VC13_1.0- 1.1	31/10/2019					x		
ES1936183	VC13_0.0- 0.5	31/10/2019	···· ·· · ·· · ··				×		ſ
ES1936183	VC13_0.5- 1.0	31/10/2019					x		T
E51936183	VC14_0.0- 0.1	31/10/2019		x	x		x	x	Ţ
ES1936183	VC14_0.3- 0.4	31/10/2019					x		Ī
ES1936183	VC14-0.5- 0.6	31/10/2019				:	x		
ES1936183	VC14_0.7- 0.8	31/10/2019		x	×		x		
ES1936183	VC14_1.0- 1.1	31/10/2019	· · · · · · · · · · · · · · · · · · ·						

ES1936183	VC14_1.3- 1.4	31/10/2019			x	
ES1936183	VC14_0.0- 0.5	31/10/2019			x	
E\$1936183	VC14_0.5- 1.0	31/10/2019			x	

Lab report	Sample ID	Date	Chromium Reducible Sulphur
E\$1936029	VC11_0.0-	30/10/2019	x
	0.1		
ES1936029	VC11_0.5-	30/10/2019	
	0.6		
ES1936029	VC11_1.0-	30/10/2019	x
	1.1		·
ES1936029	VC09_0.0-	30/10/2019	
	0.1		
ES1936029	VC09_0.5-	30/10/2019	
	0.6		· · · · · · · · · · · · · · · · · · ·
ES1936029	VC09_0.9-	30/10/2019	x
	1.0		
ES1936029	VC07_0.0-	30/10/2019	x
	0.1		
ES1936029	VC07_0.5-	30/10/2019	
	0.6		
E\$1936029	VC07_1.0-	30/10/2019	x
	1.1		
ES1936029	VC05_0.0-	30/10/2019	x
	0.1		
ES1936029	VC05_0.5-	30/10/2019	
	0.6		
ES1936029	VC05_0.8-	30/10/2019	x
	1.0		
E\$1936029	VC03_0.0-	30/10/2019	
	0.1		
ES1936029	VC03_0.5-	30/10/2019	
	0.6		

ES1936029	VC03_10- 1.1	30/10/2019	×
ES1936029	VC01_0.0- 0.1	30/10/2019	x
ES1936029	vc01_0.5- 0.6	30/10/2019	
ES1936029	VC01_1.0- 1.1	30/10/2019	x
ES1936029	VC02_0.0- 0.1	30/10/2019	×
ES1936029	VCO2_0.5- 0.6	30/10/2019	
ES1936029	VC02_0.9- 1.0	30/10/2019	
ES1936029	VC02_1.5- 1.6	30/10/2019	x
ES1936029	VC10_0.0- 0.1	30/10/2019	
ES1936029	VC10_0.5- 0.6	30/10/2019	x
ES1936029	VC04_0.0- 0.1	30/10/2019	
ES1936029	VC04_0.9- 1.0	30/10/2019	x
ES1936183	VC06_0.0- 0.1	31/10/2019	x
ES1936183	VC06_0.5- 0.6	31/10/2019	
ES1936183	VC12_0.0- 0.1	31/10/2019	x
ES1936183	VC12_0.5- 0.6	31/10/2019	
ES1936183	VC12_1.0- 1.1	31/10/2019	
ES1936183	VC08_0.0- 0.1	31/10/2019	

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ES1936183	VC08_0.5- 0.6	31/10/2019		x
ES1936183	VC08_1.0- 1.1	31/10/2019		
ES1936183	VC08_1.5- 1.6	31/10/2019	· · · ·	x
ES1936183	VC13_0.0- 0.1	31/10/2019		
ES1936183	VC13_0.5- 0.6	31/10/2019		x
ES1936183	VC13_1.0- 1.1	31/10/2019		
ES1936183	VC14_0.0- 0.1	31/10/2019		x
ES1936183	VC14_0.5- 0.6	31/10/2019		
ES1936183	VC14_1.0- 1.1	31/10/2019		
ES1936183	VC14_1.3- 1.4	31/10/2019		x

Many Thanks,

Sarah Eccleshall PhD MSc BSc Hons Graduate Environmental Scientist Contamination & Environmental Management

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SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: ES1937483						
Client : GHD PTY LTD Contact : SARAH ECCLESHALL Address : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000 E-mail : sarah.eccleshall@ghd.com		Laboratory Contact Address	: Enviro : Custo : 277-2 NSW	onmental Division Sydney mer Services ES 89 Woodpark Road Smithfield Australia 2164			
E-mail Telephone Facsimile	: sarah.eccleshall@ghd.com : :	E-mail Telephone Facsimile	: ALSE : +61-2 : +61-2	nviro.Sydney@ALSGlobal.com -8784 8555 -8784 8500			
Project Order number C-O-C number Site Sampler	Project : 12517046 Order number : C-O-C number : Site : Sampler :		: 1 of 5 : ES2019GHDSER0030 (SY/522/19) : NEPM 2013 B3 & ALS QC Standar				
Dates Date Samples Receiv Client Requested Due Date	red : 13-Nov-2019 14:57 : 20-Nov-2019	Issue Date Scheduled Reporting	g Date	: 13-Nov-2019 : 20-Nov-2019			
Delivery Detail	/s : Undefined	Security Seal		: Not Available			

Mode of Delivery No. of coolers/boxes Receipt Detail Security Seal Temperature No. of samples received / analysed

: 4.1'C

: 100 / 80

- General Comments
- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances

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- Summary of Sample(s) and Requested Analysis
- Proactive Holding Time Report
- Requested Deliverables
- This work order is a rebatch of ES1936029/ES1936183 and a split from ES1937554/ES1990050.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- TBT suite Analysis to be conducted by ALS Brisbane
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

is provided, the laboratory and	sampling date wi displayed in bra	ill be assumed by the ckets without a time		by ICPAES	olids) P-AES		olids) IMS	PAH only	
Matrix: SOIL			EA055-103 e Content	EG005C tble Metals I	EG005T (sc letals by ICI	EG035C tble Mercury	EG035T (so lercury by F	EP075 SIM AH only	TCLP -each
Laboratory sample	Client sampling date / time	Client sample ID	SOIL - Moistur	SOIL - eacha	SOIL - Fotal M	SOIL - -eacha	SOIL - Fotal M	SOIL -	SOIL -
ES1937483-001	30-Oct-2019 00:00	VC11_0.0-0.2	√	√	✓	✓	✓	✓	✓
ES1937483-003	30-Oct-2019 00:00	VC11_1.0-1.2	✓		✓			1	
ES1937483-004	30-Oct-2019 00:00	VC11_0.0-0.5	✓		1			1	
ES1937483-005	30-Oct-2019 00:00	VC11_0.5-1.0	1		1			1	
ES1937483-006	30-Oct-2019 00:00	VC07_0.2-0.4	✓		✓	✓	✓	1	✓
ES1937483-008	30-Oct-2019 00:00	VC09_0.4-0.6	✓		✓			✓	
ES1937483-009	30-Oct-2019 00:00	VC09_0.7-0.8	✓	✓	✓			✓	✓
ES1937483-010	30-Oct-2019 00:00	VC09_0.8-1.0	✓		✓			1	
ES1937483-011	30-Oct-2019 00:00	VC09_0.0-0.5	✓		✓			✓	
ES1937483-012	30-Oct-2019 00:00	VC09_0.5-1.0	✓		✓			1	
ES1937483-014	30-Oct-2019 00:00	VC07_0.5-0.6	✓		✓	✓	✓	✓	✓
ES1937483-015	30-Oct-2019 00:00	VC07_0.7-0.8	1		1			1	
ES1937483-016	30-Oct-2019 00:00	VC07_1.0-1.2	✓		✓	✓	✓	✓	✓
ES1937483-017	30-Oct-2019 00:00	VC07_0.0-0.5		✓				✓	✓
ES1937483-018	30-Oct-2019 00:00	VC07_0.5-1.0	✓		✓			✓	
ES1937483-019	30-Oct-2019 00:00	VC05_0.0-0.1	1	1	✓	✓	✓	1	1
ES1937483-020	30-Oct-2019 00:00	VC05_0.5-0.7	✓		✓			✓	
ES1937483-023	30-Oct-2019 00:00	VC05_0.5-0.9	✓		✓			✓	
ES1937483-024	30-Oct-2019 00:00	VC03_0.0-0.2	✓	✓	✓			✓	✓
ES1937483-026	30-Oct-2019 00:00	VC03_0.4-0.6	✓		✓			✓	
ES1937483-027	30-Oct-2019 00:00	VC03_0.6-0.7	✓		✓			✓	
ES1937483-028	30-Oct-2019 00:00	VC03_1.0-1.2	✓		✓			✓	
ES1937483-029	30-Oct-2019 00:00	VC12_0.0-0.5	✓						
ES1937483-030	30-Oct-2019 00:00	VC03_0.5-1.0	✓		✓			1	
ES1937483-031	30-Oct-2019 00:00	VC04_0.0-0.1	1	✓	✓	✓	✓	✓	1
ES1937483-033	31-Oct-2019 00:00	VC04_0.5-0.6	✓		✓			1	
ES1937483-034	31-Oct-2019 00:00	VC04_0.7-0.8	1	✓	✓			✓	1
ES1937483-035	31-Oct-2019 00:00	VC04_0.9-1.0	✓		✓			1	
ES1937483-038	30-Oct-2019 00:00	VC02_0.0-0.2	✓	✓	✓			1	✓
ES1937483-039	30-Oct-2019 00:00	VC02_0.5-0.6	✓		✓	✓	✓	1	✓
ES1937483-040	30-Oct-2019 00:00	VC02_1.0-1.2	1	✓	✓	✓	✓	✓	1
ES1937483-042	30-Oct-2019 00:00	VC02_1.0-1.5	✓		✓			1	
ES1937483-043	30-Oct-2019 00:00	VC01_0.0-0.2	1	✓	✓	✓	✓	✓	1
ES1937483-044	30-Oct-2019 00:00	vc01_0.4-0.6	✓		✓			✓	
ES1937483-048	31-Oct-2019 00:00	VC10_0.0-0.2	✓	1	✓	✓	✓	✓	1

Issue Date	: 13-Nov-2019
Page	: 3 of 5
Work Order	ES1937483 Amendment 0
Client	: GHD PTY LTD



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			SOIL Moist	SOIL	SOIL	SOIL	SOIL	SOIL-	SOIL	
ES1937483-049	31-Oct-2019 00:00	VC10_0.5-0.6	✓		✓			✓		
ES1937483-051	31-Oct-2019 00:00	VC10_0.0-0.5	✓							
ES1937483-053	30-Oct-2019 00:00	VC02_0.0-0.5	✓	✓		✓		✓	✓	
ES1937483-054	30-Oct-2019 00:00	VC02_0.5-1.0	1		✓			✓		
ES1937483-055	31-Oct-2019 00:00	VC06_0.0-0.1		✓				✓	✓	
ES1937483-056	31-Oct-2019 00:00	VC06_0.3-0.4	✓		✓	✓	✓	✓	✓	
ES1937483-057	31-Oct-2019 00:00	VC06_0.5-0.6	✓		✓			✓		
ES1937483-058	31-Oct-2019 00:00	VC06_0.7-0.8	✓		✓			✓		
ES1937483-059	31-Oct-2019 00:00	VC06_0.8-0.9	1		✓			✓		
ES1937483-060	31-Oct-2019 00:00	VC06_0.0-0.5	✓		✓			✓		
ES1937483-061	31-Oct-2019 00:00	VC06_0.5-1.0	✓		✓			✓		
ES1937483-063	31-Oct-2019 00:00	VC12_0.3-0.4	✓		✓			✓		
ES1937483-064	31-Oct-2019 00:00	VC12_0.5-0.6	1		✓			✓		
ES1937483-065	31-Oct-2019 00:00	VC12_0.8-0.9	 ✓ 	✓	 ✓ 			✓	✓	
ES1937483-066	31-Oct-2019 00:00	VC12_1.0-1.1	✓		✓			✓		
ES1937483-069	31-Oct-2019 00:00	VC08_0.0-0.1		✓				 ✓ 	 ✓ ✓ 	
ES1937483-070	31-Oct-2019 00:00	VC08_0.3-0.4	✓ ✓		✓ ✓	✓	✓	✓ ✓	✓	
ES1937483-071	31-Oct-2019 00:00	VC08_0.5-0.6	 ✓ ✓ 		✓ ✓			 ✓ 		
ES1937483-072	31-Oct-2019 00:00	VC08_0.7-0.8	✓ ✓		✓ ✓			 ✓ 		
ES1937483-073	31-Oct-2019 00:00	VC08_1.0-1.1	 ✓ ✓ 		 ✓ ✓ 			 ✓ ✓ 		
ES1937483-074	31-Oct-2019 00:00	VC08_1.3-1.4	 ✓ 		 ✓ 			√		
ES1937483-075	31-Oct-2019 00:00	VC08_1.5-1.6	•		✓ ✓			•		
ES1937483-076	31-Oct-2019 00:00	VC08_0.0-0.5	•		*			•		
ES1937403-077	31-Oct-2019 00:00	VC00_0.5-1.0	v		v			•		
ES1937483-080	31-Oct-2019 00:00	VC13_0.3-0.4	4	v	1	1	1	•	* -	
ES1937483-081	31-Oct-2019 00:00	VC13_0.5-0.6	•		•	•	•	•	-	
ES1937483-082	31-Oct-2019 00:00	VC13_0.7-0.8	· ·		• •			•		
ES1937483-083	31-Oct-2019 00:00	VC13_1.0-1.1	· •		•			•		
ES1937483-084	31-Oct-2019 00:00	VC13_0.0-0.5	· •		· •			· •		
ES1937483-085	31-Oct-2019 00:00	VC13 0.5-1.0	✓		· •			· •		
ES1937483-086	31-Oct-2019 00:00	VC14 0.0-0.1	1	1	1	1	1	1	1	
ES1937483-087	31-Oct-2019 00:00	VC14 0.3-0.4	1		1			✓		
ES1937483-088	31-Oct-2019 00:00	VC14-0.5-0.6	1		1			✓		
ES1937483-089	31-Oct-2019 00:00	VC14_0.7-0.8	✓	✓	1	✓	✓	✓	✓	
ES1937483-091	31-Oct-2019 00:00	_ VC14_1.3-1.4	1		1			✓		
ES1937483-092	31-Oct-2019 00:00	 VC14_0.0-0.5	✓		1			✓		
ES1937483-093	31-Oct-2019 00:00	VC14_0.5-1.0	1		1			✓		
ES1937483-094	30-Oct-2019 00:00	VC07_0.0-0.5						✓		
ES1937483-095	30-Oct-2019 00:00	VC12_0.0-0.5						1		
ES1937483-096	30-Oct-2019 00:00	VC02_0.0-0.5						1		

Issue Date Page Work Order	: 13-Nov-2019 : 4 of 5 : ES1937483 Ameno	lment 0								
Client	: GHD PTY LTD									(A)
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E01027492-007	20 Oct 2010 00:00	VC07 0 0 0 5	No So	le S	1 SO	N N N			S C C	
ES1937483-098	30-Oct-2019 00:00	VC07_0.0-0.5	_			-	-	▼ ✓		
ES1937483-099	30-Oct-2019 00:00	VC12 0.0-0.5	_			-		· •		
ES1937483-100	31-Oct-2019 00:00	SEAWATER	_			-	-	 ✓ 		
		1				1		1		I
				lysis						
				anal		CMS	á	5		
				or 2-3				5		
			g	ates fe		s) envls	WA	() ()		
			queste	/3 Elutria	action	solids Biph	PCB-	solid		
Matrix: SOIL			SOIL sis red	168-2 on of	182 LEXtr	2066 (066-I	060		
Laboratory sample	Client sampling	Client sample ID	Hold) analys	L - EN paratio	L - EN ewate	L - EF	L - EF	L - EF		
ID	date / time	1	<u>ų s</u>	SOI Prej	SOI Por	SOI	S IOS		<u>n</u>	
ES1937483-002	30-Oct-2019 00:00	VC11_0.5-0.7	 ✓ ✓ 					_	_	
ES1937483-007	30-Oct-2019 00:00	VC09_0.0-0.2	✓				-	_	-	
ES1937483-008	30-Oct-2019 00:00	VC09_0.4-0.6			-	•	-	_	-	
ES1937483-013	30-Oct-2019 00:00	VC07_0.0-0.2	•		-			_	-	
ES1937483-010	30-Oct-2019 00:00	VC07_0.5-1.0	_			▼ ✓	-	_	-	
ES1937483-021	30-Oct-2019 00:00	VC05_0.8-0.9	-		-	•	+		-	
ES1937483-022	30-Oct-2019 00:00	VC05 0.0-0.5	· •			-	-	-	-	
ES1937483-025	30-Oct-2019 00:00	VC03 0.3-0.4			-	-	-		-	
ES1937483-029	30-Oct-2019 00:00	 VC12_0.0-0.5				-		1	1	
ES1937483-032	31-Oct-2019 00:00	 VC04_0.4-0.5	1			1	1	-	1	
ES1937483-036	31-Oct-2019 00:00	VC04_0.0-0.5	✓						1	
ES1937483-037	31-Oct-2019 00:00	VC04_0.5-1.0	1							
ES1937483-041	30-Oct-2019 00:00	VC02_1.5-1.6	✓							
ES1937483-045	31-Oct-2019 00:00	VC01_1.0-1.1	✓							
ES1937483-046	30-Oct-2019 00:00	VC01_0.0-0.5	1							
ES1937483-047	30-Oct-2019 00:00	VC01_0.5-1.0	✓							
ES1937483-050	31-Oct-2019 00:00	VC10_0.7-0.8	✓							
ES1937483-051	31-Oct-2019 00:00	VC10_0.0-0.5	_					✓	_	
ES1937483-052	31-Oct-2019 00:00	VC10_0.5-1.0	✓						_	
ES1937483-053	30-Oct-2019 00:00	VC02_0.0-0.5						✓	_	
ES1937483-062	31-Oct-2019 00:00	VC12_0.0-0.1	✓			<u> </u>		_	_	
ES1937483-063	31-Oct-2019 00:00	VC12_0.3-0.4	_			√	-		-	
ES1937483-066	31-Oct-2019 00:00	VC12_1.0-1.1	_		-	√	_	_	-	
ES1937483-067	31-Oct-2019 00:00	VC12_0.0-0.5	√		-				-	
ES1937483-068	31-Oct-2019 00:00	VC12_0.5-1.0	 ✓ 							



			(On Hold) SOIL No analysis requested	SOIL - EN68-2/3 Preparation of Elutriates for 2-3 analysis	SOIL - EN82 Porewater Extraction	SOIL - EP066 (solids) Polychlorinated Biphenyls by GCMS	SOIL - EP066-PCB-WA Polychlorinated Biphenyls (PCB)	SOIL - EP090 (solids) Organotins	
ES1937483-070	31-Oct-2019 00:00	VC08_0.3-0.4				✓			
ES1937483-078	31-Oct-2019 00:00	VC08_1.0-1.5	✓						
ES1937483-090	31-Oct-2019 00:00	VC14_1.0-1.1	✓						
ES1937483-094	30-Oct-2019 00:00	VC07_0.0-0.5			✓		1		
ES1937483-095	30-Oct-2019 00:00	VC12_0.0-0.5			✓		✓		
ES1937483-096	30-Oct-2019 00:00	VC02_0.0-0.5			✓		1		
ES1937483-097	30-Oct-2019 00:00	VC07_0.0-0.5		✓			1		
ES1937483-098	30-Oct-2019 00:00	VC02_0.0-0.5		✓			1		
ES1937483-099	30-Oct-2019 00:00	VC12_0.0-0.5		✓			✓		
ES1937483-100	31-Oct-2019 00:00	SEAWATER		✓			1		

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE (Hobart)		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
GHD LAB REPORTS		
 *AU Certificate of Analysis - NATA (COA) 	Email	ghdlabreports@ghd.com
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	ghdlabreports@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ghdlabreports@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ghdlabreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	ghdlabreports@ghd.com
 Electronic SRN for ESdat (ESRN_ESDAT) 	Email	ghdlabreports@ghd.com
SARAH ECCLESHALL		
 *AU Certificate of Analysis - NATA (COA) 	Email	sarah.eccleshall@ghd.com
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	sarah.eccleshall@ghd.com
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	sarah.eccleshall@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sarah.eccleshall@ghd.com
- Chain of Custody (CoC) (COC)	Email	sarah.eccleshall@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	sarah.eccleshall@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	sarah.eccleshall@ghd.com
- EDI Format - XTab (XTAB)	Email	sarah.eccleshall@ghd.com
 Electronic SRN for ESdat (ESRN_ESDAT) 	Email	sarah.eccleshall@ghd.com



CERTIFICATE OF ANALYSIS

Work Order	ES1937483	Page	: 1 of 37
Client	: GHD PTY LTD	Laboratory	Environmental Division Sydney
Contact	: SARAH ECCLESHALL	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	:	Telephone	: +61-2-8784 8555
Project	: 12517046	Date Samples Received	: 13-Nov-2019 14:57
Order number	:	Date Analysis Commenced	: 14-Nov-2019
C-O-C number	:	Issue Date	25-Nov-2019 17:44
Sampler	:		Hac-MRA NATA
Site	:		
Quote number	: SY/522/19		Accreditation No. 925
No. of samples received	: 100		Accredited for compliance with
No. of samples analysed	: 73		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Sarah Ashworth	Laboratory Manager - Brisbane	Brisbane Organics, Stafford, QLD

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Work Order	: ES1937483
Client	: GHD PTY LTD
Project	12517046



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

 Key :
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

 LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EG035: Positive Hg result for ES1937483 #1 has been confirmed by reanalysis.
- EG035: Positive Hg result for ES1937483 #43, 70 have been confirmed by reanalysis.

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Work Order	ES1937483
Client	: GHD PTY LTD
Project	12517046



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC11_0.0-0.2	VC11_1.0-1.2	VC11_0.0-0.5	VC11_0.5-1.0	VC07_0.2-0.4	
	Cli	ient samplii	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937483-001	ES1937483-003	ES1937483-004	ES1937483-005	ES1937483-006	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-11	10°C)								
Moisture Content		0.1	%	28.6	27.7	28.4	29.0	32.7	
EG005(ED093)T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg	55	6	5	9	89	
EG035T: Total Recoverable Mercury by F	IMS								
Mercury	7439-97-6	0.1	mg/kg	0.8				1.0	
EN33: TCLP Leach									
Initial pH		0.1	pH Unit	9.2				9.2	
After HCl pH		0.1	pH Unit	5.3				5.2	
Extraction Fluid Number		1	-	2				2	
Final pH		0.1	pH Unit	6.1				6.1	
EP075(SIM)B: Polynuclear Aromatic Hydi	rocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	1.0	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	1.2	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(b+j)fluoranthene 20	05-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	0.7	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	0.7	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	3.6	
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	0.8	
A Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	0.6	0.6	1.1	
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2	1.2	1.4	
EP075(SIM)S: Phenolic Compound Surro	gates								
Phenol-d6	13127-88-3	0.5	%	89.2	91.8	85.8	84.1	85.8	
2-Chlorophenol-D4	93951-73-6	0.5	%	108	110	103	99.9	101	

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Work Order	ES1937483
Client	: GHD PTY LTD
Project	12517046



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Cli	ent sample ID	VC11_0.0-0.2	VC11_1.0-1.2	VC11_0.0-0.5	VC11_0.5-1.0	VC07_0.2-0.4	
	Cli	ent sampli	ing date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937483-001	ES1937483-003	ES1937483-004	ES1937483-005	ES1937483-006	
				Result	Result	Result	Result	Result	
EP075(SIM)S: Phenolic Compound S	EP075(SIM)S: Phenolic Compound Surrogates - Continued								
2.4.6-Tribromophenol	118-79-6	0.5	%	92.4	89.5	82.4	79.8	92.4	
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%	129	126	123	126	127	
Anthracene-d10	1719-06-8	0.5	%	126	120	121	117	118	
4-Terphenyl-d14	1718-51-0	0.5	%	120	123	115	112	113	

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Work Order	: ES1937483
Client	: GHD PTY LTD
Project	: 12517046



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC09_0.4-0.6	VC09_0.7-0.8	VC09_0.8-1.0	VC09_0.0-0.5	VC09_0.5-1.0
	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-008	ES1937483-009	ES1937483-010	ES1937483-011	ES1937483-012
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105	-110°C)							
Moisture Content		0.1	%	16.3	17.2	15.6	14.5	17.8
EG005(ED093)T: Total Metals by ICP-A	ES							
Lead	7439-92-1	5	mg/kg	17	10	5	<5	22
EN33: TCLP Leach								
Initial pH		0.1	pH Unit		8.2			
After HCI pH		0.1	pH Unit		1.7			
Extraction Fluid Number		1	-		1			
Final pH		0.1	pH Unit		5.0			
EP066: Polychlorinated Biphenyls (PC	B)							
Total Polychlorinated biphenyls		0.1	mg/kg	<0.1				
EP075(SIM)B: Polynuclear Aromatic Hy	/drocarbons							
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	i	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	110				
EP075(SIM)S: Phenolic Compound Sur	rogates							
Page	: 6 of 37							
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Work Order	ES1937483							
Client	: GHD PTY LTD							
Project	: 12517046							



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC09_0.4-0.6	VC09_0.7-0.8	VC09_0.8-1.0	VC09_0.0-0.5	VC09_0.5-1.0
	Cli	ent sampli	ing date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-008	ES1937483-009	ES1937483-010	ES1937483-011	ES1937483-012
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound S	Surrogates - Continued	1						
Phenol-d6	13127-88-3	0.5	%	89.3	82.7	86.0	92.8	94.2
2-Chlorophenol-D4	93951-73-6	0.5	%	106	99.3	102	109	110
2.4.6-Tribromophenol	118-79-6	0.5	%	84.8	77.2	75.6	79.9	80.3
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	127	120	122	128	125
Anthracene-d10	1719-06-8	0.5	%	122	116	118	121	119
4-Terphenyl-d14	1718-51-0	0.5	%	118	115	117	125	126

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Work Order	ES1937483
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC07_0.5-0.6	VC07_0.7-0.8	VC07_1.0-1.2	VC07_0.0-0.5	VC07_0.5-1.0	
	Cl	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937483-014	ES1937483-015	ES1937483-016	ES1937483-017	ES1937483-018	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 1	05-110°C)								
Moisture Content		0.1	%	19.0	20.6	17.4		22.3	
EG005(ED093)T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg	10	6	198		7	
EG035T: Total Recoverable Mercury	/ by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1		<0.1			
EN33: TCLP Leach									
Initial pH		0.1	pH Unit	8.7		8.5	8.9		
After HCI pH		0.1	pH Unit	1.4		1.4	5.2		
Extraction Fluid Number		1	-	1		1	2		
Final pH		0.1	pH Unit	5.1		5.1	6.0		
EP066: Polychlorinated Biphenyls (F	PCB)								
Total Polychlorinated biphenyls		0.1	mg/kg					<0.1	
EP075(SIM)B: Polynuclear Aromatic	Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
^ Sum of polycyclic aromatic hydrocarbo	ons	0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	<0.5		<0.5	
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	0.6		0.6	
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2		1.2	
EP066S: PCB Surrogate									

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC07_0.5-0.6	VC07_0.7-0.8	VC07_1.0-1.2	VC07_0.0-0.5	VC07_0.5-1.0
	Cli	ent sampli	ing date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-014	ES1937483-015	ES1937483-016	ES1937483-017	ES1937483-018
				Result	Result	Result	Result	Result
EP066S: PCB Surrogate - Continued								
Decachlorobiphenyl	2051-24-3	0.1	%					93.7
EP075(SIM)S: Phenolic Compound Surro	ogates							
Phenol-d6	13127-88-3	0.5	%	97.0	90.1	94.5		97.1
2-Chlorophenol-D4	93951-73-6	0.5	%	113	107	110		114
2.4.6-Tribromophenol	118-79-6	0.5	%	84.4	72.2	75.8		79.5
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	121	125	126		133
Anthracene-d10	1719-06-8	0.5	%	120	126	119		122
4-Terphenyl-d14	1718-51-0	0.5	%	121	124	126		124

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Project	: 12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.0-0.1	VC05_0.5-0.7	VC05_0.5-0.9	VC03_0.0-0.2	VC03_0.4-0.6	
	Cl	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937483-019	ES1937483-020	ES1937483-023	ES1937483-024	ES1937483-026	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @	105-110°C)								
Moisture Content		0.1	%	23.5	17.8	14.7	20.4	20.2	
EG005(ED093)T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg	56	<5	5	14	29	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg	0.6					
EN33: TCLP Leach									
Initial pH		0.1	pH Unit	9.2			8.8		
After HCI pH		0.1	pH Unit	2.0			1.6		
Extraction Fluid Number		1	-	1			1		
Final pH		0.1	pH Unit	6.5			5.0		
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls		0.1	mg/kg	<0.1					
EP075(SIM)B: Polynuclear Aromatic	c Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	0.7	<0.5	<0.5	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	0.8	<0.5	<0.5	<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocart	oons	0.5	mg/kg	1.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	0.6	0.6	0.6	
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2	1.2	1.2	
EP066S: PCB Surrogate									

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID		VC05_0.0-0.1	VC05_0.5-0.7	VC05_0.5-0.9	VC03_0.0-0.2	VC03_0.4-0.6	
	Cli	ent sampli	ing date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-019	ES1937483-020	ES1937483-023	ES1937483-024	ES1937483-026
				Result	Result	Result	Result	Result
EP066S: PCB Surrogate - Continued								
Decachlorobiphenyl	2051-24-3	0.1	%	81.8				
EP075(SIM)S: Phenolic Compound Surro	ogates							
Phenol-d6	13127-88-3	0.5	%	93.3	93.1	96.0	102	104
2-Chlorophenol-D4	93951-73-6	0.5	%	110	110	113	108	110
2.4.6-Tribromophenol	118-79-6	0.5	%	96.6	83.8	87.2	80.5	81.7
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	128	128	126	113	117
Anthracene-d10	1719-06-8	0.5	%	124	121	124	119	122
4-Terphenyl-d14	1718-51-0	0.5	%	123	122	125	123	127

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC03_0.6-0.7	VC03_1.0-1.2	VC12_0.0-0.5	VC03_0.5-1.0	VC04_0.0-0.1	
	Cl	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937483-027	ES1937483-028	ES1937483-029	ES1937483-030	ES1937483-031	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 10	5-110°C)								
Moisture Content		0.1	%	19.3	17.3	18.4	18.5	24.0	
EG005(ED093)T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg	5	<5		<5	16	
EG035T: Total Recoverable Mercury I	ov FIMS								
Mercury	7439-97-6	0.1	mg/kg					<0.1	
EN33: TCLP Leach									
Initial pH		0.1	pH Unit					6.7	
After HCI pH		0.1	pH Unit					1.4	
Extraction Fluid Number		1	-					1	
Final pH		0.1	pH Unit					5.0	
EP075(SIM)B: Polynuclear Aromatic H	lydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbon	IS	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5		<0.5	<0.5	
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6		0.6	0.6	
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2		1.2	1.2	
EP090: Organotin Compounds									
Tributyltin	56573-85-4	0.5	µgSn/kg			4.0			
EP075(SIM)S: Phenolic Compound Su	rrogates								

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC03_0.6-0.7	VC03_1.0-1.2	VC12_0.0-0.5	VC03_0.5-1.0	VC04_0.0-0.1
	Cli	ent sampli	ing date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-027	ES1937483-028	ES1937483-029	ES1937483-030	ES1937483-031
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surro	gates - Continued							
Phenol-d6	13127-88-3	0.5	%	102	111		95.5	115
2-Chlorophenol-D4	93951-73-6	0.5	%	108	118		102	123
2.4.6-Tribromophenol	118-79-6	0.5	%	76.0	84.4		70.2	85.7
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	115	114		108	112
Anthracene-d10	1719-06-8	0.5	%	119	115		110	119
4-Terphenyl-d14	1718-51-0	0.5	%	124	125		116	120
EP090S: Organotin Surrogate								
Tripropyltin		0.5	%			39.5		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC04_0.5-0.6	VC04_0.7-0.8	VC04_0.9-1.0	VC02_0.0-0.2	VC02_0.5-0.6	
	Cli	ient sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937483-033	ES1937483-034	ES1937483-035	ES1937483-038	ES1937483-039	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-11	0°C)								
Moisture Content		0.1	%	15.9	19.2	20.1	43.8	22.4	
EG005(ED093)T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg	7	<5	<5	223	66	
EG035T: Total Recoverable Mercury by F	IMS								
Mercury	7439-97-6	0.1	mg/kg					0.9	
EN33: TCLP Leach									
Initial pH		0.1	pH Unit		6.7		8.8	8.1	
After HCI pH		0.1	pH Unit		1.3		5.5	1.4	
Extraction Fluid Number		1	-		1		2	1	
Final pH		0.1	pH Unit		4.9		5.7	5.1	
EP075(SIM)B: Polynuclear Aromatic Hydr	ocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	0.9	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	2.6	<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	2.9	0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	1.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	1.5	<0.5	
Benzo(b+j)fluoranthene 20	05-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	2.7	0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	0.9	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	1.9	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	1.2	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	1.6	<0.5	
^ Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5	<0.5	<0.5	17.7	1.0	
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	<0.5	2.6	<0.5	
A Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	0.6	2.8	0.6	
Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2	3.1	1.2	
EP075(SIM)S: Phenolic Compound Surro	gates								
Phenol-d6	13127-88-3	0.5	%	97.8	110	100.0	91.6	92.8	
2-Chlorophenol-D4	93951-73-6	0.5	%	105	116	105	94.8	97.7	

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Sub-Matrix: SOIL	Client sample ID			VC04_0.5-0.6	VC04_0.7-0.8	VC04_0.9-1.0	VC02_0.0-0.2	VC02_0.5-0.6
(Matrix: SOIL)								
	Cli	ent sampli	ing date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-033	ES1937483-034	ES1937483-035	ES1937483-038	ES1937483-039
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound S	Surrogates - Continued							
2.4.6-Tribromophenol	118-79-6	0.5	%	72.7	96.3	81.7	79.7	78.2
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	112	124	122	110	111
Anthracene-d10	1719-06-8	0.5	%	115	118	118	109	108
4-Terphenyl-d14	1718-51-0	0.5	%	121	124	114	115	117

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Project	: 12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_1.0-1.2	VC02_1.0-1.5	VC01_0.0-0.2	vc01_0.4-0.6	VC10_0.0-0.2	
	Cli	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937483-040	ES1937483-042	ES1937483-043	ES1937483-044	ES1937483-048	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-1	10°C)								
Moisture Content		0.1	%	20.7	17.6	29.0	13.8	19.4	
EG005(ED093)T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg	13	8	156	<5	29	
EG035T: Total Recoverable Mercury by I	FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1		1.9		0.1	
EN33: TCLP Leach									
Initial pH		0.1	pH Unit	8.6		9.0		9.0	
After HCI pH		0.1	pH Unit	1.4		4.1		1.7	
Extraction Fluid Number		1	-	1		1		1	
Final pH		0.1	pH Unit	4.9		6.4		5.1	
EP075(SIM)B: Polynuclear Aromatic Hyd	rocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.7	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	1.9	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	2.1	<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	1.2	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	1.1	<0.5	<0.5	
Benzo(b+j)fluoranthene 2	05-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	1.9	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.8	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	1.4	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.8	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	1.1	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5	<0.5	13.0	<0.5	<0.5	
A Benzo(a)pyrene TEQ (zero)		0.5	mg/kg 	<0.5	<0.5	1.9	<0.5	<0.5	
A Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	2.1	0.6	0.6	
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	2.4	1.2	1.2	
EP075(SIM)S: Phenolic Compound Surro	gates								
Phenol-d6	13127-88-3	0.5	%	93.8	91.0	101	93.7	105	
2-Chlorophenol-D4	93951-73-6	0.5	%	98.5	96.6	103	99.8	110	

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC02_1.0-1.2	VC02_1.0-1.5	VC01_0.0-0.2	vc01_0.4-0.6	VC10_0.0-0.2
	Cli	ent sampli	ing date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-040	ES1937483-042	ES1937483-043	ES1937483-044	ES1937483-048
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
2.4.6-Tribromophenol	118-79-6	0.5	%	77.6	73.8	82.9	72.8	86.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	113	111	120	115	120
Anthracene-d10	1719-06-8	0.5	%	111	109	116	112	113
4-Terphenyl-d14	1718-51-0	0.5	%	123	118	124	123	124

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC10_0.5-0.6	VC10_0.0-0.5	VC02_0.0-0.5	VC02_0.5-1.0	VC06_0.0-0.1	
	Cli	ient sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937483-049	ES1937483-051	ES1937483-053	ES1937483-054	ES1937483-055	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-11	0°C)								
Moisture Content		0.1	%	20.4	16.1	49.8	21.4		
EG005(ED093)T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg	9			6		
EN33: TCLP Leach									
Initial pH		0.1	pH Unit			9.1		9.1	
After HCI pH		0.1	pH Unit			5.2		5.4	
Extraction Fluid Number		1	-			2		2	
Final pH		0.1	pH Unit			4.8		5.2	
EP075(SIM)B: Polynuclear Aromatic Hydr	ocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5			<0.5		
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5			<0.5		
Acenaphthene	83-32-9	0.5	mg/kg	<0.5			<0.5		
Fluorene	86-73-7	0.5	mg/kg	<0.5			<0.5		
Phenanthrene	85-01-8	0.5	mg/kg	<0.5			<0.5		
Anthracene	120-12-7	0.5	mg/kg	<0.5			<0.5		
Fluoranthene	206-44-0	0.5	mg/kg	<0.5			<0.5		
Pyrene	129-00-0	0.5	mg/kg	<0.5			<0.5		
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5			<0.5		
Chrysene	218-01-9	0.5	mg/kg	<0.5			<0.5		
Benzo(b+j)fluoranthene 20	5-99-2 205-82-3	0.5	mg/kg	<0.5			<0.5		
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5			<0.5		
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5			<0.5		
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5			<0.5		
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5			<0.5		
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5			<0.5		
^ Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5			<0.5		
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5			<0.5		
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6			0.6		
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2			1.2		
EP090: Organotin Compounds									
Tributyltin	56573-85-4	0.5	µgSn/kg		<0.5	2.8			
EP075(SIM)S: Phenolic Compound Surrog	gates								
Phenol-d6	13127-88-3	0.5	%	110			106		
2-Chlorophenol-D4	93951-73-6	0.5	%	116			113		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC10_0.5-0.6	VC10_0.0-0.5	VC02_0.0-0.5	VC02_0.5-1.0	VC06_0.0-0.1
	Cli	ent sampli	ing date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-049	ES1937483-051	ES1937483-053	ES1937483-054	ES1937483-055
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Su	urrogates - Continued	1						
2.4.6-Tribromophenol	118-79-6	0.5	%	88.6			83.1	
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	135			120	
Anthracene-d10	1719-06-8	0.5	%	117			113	
4-Terphenyl-d14	1718-51-0	0.5	%	118			127	
EP090S: Organotin Surrogate								
Tripropyltin		0.5	%		102	60.8		

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC06_0.3-0.4	VC06_0.5-0.6	VC06_0.7-0.8	VC06_0.8-0.9	VC06_0.0-0.5	
	Cli	ient samplii	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937483-056	ES1937483-057	ES1937483-058	ES1937483-059	ES1937483-060	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-	110°C)								
Moisture Content		0.1	%	18.1	18.9	22.1	21.6	20.0	
EG005(ED093)T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg	8	11	36	18	11	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg	<0.1					
EN33: TCLP Leach									
Initial pH		0.1	pH Unit	8.0					
After HCl pH		0.1	pH Unit	1.4					
Extraction Fluid Number		1	-	1					
Final pH		0.1	pH Unit	5.1					
EP075(SIM)B: Polynuclear Aromatic Hy	drocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
A Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	0.6	0.6	0.6	
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2	1.2	1.2	
EP075(SIM)S: Phenolic Compound Surr	ogates								
Phenol-d6	13127-88-3	0.5	%	106	99.7	86.6	81.2	83.1	
2-Chlorophenol-D4	93951-73-6	0.5	%	114	107	92.6	87.1	88.0	

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Sub-Matrix: SOIL	Client sample ID			VC06_0.3-0.4	VC06_0.5-0.6	VC06_0.7-0.8	VC06_0.8-0.9	VC06_0.0-0.5
(Matrix: SOIL)								
	Clie	ent sampli	ing date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-056	ES1937483-057	ES1937483-058	ES1937483-059	ES1937483-060
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
2.4.6-Tribromophenol	118-79-6	0.5	%	81.1	74.8	61.8	58.4	57.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	120	117	108	102	104
Anthracene-d10	1719-06-8	0.5	%	115	119	103	98.1	96.4
4-Terphenyl-d14	1718-51-0	0.5	%	126	121	116	108	109

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC06_0.5-1.0	VC12_0.3-0.4	VC12_0.5-0.6	VC12_0.8-0.9	VC12_1.0-1.1	
	Cli	ient sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	
Compound	CAS Number	LOR	Unit	ES1937483-061	ES1937483-063	ES1937483-064	ES1937483-065	ES1937483-066	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-1	10°C)								
Moisture Content		0.1	%	21.4	19.3	19.6	16.6	24.1	
EG005(ED093)T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg	30	<5	<5	<5	32	
EN33: TCLP Leach									
Initial pH		0.1	pH Unit				8.2		
After HCI pH		0.1	pH Unit				1.6		
Extraction Fluid Number		1	-				1		
Final pH		0.1	pH Unit				4.9		
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls		0.1	mg/kg		<0.1			<0.1	
EP075(SIM)B: Polynuclear Aromatic Hyd	rocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(b+j)fluoranthene 2	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	0.6	0.6	0.6	
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2	1.2	1.2	
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		102			97.0	
EP075(SIM)S: Phenolic Compound Surro	ogates								

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC06_0.5-1.0	VC12_0.3-0.4	VC12_0.5-0.6	VC12_0.8-0.9	VC12_1.0-1.1
	Cli	ient sampli	ing date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-061	ES1937483-063	ES1937483-064	ES1937483-065	ES1937483-066
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound S	urrogates - Continued	ł						
Phenol-d6	13127-88-3	0.5	%	81.5	94.6	81.8	84.2	97.5
2-Chlorophenol-D4	93951-73-6	0.5	%	86.5	111	86.7	89.1	115
2.4.6-Tribromophenol	118-79-6	0.5	%	55.7	78.7	55.4	55.0	83.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	101	129	102	105	125
Anthracene-d10	1719-06-8	0.5	%	95.1	123	97.7	99.4	124
4-Terphenyl-d14	1718-51-0	0.5	%	109	123	110	112	122

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_0.0-0.1	VC08_0.3-0.4	VC08_0.5-0.6	VC08_0.7-0.8	VC08_1.0-1.1		
	Cl	ient sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1937483-069	ES1937483-070	ES1937483-071	ES1937483-072	ES1937483-073		
				Result	Result	Result	Result	Result		
EA055: Moisture Content (Dried @	105-110°C)									
Moisture Content		0.1	%		46.0	31.3	27.1	18.6		
EG005(ED093)T: Total Metals by ICP-AES										
Lead	7439-92-1	5	mg/kg		216	19	6	6		
EG035T: Total Recoverable Mercur	EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		2.5					
EN33: TCLP Leach										
Initial pH		0.1	pH Unit	9.2	9.2					
After HCI pH		0.1	pH Unit	5.4	5.2					
Extraction Fluid Number		1	-	2	2					
Final pH		0.1	pH Unit	6.0	6.1					
EP066: Polychlorinated Biphenyls ((PCB)									
Total Polychlorinated biphenyls		0.1	mg/kg		<0.1					
EP075(SIM)B: Polynuclear Aromatic	c Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5		
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5		
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5		
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5		
Phenanthrene	85-01-8	0.5	mg/kg		2.7	<0.5	<0.5	<0.5		
Anthracene	120-12-7	0.5	mg/kg		0.8	<0.5	<0.5	<0.5		
Fluoranthene	206-44-0	0.5	mg/kg		4.6	<0.5	<0.5	<0.5		
Pyrene	129-00-0	0.5	mg/kg		5.0	<0.5	<0.5	<0.5		
Benz(a)anthracene	56-55-3	0.5	mg/kg		2.0	<0.5	<0.5	<0.5		
Chrysene	218-01-9	0.5	mg/kg		2.0	<0.5	<0.5	<0.5		
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		3.0	<0.5	<0.5	<0.5		
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		1.3	<0.5	<0.5	<0.5		
Benzo(a)pyrene	50-32-8	0.5	mg/kg		3.0	<0.5	<0.5	<0.5		
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		0.9	<0.5	<0.5	<0.5		
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5		
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		1.1	<0.5	<0.5	<0.5		
^ Sum of polycyclic aromatic hydrocart	oons	0.5	mg/kg		26.4	<0.5	<0.5	<0.5		
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg		3.8	<0.5	<0.5	<0.5		
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg		4.0	0.6	0.6	0.6		
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg		4.2	1.2	1.2	1.2		
EP066S: PCB Surrogate										

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_0.0-0.1	VC08_0.3-0.4	VC08_0.5-0.6	VC08_0.7-0.8	VC08_1.0-1.1
	Cli	ent sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-069	ES1937483-070	ES1937483-071	ES1937483-072	ES1937483-073
				Result	Result	Result	Result	Result
EP066S: PCB Surrogate - Continued								
Decachlorobiphenyl	2051-24-3	0.1	%		88.7			
EP075(SIM)S: Phenolic Compound Surro	gates							
Phenol-d6	13127-88-3	0.5	%		87.6	83.5	81.6	80.4
2-Chlorophenol-D4	93951-73-6	0.5	%		102	87.6	85.4	86.0
2.4.6-Tribromophenol	118-79-6	0.5	%		90.3	55.6	54.8	55.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%		121	104	100	99.7
Anthracene-d10	1719-06-8	0.5	%		119	99.1	96.6	94.7
4-Terphenyl-d14	1718-51-0	0.5	%		112	109	108	106

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC08_1.3-1.4	VC08_1.5-1.6	VC08_0.0-0.5	VC08_0.5-1.0	VC13_0.0-0.1		
	Cl	ient sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1937483-074	ES1937483-075	ES1937483-076	ES1937483-077	ES1937483-079		
				Result	Result	Result	Result	Result		
EA055: Moisture Content (Dried @ 105-110°C)										
Moisture Content		0.1	%	18.7	15.4	36.7	27.3			
EG005(ED093)T: Total Metals by ICP-AES										
Lead	7439-92-1	5	mg/kg	9	11	111	7			
EN33: TCLP Leach										
Initial pH		0.1	pH Unit					9.0		
After HCI pH		0.1	pH Unit					5.4		
Extraction Fluid Number		1	-					2		
Final pH		0.1	pH Unit					6.0		
EP075(SIM)B: Polynuclear Aromatic F	lydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.7	<0.5			
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.8	<0.5			
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.7	<0.5			
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.6	<0.5			
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5			
^ Sum of polycyclic aromatic hydrocarbor	ıs	0.5	mg/kg	<0.5	<0.5	2.8	<0.5			
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.7	<0.5			
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	1.0	0.6			
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.3	1.2			
EP075(SIM)S: Phenolic Compound Su	irrogates									
Phenol-d6	13127-88-3	0.5	%	81.1	84.3	84.1	86.1			
2-Chlorophenol-D4	93951-73-6	0.5	%	86.3	89.7	89.0	91.1			
2.4.6-Tribromophenol	118-79-6	0.5	%	53.9	56.3	60.1	59.8			
EP075(SIM)T: PAH Surrogates										

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	VC08_1.3-1.4	VC08_1.5-1.6	VC08_0.0-0.5	VC08_0.5-1.0	VC13_0.0-0.1
	Cli	ent sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-074	ES1937483-075	ES1937483-076	ES1937483-077	ES1937483-079
				Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued								
2-Fluorobiphenyl	321-60-8	0.5	%	101	105	104	105	
Anthracene-d10	1719-06-8	0.5	%	95.8	99.0	97.7	102	
4-Terphenyl-d14	1718-51-0	0.5	%	107	111	107	112	

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC13_0.3-0.4	VC13_0.5-0.6	VC13_0.7-0.8	VC13_1.0-1.1	VC13_0.0-0.5			
	Cli	ient sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00			
Compound	CAS Number	LOR	Unit	ES1937483-080	ES1937483-081	ES1937483-082	ES1937483-083	ES1937483-084			
				Result	Result	Result	Result	Result			
EA055: Moisture Content (Dried @ 105	5-110°C)										
Moisture Content		0.1	%	30.5	15.4	14.8	13.6	30.0			
EG005(ED093)T: Total Metals by ICP-A	EG005(ED093)T: Total Metals by ICP-AES										
Lead	7439-92-1	5	mg/kg	18	6	16	7	84			
EG035T: Total Recoverable Mercury by FIMS											
Mercury	7439-97-6	0.1	mg/kg	0.3							
EN33: TCLP Leach											
Initial pH		0.1	pH Unit	9.3							
After HCI pH		0.1	pH Unit	5.1							
Extraction Fluid Number		1	-	2							
Final pH		0.1	pH Unit	5.8							
EP075(SIM)B: Polynuclear Aromatic H	ydrocarbons										
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5			
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5			
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5			
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5			
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	0.8			
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5			
Fluoranthene	206-44-0	0.5	mg/kg	0.9	<0.5	<0.5	<0.5	2.0			
Pyrene	129-00-0	0.5	mg/kg	1.0	<0.5	<0.5	<0.5	2.1			
Benz(a)anthracene	56-55-3	0.5	mg/kg	0.5	<0.5	<0.5	<0.5	1.0			
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	0.9			
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	0.8	<0.5	<0.5	<0.5	1.2			
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	0.5			
Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.7	<0.5	<0.5	<0.5	1.0			
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5			
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5			
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.5	<0.5	<0.5	<0.5	0.7			
^ Sum of polycyclic aromatic hydrocarbon	s	0.5	mg/kg	4.4	<0.5	<0.5	<0.5	10.2			
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	0.8	<0.5	<0.5	<0.5	1.3			
A Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	1.1	0.6	0.6	0.6	1.6			
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.4	1.2	1.2	1.2	1.8			
EP075(SIM)S: Phenolic Compound Su	rrogates										
Phenol-d6	13127-88-3	0.5	%	87.2	82.6	82.8	84.4	81.5			
2-Chlorophenol-D4	93951-73-6	0.5	%	91.9	87.4	87.8	88.9	87.1			

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Sub-Matrix: SOIL	Client sample ID			VC13_0.3-0.4	VC13_0.5-0.6	VC13_0.7-0.8	VC13_1.0-1.1	VC13_0.0-0.5
(Matrix: SOIL)								
	Cli	ent sampli	ing date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-080	ES1937483-081	ES1937483-082	ES1937483-083	ES1937483-084
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound S								
2.4.6-Tribromophenol	118-79-6	0.5	%	63.3	57.3	54.9	57.3	58.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	107	101	101	104	101
Anthracene-d10	1719-06-8	0.5	%	102	97.7	97.2	99.8	97.6
4-Terphenyl-d14	1718-51-0	0.5	%	112	108	108	110	105

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC13_0.5-1.0	VC14_0.0-0.1	VC14_0.3-0.4	VC14-0.5-0.6	VC14_0.7-0.8	
	Cli	ent sampliı	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	
Compound C	CAS Number	LOR	Unit	ES1937483-085	ES1937483-086	ES1937483-087	ES1937483-088	ES1937483-089	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-110°C	;)								
Moisture Content		0.1	%	15.0	35.7	34.0	30.8	26.1	
EG005(ED093)T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg	9	57	20	6	<5	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		0.7			<0.1	
EN33: TCLP Leach									
Initial pH		0.1	pH Unit		9.3			9.4	
After HCI pH		0.1	pH Unit		5.2			5.3	
Extraction Fluid Number		1	-		2			2	
Final pH		0.1	pH Unit		6.0			6.0	
EP075(SIM)B: Polynuclear Aromatic Hydroca	rbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(b+j)fluoranthene 205-99	9-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	0.6	0.6	0.6	
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2	1.2	1.2	
EP075(SIM)S: Phenolic Compound Surrogate	es								
Phenol-d6	13127-88-3	0.5	%	89.4	80.8	83.4	82.9	87.4	
2-Chlorophenol-D4	93951-73-6	0.5	%	94.0	85.5	89.2	88.5	93.7	

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Sub-Matrix: SOIL	Client sample ID			VC13_0.5-1.0	VC14_0.0-0.1	VC14_0.3-0.4	VC14-0.5-0.6	VC14_0.7-0.8
(Matrix: SOIL)								
	Cli	ent sampl	ing date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-085	ES1937483-086	ES1937483-087	ES1937483-088	ES1937483-089
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
2.4.6-Tribromophenol	118-79-6	0.5	%	62.9	55.8	76.9	72.6	77.3
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	109	97.8	97.7	99.1	97.1
Anthracene-d10	1719-06-8	0.5	%	106	96.1	98.1	95.9	104
4-Terphenyl-d14	1718-51-0	0.5	%	116	105	93.4	93.5	100

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Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC14_1.3-1.4	VC14_0.0-0.5	VC14_0.5-1.0				
	Cli	ient sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00				
Compound	CAS Number	LOR	Unit	ES1937483-091	ES1937483-092	ES1937483-093				
				Result	Result	Result				
EA055: Moisture Content (Dried @ 105-110°C)										
Moisture Content		0.1	%	17.9	38.0	31.7				
EG005(ED093)T: Total Metals by ICP-AES										
Lead	7439-92-1	5	mg/kg	8	14	6				
EP075(SIM)B: Polynuclear Aromatic H	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5				
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5				
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5				
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5				
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5				
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5				
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5				
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5				
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5				
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5				
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5				
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5				
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5				
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5				
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5				
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5				
^ Sum of polycyclic aromatic hydrocarbo	ns	0.5	mg/kg	<0.5	<0.5	<0.5				
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	<0.5				
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6	0.6				
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2	1.2				
EP075(SIM)S: Phenolic Compound Su	urrogates									
Phenol-d6	13127-88-3	0.5	%	88.1	85.6	86.4				
2-Chlorophenol-D4	93951-73-6	0.5	%	93.6	90.4	92.7				
2.4.6-Tribromophenol	118-79-6	0.5	%	72.5	71.5	69.9				
EP075(SIM)T: PAH Surrogates										
2-Fluorobiphenyl	321-60-8	0.5	%	94.9	91.8	94.0				
Anthracene-d10	1719-06-8	0.5	%	104	101	100				
4-Terphenyl-d14	1718-51-0	0.5	%	101	94.3	98.5				

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Sub-Matrix: TCLP LEACHATE (Matrix: WATER)	Client sample ID		VC11_0.0-0.2	VC07_0.2-0.4	VC09_0.7-0.8	VC07_0.5-0.6	VC07_1.0-1.2	
	Cl	ient sampli	ing date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-001	ES1937483-006	ES1937483-009	ES1937483-014	ES1937483-016
				Result	Result	Result	Result	Result
EG005(ED093)C: Leachable Metals b	y ICPAES							
Lead	7439-92-1	0.1	mg/L	<0.1		<0.1		
EG035C: Leachable Mercury by FIMS	3							
Mercury	7439-97-6	0.0010	mg/L	<0.0010	<0.0010		<0.0010	<0.0010
EP075(SIM)B: Polynuclear Aromatic	Hydrocarbons							
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5		<0.5		
EP075(SIM)S: Phenolic Compound S	urrogates							
Phenol-d6	13127-88-3	1.0	%	18.8		22.7		
2-Chlorophenol-D4	93951-73-6	1.0	%	47.6		56.9		
2.4.6-Tribromophenol	118-79-6	1.0	%	43.2		43.6		
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	67.6		68.0		
Anthracene-d10	1719-06-8	1.0	%	64.8		74.4		
4-Terphenyl-d14	1718-51-0	1.0	%	69.0		75.8		

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Sub-Matrix: TCLP LEACHATE (Matrix: WATER)	Client sample ID		VC07_0.0-0.5	VC05_0.0-0.1	VC03_0.0-0.2	VC04_0.0-0.1	VC04_0.7-0.8	
	Cl	lient sampli	ing date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-017	ES1937483-019	ES1937483-024	ES1937483-031	ES1937483-034
				Result	Result	Result	Result	Result
EG005(ED093)C: Leachable Metals by	ICPAES							
Lead	7439-92-1	0.1	mg/L	0.1	<0.1	<0.1	<0.1	<0.1
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L		<0.0010		<0.0010	
EP075(SIM)B: Polynuclear Aromatic H	ydrocarbons							
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP075(SIM)S: Phenolic Compound Su	rrogates							
Phenol-d6	13127-88-3	1.0	%	19.1	17.8	22.4	16.9	23.7
2-Chlorophenol-D4	93951-73-6	1.0	%	46.2	41.5	54.7	44.2	54.3
2.4.6-Tribromophenol	118-79-6	1.0	%	45.3	42.7	40.3	49.9	39.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	65.3	70.0	70.7	70.0	71.8
Anthracene-d10	1719-06-8	1.0	%	65.5	61.6	70.2	67.1	67.3
4-Terphenyl-d14	1718-51-0	1.0	%	69.9	69.2	74.7	72.3	69.2

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Sub-Matrix: TCLP LEACHATE (Matrix: WATER)	Client sample ID			VC02_0.0-0.2	VC02_0.5-0.6	VC02_1.0-1.2	VC01_0.0-0.2	VC10_0.0-0.2
	Cl	lient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-038	ES1937483-039	ES1937483-040	ES1937483-043	ES1937483-048
				Result	Result	Result	Result	Result
EG005(ED093)C: Leachable Metals by I	CPAES							
Lead	7439-92-1	0.1	mg/L	0.2		<0.1	<0.1	<0.1
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010
EP075(SIM)B: Polynuclear Aromatic Hy	/drocarbons							
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5		<0.5	<0.5	<0.5
EP075(SIM)S: Phenolic Compound Sur	rogates							
Phenol-d6	13127-88-3	1.0	%	19.3		22.5	19.6	21.1
2-Chlorophenol-D4	93951-73-6	1.0	%	42.1		53.0	41.1	45.0
2.4.6-Tribromophenol	118-79-6	1.0	%	36.0		50.7	39.7	46.6
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	63.8		67.8	67.8	68.0
Anthracene-d10	1719-06-8	1.0	%	61.1		61.7	61.0	62.0
4-Terphenyl-d14	1718-51-0	1.0	%	61.9		63.2	60.4	66.4

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Sub-Matrix: TCLP LEACHATE (Matrix: WATER)	Client sample ID			VC02_0.0-0.5	VC06_0.0-0.1	VC06_0.3-0.4	VC12_0.8-0.9	VC08_0.0-0.1
	Cl	ient sampli	ng date / time	30-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937483-053	ES1937483-055	ES1937483-056	ES1937483-065	ES1937483-069
				Result	Result	Result	Result	Result
EG005(ED093)C: Leachable Metals by	ICPAES							
Lead	7439-92-1	0.1	mg/L	0.7	0.8		<0.1	<0.1
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010		<0.0010		
EP075(SIM)B: Polynuclear Aromatic H	lydrocarbons							
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5		<0.5	<0.5
EP075(SIM)S: Phenolic Compound Su	ırrogates							
Phenol-d6	13127-88-3	1.0	%	20.7	18.2		20.8	21.2
2-Chlorophenol-D4	93951-73-6	1.0	%	35.9	43.9		43.9	40.2
2.4.6-Tribromophenol	118-79-6	1.0	%	44.1	48.4		48.1	45.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	62.3	71.7		63.1	65.4
Anthracene-d10	1719-06-8	1.0	%	61.1	66.4		65.4	67.6
4-Terphenyl-d14	1718-51-0	1.0	%	62.6	67.1		64.4	68.4

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Sub-Matrix: TCLP LEACHATE (Matrix: WATER)		Cli	ent sample ID	VC08_0.3-0.4	VC13_0.0-0.1	VC13_0.3-0.4	VC14_0.0-0.1	VC14_0.7-0.8		
	Cl	ient sampli	ing date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1937483-070	ES1937483-079	ES1937483-080	ES1937483-086	ES1937483-089		
				Result	Result	Result	Result	Result		
EG005(ED093)C: Leachable Metals by	EG005(ED093)C: Leachable Metals by ICPAES									
Lead	7439-92-1	0.1	mg/L		<0.1		<0.1	<0.1		
EG035C: Leachable Mercury by FIMS	;									
Mercury	7439-97-6	0.0010	mg/L	<0.0010		<0.0010	<0.0010	<0.0010		
EP075(SIM)B: Polynuclear Aromatic I	Hydrocarbons									
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5		<0.5	<0.5		
EP075(SIM)S: Phenolic Compound S	urrogates									
Phenol-d6	13127-88-3	1.0	%		20.8		22.6	19.5		
2-Chlorophenol-D4	93951-73-6	1.0	%		41.2		56.1	52.2		
2.4.6-Tribromophenol	118-79-6	1.0	%		45.7		50.4	45.2		
EP075(SIM)T: PAH Surrogates										
2-Fluorobiphenyl	321-60-8	1.0	%		64.6		65.2	64.4		
Anthracene-d10	1719-06-8	1.0	%		63.7		76.3	67.8		
4-Terphenyl-d14	1718-51-0	1.0	%		66.4		79.2	71.7		

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Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Limits (%)
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP090S: Organotin Surrogate			
Tripropyltin		35	130
Sub-Matrix: TCLP LEACHATE		Recovery	Limits (%)
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112



QUALITY CONTROL REPORT

Work Order	: ES1937483	Page	: 1 of 14	
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney	
Contact	: SARAH ECCLESHALL	Contact	: Customer Services ES	
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164	
Telephone	:	Telephone	: +61-2-8784 8555	
Project	: 12517046	Date Samples Received	: 13-Nov-2019	
Order number	:	Date Analysis Commenced	: 14-Nov-2019	
C-O-C number	:	Issue Date	25-Nov-2019	TA
Sampler	:		Hac-MRA NA	A
Site	:			
Quote number	: SY/522/19		Accorditation	No 925
No. of samples received	: 100		Accredited for complian	nce with
No. of samples analysed	: 73		ISO/IEC 17025	- Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
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Sarah Ashworth	Laboratory Manager - Brisbane	Brisbane Organics, Stafford, QLD

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key: Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

- CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
- LOR = Limit of reporting
- RPD = Relative Percentage Difference
- # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL			Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005(ED093)T: Tot	al Metals by ICP-AE	S (QC Lot: 2707726)							
ES1937419-031	Anonymous	EG005T: Lead	7439-92-1	5	mg/kg	5	<5	0.00	No Limit
ES1937483-001	VC11_0.0-0.2	EG005T: Lead	7439-92-1	5	mg/kg	55	50	10.9	0% - 50%
EG005(ED093)T: Tot	al Metals by ICP-AE	S (QC Lot: 2707768)							
ES1937483-028	VC03_1.0-1.2	EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
ES1937483-014	VC07_0.5-0.6	EG005T: Lead	7439-92-1	5	mg/kg	10	7	32.9	No Limit
EG005(ED093)T: Tot	al Metals by ICP-AE	S (QC Lot: 2707770)							
ES1937483-043	VC01_0.0-0.2	EG005T: Lead	7439-92-1	5	mg/kg	156	166	6.24	0% - 20%
ES1937483-061	VC06_0.5-1.0	EG005T: Lead	7439-92-1	5	mg/kg	30	8	117	No Limit
EG005(ED093)T: Tot	al Metals by ICP-AE	S (QC Lot: 2707800)							
ES1937483-087	VC14_0.3-0.4	EG005T: Lead	7439-92-1	5	mg/kg	20	12	52.5	No Limit
ES1937483-080	VC13_0.3-0.4	EG005T: Lead	7439-92-1	5	mg/kg	18	37	69.7	No Limit
EG005(ED093)T: Tot	al Metals by ICP-AE	S (QC Lot: 2710607)							
ES1937483-006	VC07_0.2-0.4	EG005T: Lead	7439-92-1	5	mg/kg	89	79	11.0	0% - 50%
ES1938021-008	Anonymous	EG005T: Lead	7439-92-1	5	mg/kg	54	43	22.9	0% - 50%
EA055: Moisture Co	ntent (Dried @ 105- ⁻	110°C) (QC Lot: 2707729)							
ES1937419-034	Anonymous	EA055: Moisture Content		0.1	%	3.4	3.8	12.8	No Limit
ES1937483-005	VC11_0.5-1.0	EA055: Moisture Content		0.1	%	29.0	27.8	4.01	0% - 20%
EA055: Moisture Co	ntent (Dried @ 105- ⁻	110°C) (QC Lot: 2707771)							
ES1937483-016	VC07_1.0-1.2	EA055: Moisture Content		0.1	%	17.4	18.5	6.24	0% - 20%
ES1937483-033	VC04_0.5-0.6	EA055: Moisture Content		0.1	%	15.9	15.1	5.04	0% - 20%
EA055: Moisture Co	ntent (Dried @ 105-*	110°C) (QC Lot: 2707772)							
ES1937483-048	VC10_0.0-0.2	EA055: Moisture Content		0.1	%	19.4	22.5	15.2	0% - 20%
ES1937483-065	VC12_0.8-0.9	EA055: Moisture Content		0.1	%	16.6	16.0	3.95	0% - 20%

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Sub-Matrix: SOIL			[Laboratory L	Duplicate (DUP) Report	t	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Co	ntent (Dried @ 105-110	°C) (QC Lot: 2707804)							
ES1937483-077	VC08_0.5-1.0	EA055: Moisture Content		0.1	%	27.3	25.3	7.39	0% - 20%
ES1937483-091	VC14_1.3-1.4	EA055: Moisture Content		0.1	%	17.9	18.3	2.30	0% - 20%
EA055: Moisture Co	ntent (Dried @ 105-110	°C) (QC Lot: 2710241)							
ES1937483-053	VC02_0.0-0.5	EA055: Moisture Content		0.1	%	49.8	51.7	3.66	0% - 20%
ES1937840-003	Anonymous	EA055: Moisture Content		0.1	%	7.2	6.7	6.94	0% - 20%
EA055: Moisture Co	ntent (Dried @ 105-110	°C) (QC Lot: 2713070)							
ES1937483-029	VC12_0.0-0.5	EA055: Moisture Content		0.1	%	18.4	18.2	0.934	0% - 20%
EG035T: Total Reco	overable Mercury by Fl	MS (QC Lot: 2707727)							
ES1937483-001	VC11_0.0-0.2	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.8	0.4	74.3	No Limit
ES1937419-031	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Reco	overable Mercury by Fl	MS (QC Lot: 2707769)							
ES1937483-014	VC07_0.5-0.6	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Reco	verable Mercurv bv Fl	MS (QC Lot: 2707801)							
ES1937483-080	VC13 0.3-0.4	EG035T: Mercury	7439-97-6	0.1	ma/ka	0.3	0.3	0.00	No Limit
ES1937501-020	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Reco	verable Mercury by Fl	MS (QC Lot: 2710606)			0.0				
ES1937483-006	VC07 0.2-0.4	EG035T: Mercury	7439-97-6	0.1	ma/ka	1.0	1.0	0.00	0% - 50%
ES1938021-008	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	<0.1	0.00	No Limit
EP066: Polvchlorina	ted Biphenvls (PCB) (QC Lot: 2701079)							
ES1937483-008	VC09_0.4-0.6	EP066: Total Polychlorinated biphenyls		0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP075(SIM)B: Polvn	uclear Aromatic Hvdro	carbons (QC Lot: 2701078)							
ES1937483-014	VC07 0.5-0.6	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
	_	EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynu	clear Aromatic Hydrocarbo	ons (QC Lot: 2701078) - continued							
ES1937483-014	VC07_0.5-0.6	EP075(SIM): Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1937483-008	VC09_0.4-0.6	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynu	clear Aromatic Hydrocarbo	ons (QC Lot: 2701090)							
ES1937483-024	VC03_0.0-0.2	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
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Work Order	: ES1937483								
Client	: GHD PTY LTD								
Project	: 12517046								



Sub-Matrix: SOIL									
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynu	uclear Aromatic Hydroca	rbons (QC Lot: 2701090) - continued							
ES1937483-024	VC03_0.0-0.2	EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1937483-039	VC02_0.5-0.6	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	0.5	0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	0.5	0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
	EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
EP075(SIM): Diber		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
	EP075(SIM): Benzo(g.h.i)perylene		191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	1.0	1.0	0.00	No Limit
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynu	uclear Aromatic Hydroca	rbons (QC Lot: 2701091)							
ES1937483-058	VC06_0.7-0.8	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Work Order	: ES1937483
Client	: GHD PTY LTD
Project	: 12517046



Laboratory sample ID Method: Compound CAR Unit Original Result Duplicate Result RPD (%) Recovery Limits (%) EP075(SIM)3: Polynuclear Aromatic Hydrocarbons (QC L-01: 2701091) - continued 5 mg/kg <0.5 <0.5 <0.5 0.00 No Limit ES1937483-058 VCG6_0.7-0.8 EP075(SIM): Benzo(g.h.)perylene 191-24-2 0.5 mg/kg <0.5 <0.5 0.00 No Limit ES1937483-075 VCG8_1.5-1.6 EP075(SIM): Benzo(g.hyrene TEQ (zero) 0.5 mg/kg <0.5 <0.00 No Limit ES1937483-075 VCG8_1.5-1.6 EP075(SIM): Acenaphthylene 209-96-8 0.5 mg/kg <0.5 <0.00 No Limit EP075(SIM): Acenaphthylene 209-96-8 0.5 mg/kg <0.5 <0.00 No Limit EP075(SIM): Acenaphthylene 209-96-8 0.5 mg/kg <0.5 <0.00 No Limit EP075(SIM): Acenaphthylene 209-96-8 0.5 mg/kg <0.5 <0.00 No Limit EP075(SIM): Antracene	Sub-Matrix: SOIL						Laboratory L	Duplicate (DUP) Report		
EP075(SIM)8: Polynuclear Aromatic Hydrocarbons (QC Lot: 2701091) - continued ES1937483-058 VC06_0.7-0.8 EP075(SIM): Denz(a,h)anthracene 53-70.3 0.5 mg/kg <0.5 <0.0 No Limit ES1937483-058 VC06_0.7-0.8 EP075(SIM): Denz(a,h)perylene 191-24-2 0.5 mg/kg <0.5 <0.0 No Limit EP075(SIM): Enzo(a)prene TEQ (zero) 0.5 mg/kg <0.5 <0.0 No Limit ES1937483-075 VC08_1.5-1.6 EP075(SIM): Aconaphthylene <0.5 mg/kg <0.5 <0.0 No Limit EP075(SIM): Aconaphthylene 0.40 mg/kg <0.5 <0.5 <0.00 No Limit EP075(SIM): Aconaphthylene 0.40 mg/kg <0.5 <0.5 <0.00 No Limit EP075(SIM): Planothylene 2049-66 0.5 mg/kg <0.5 <0.5 <0.00 No Limit EP075(SIM): Planothylene 2049-60 0.5 mg/kg <0.5 <0.5 <0.00 No Limit EP075(SIM): Planothylene 20-12 <	Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES1937483-058 VC06_0.7-0.8 EP075(SIM): Dibenz(a,h)apthracene 53-70-3 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Benzo(g,h,i)perylene 191-24-2 0.5 mg/kg <0.5	EP075(SIM)B: Polynu	clear Aromatic Hydrocarbo	ons (QC Lot: 2701091) - continued							
EP075(SIM): Benzo(g.h.i)perylene 191-24-2 0.5 mg/kg <0.5 <0.0 No Limit EP075(SIM): Sum of polycyclic aromatic hydrocarbons	ES1937483-058	VC06_0.7-0.8	EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Sum of polycyclic aromatic 0.5 mg/kg <0.5 <0.0 No Limit ES1937483-075 VC08_1.5-1.6 EP075(SIM): Benzo(a)pyrene TEQ (zero) 0.5 mg/kg <0.5			EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
hydrocarbons Image			EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Benzo(a)pyrene TEQ (zero) 0.5 mg/kg <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5			hydrocarbons							
ES1937483-075 VC08_1.5-1.6 EP075(SIM): Naphthalene 91-20-3 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Acenaphthylene 208-96-8 0.5 mg/kg <0.5			EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Acenaphthylene 208-96-8 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Acenaphthene 83-32-9 0.5 mg/kg <0.5	ES1937483-075	VC08_1.5-1.6	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Acenaphthene 83-32-9 0.5 mg/kg <0.5 <0.0 No Limit EP075(SIM): Fluorene 86-73-7 0.5 mg/kg <0.5			EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Fluorene 86-73-7 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Phenanthrene 85-01-8 0.5 mg/kg <0.5			EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Phenanthrene 85-01-8 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Anthracene 120-12-7 0.5 mg/kg <0.5			EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Anthracene 120-12-7 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Fluoranthene 206-44-0 0.5 mg/kg <0.5			EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Fluoranthene 206-44-0 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Pyrene 129-00-0 0.5 mg/kg <0.5			EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Pyrene 129-00- 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Benz(a)anthracene 56-55-3 0.5 mg/kg <0.5			EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Benz(a)anthracene 56-55-3 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Chrysene 218-01-9 0.5 mg/kg <0.5			EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Chrysene 218-01-9 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Benzo(b+j)fluoranthene 205-99-2 0.5 mg/kg <0.5			EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Benzo(b+j)fluoranthene 205-99-2 205-82-3 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Benzo(k)fluoranthene 207-08-9 0.5 mg/kg <0.5			EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
205-82-3 Image: Construction of the state o			EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Benzo(k)fluoranthene 207-08-9 0.5 mg/kg <0.5 0.00 No Limit EP075(SIM): Benzo(a)pyrene 50-32-8 0.5 mg/kg <0.5				205-82-3						
EP075(SIM): Benzo(a)pyrene 50-32-8 0.5 mg/kg <0.5 <0.5 0.00 No Limit EP075(SIM): Indeno(1.2.3.cd)pyrene 193-39-5 0.5 mg/kg <0.5			EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Indeno(1.2.3.cd)pyrene 193-39-5 0.5 mg/kg <0.5 0.00 No Limit EP075(SIM): Dibenz(a.h)anthracene 53-70-3 0.5 mg/kg <0.5			EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Dibenz(a.h)anthracene 53-70-3 0.5 mg/kg <0.5 <0.00 No Limit EP075(SIM): Benzo(g.h.i)perylene 191-24-2 0.5 mg/kg <0.5			EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Benzo(g.h.i)perylene 191-24-2 0.5 mg/kg <0.5 <0.00 No Limit	EP075(SIM): Dibenz(a.h)anthracene EP075(SIM): Benzo(g.h.i)perylene		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Sum of polycyclic aromatic U.S mig/kg <-U.S < < U.S mig/kg < < U.S			EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
hydrocarbons			hydrocarbons							
EP075(SIM): Benzo(a)pyrene TEQ (zero) 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2701122)	EP075(SIM)B: Polynu	clear Aromatic Hydrocarbo	ons (QC Lot: 2701122)							
ES1937404-028 Anonymous EP075(SIM): Naphthalene 91-20-3 0.5 mg/kg <0.5 <0.5 0.00 No Limit	ES1937404-028	Anonymous	EP075(SIM); Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Acenaphthylene 208-96-8 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Acenaphthene 83-32-9 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Fluorene 86-73-7 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Phenanthrene 85-01-8 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Anthracene 120-12-7 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Fluoranthene 206-44-0 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Eluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Pyrene 129-00-0 0.5 mg/kg <0.5 0.00 No Limit			EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Benz(a)anthracene 56-55-3 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Chrysene 218-01-9 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Benzo(b+i)fluoranthene 205-99-2 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Benzo(b+i)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
205-82-3				205-82-3		55				
EP075(SIM): Benzo(k)fluoranthene 207-08-9 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Benzo(a)pyrene 50-32-8 0.5 mg/kg <0.5 <0.5 0.00 No Limit			EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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Work Order	: ES1937483
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: SOIL						Laboratory L	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynu	clear Aromatic Hydrocarbo	ns (QC Lot: 2701122) - continued							
ES1937404-028	Anonymous	EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1937404-040	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP090: Organotin Co	mpounds (QC Lot: 271306))							
ES1937483-051	VC10_0.0-0.5	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.00	No Limit
Sub-Matrix: WATER						Laboratory L	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005(ED093)C: Lead	chable Metals by ICPAES(QC Lot: 2706695)							
ES1937276-001	Anonymous	EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	0.00	No Limit
ES1937423-002	Anonymous	EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EG005(ED093)C: Lead	chable Metals by ICPAES(QC Lot: 2706696)							
ES1937483-043	VC01_0.0-0.2	EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	0.00	No Limit
ES1937535-003	Anonymous	EG005C: Lead	7439-92-1	0.1	mg/L	0.1	0.1	0.00	No Limit
EG035C: Leachable M	/ Iercury by FIMS (QC Lot: 2	707496)							
ES1937422-015	Anonymous	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit
ES1937535-003	Anonymous	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit

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Sub-Matrix: WATER						Laboratory D	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG035C: Leachable M	lercury by FIMS (QC Lot: 27	711136)							
ES1937418-002	Anonymous	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit
ES1937701-003	Anonymous	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit
EG035C: Leachable Mercury by FIMS (QC Lot: 2713255)									
ES1937483-080	VC13_0.3-0.4	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL			Method Blank (MB)	Laboratory Control Spike (LCS) Report				
	-		Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2707726)								
EG005T: Lead 7439-92-1	5	mg/kg	<5	40 mg/kg	91.8	80.0	114	
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2707768)								
EG005T: Lead 7439-92-1	5	mg/kg	<5	40 mg/kg	90.7	80.0	114	
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2707770)								
EG005T: Lead 7439-92-1	5	mg/kg	<5	40 mg/kg	94.4	80.0	114	
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2707800)								
EG005T: Lead 7439-92-1	5	mg/kg	<5	40 mg/kg	97.4	80.0	114	
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2710607)								
EG005T: Lead 7439-92-1	5	mg/kg	<5	40 mg/kg	103	80.0	114	
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2707727)								
EG035T: Mercury 7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	82.9	70.0	105	
EG035T: Total Recoverable Mercury by EIMS (OCI of: 2707769)								
EG035T: Mercury 7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	93.3	70.0	105	
EG035T: Total Recoverable Mercury by EIMS (OCI of: 2707801)								
EG035T: Mercury 7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	93.7	70.0	105	
EG035T: Total Recoverable Mercury by FIMS (OCLot: 2710606)								
EG035T: Mercury 7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	92.9	70.0	105	
EN33: TCL P Leach (OCL of: 2701092)								
EN33a: Initial pH	0.1	pH Unit	1.0					
EN33a: After HCl pH	0.1	pH Unit	1.0					
EN33a: Final pH	0.1	pH Unit	1.0					
EN33: TCLP Leach (QCLot: 2701093)								
EN33a: Initial pH	0.1	pH Unit	1.0					
EN33a: After HCl pH	0.1	pH Unit	1.0					
EN33a: Final pH	0.1	pH Unit	1.0					
EN33: TCLP Leach (QCLot: 2701094)								
EN33a: Initial pH	0.1	pH Unit	1.0					
EN33a: After HCl pH	0.1	pH Unit	1.0					
EN33a: Final pH	0.1	pH Unit	1.0					
EN33: TCLP Leach (QCLot: 2705480)								
EN33a: Initial pH	0.1	pH Unit	1.0					
EN33a: After HCl pH	0.1	pH Unit	1.0					

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EN33: TCLP Leach (QCLot: 2705480) - continued									
EN33a: Final pH		0.1	pH Unit	1.0					
EN33: TCLP Leach (QCLot: 2706713)									
EN33a: Initial pH		0.1	pH Unit	1.0					
EN33a: After HCl pH		0.1	pH Unit	1.0					
EN33a: Final pH		0.1	pH Unit	1.0					
EN33: TCLP Leach (QCLot: 2706714)									
EN33a: Initial pH		0.1	pH Unit	1.0					
EN33a: After HCl pH		0.1	pH Unit	1.0					
EN33a: Final pH		0.1	pH Unit	1.0					
EN33: TCLP Leach (QCLot: 2711098)									
EN33a: Initial pH		0.1	pH Unit	1.0					
EN33a: After HCl pH		0.1	pH Unit	1.0					
EN33a: Final pH		0.1	pH Unit	1.0					
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2701	079)								
EP066: Total Polychlorinated biphenyls		0.1	mg/kg	<0.1	1 mg/kg	94.0	62.0	126	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC	CLot: 2701078)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	90.4	77.0	125	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	89.7	72.0	124	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	92.5	73.0	127	
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	91.5	72.0	126	
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	94.1	75.0	127	
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	94.1	77.0	127	
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	92.9	73.0	127	
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	92.1	74.0	128	
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	89.8	69.0	123	
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	93.6	75.0	127	
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	88.4	68.0	116	
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	92.0	74.0	126	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	90.3	70.0	126	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	88.0	61.0	121	
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	85.0	62.0	118	
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	89.5	63.0	121	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC	CLot: 2701090)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	121	77.0	125	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	120	72.0	124	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	120	73.0	127	
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	122	72.0	126	

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Sub-Matrix: SOIL			Method Blank (MB)	Laboratory Control Spike (LCS) Report					
		Report		Report	Spike	Spike Recovery (%)	Recovery	ecovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (C	QCLot: 2701090) - c	ontinued							
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	126	75.0	127	
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	125	77.0	127	
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	124	73.0	127	
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	124	74.0	128	
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	120	69.0	123	
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	122	75.0	127	
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	111	68.0	116	
	205-82-3								
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	118	74.0	126	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	121	70.0	126	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	112	61.0	121	
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	109	62.0	118	
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	113	63.0	121	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (0	QCLot: 2701091)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	97.8	77.0	125	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	97.8	72.0	124	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	97.7	73.0	127	
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	97.3	72.0	126	
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	100	75.0	127	
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	102	77.0	127	
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	100	73.0	127	
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	100	74.0	128	
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	98.7	69.0	123	
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	101	75.0	127	
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	99.8	68.0	116	
	205-82-3								
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	102	74.0	126	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	96.5	70.0	126	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	92.0	61.0	121	
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	87.2	62.0	118	
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	94.7	63.0	121	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (C	QCLot: 2701122)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	98.0	77.0	125	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	93.8	72.0	124	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	99.1	73.0	127	
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	97.1	72.0	126	
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	95.2	75.0	127	
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	93.6	77.0	127	
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	96.6	73.0	127	

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Out Matter 201				Mothod Blank (MB)	Laboratory Control Snike (LCS) Penort				
Sub-Matrix: SOIL				Report	Sniko	Spike Pecovery (%)	Bocovoru	Limite (%)	
Matheads Operational	CAS Number	LOR	Unit	Posult	Concentration		Low	High	
ED075(CIMA)D: Deluguele en Anemetie Undresenhene (O		- Lon	onn	Kesun	Concentration	200	200	ingii	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (Q	120 00 0		ma/ka	<0.5	6 ma/ka	08.0	74.0	128	
	56 55 3	0.5	mg/kg	<0.5	6 mg/kg	90.9	69.0	120	
EP075(SIM): Benz(a)anthracene	218 01 0	0.5	mg/kg	<0.5	6 mg/kg	91.0	75.0	125	
EP075(SIM): Chrysene	210-01-9	0.5	mg/kg	<0.5	6 mg/kg	100	68.0	127	
EP075(SIM): Benzo(b+J)nuorantnene	205-99-2 205-82-3	0.5	iiig/kg	-0.5	o nig/kg	100	00.0	110	
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	95.4	74.0	126	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	89.2	70.0	126	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	91.0	61.0	121	
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	97.7	62.0	118	
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	91.4	63.0	121	
EP090: Organotin Compounds (QCLot: 2713069)									
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	104	52.0	139	
Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LC	S) Report		
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EG005(ED093)C: Leachable Metals by ICPAES (QCLot	t: 2706695)								
EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	0.1 mg/L	96.9	80.0	118	
EG005(ED093)C: Leachable Metals by ICPAES (QCLot	t: 2706696)								
EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	0.1 mg/L	96.4	80.0	118	
EG035C: Leachable Mercury by FIMS (QCLot: 2707496	6)								
EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	99.4	79.0	109	
EG035C: Leachable Mercury by FIMS (QCLot: 271113)	6)								
EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	99.0	79.0	109	
EG035C: Leachable Mercury by FIMS (QCLot: 271325	5)								
EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	104	79.0	109	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons(Q	CLot: 2705372)								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	μg/L	<0.5	5 µg/L	79.7	63.3	117	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons(Q	CLot: 2707071)								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	μg/L	<0.5	5 µg/L	86.6	63.3	117	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL		Ма	atrix Spike (MS) Repor	t	
		Spike	SpikeRecovery(%)	Recovery L	imits (%)
Laboratory sample ID Client sample ID	Method: Compound CAS Number	Concentration	MS	Low	High

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Sub-Matrix: SOIL			[Ма	ntrix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Recovery Lim	its (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: T	otal Metals by ICP-AES (QCLot: 2707726)						
ES1937419-031	Anonymous	EG005T: Lead	7439-92-1	250 mg/kg	93.4	70.0	130
EG005(ED093)T: T	otal Metals by ICP-AES (QCLot: 2707768)						
ES1937483-014	VC07_0.5-0.6	EG005T: Lead	7439-92-1	250 mg/kg	95.4	70.0	130
EG005(ED093)T: T	otal Metals by ICP-AES (QCLot: 2707770)						
ES1937483-043	VC01_0.0-0.2	EG005T: Lead	7439-92-1	250 mg/kg	89.6	70.0	130
EG005(ED093)T: T	otal Metals by ICP-AES (QCLot: 2707800)						
ES1937483-080	VC13_0.3-0.4	EG005T: Lead	7439-92-1	250 mg/kg	91.6	70.0	130
EG005(ED093)T: T	otal Metals by ICP-AES (QCLot: 2710607)						
ES1937483-006	VC07_0.2-0.4	EG005T: Lead	7439-92-1	250 mg/kg	94.4	70.0	130
EG035T: Total Red	coverable Mercury by FIMS (QCLot: 2707727)						
ES1937419-031	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	89.2	70.0	130
EG035T: Total Red	coverable Mercury by FIMS (QCLot: 2707769)						
ES1937483-014	VC07_0.5-0.6	EG035T: Mercury	7439-97-6	5 mg/kg	98.0	70.0	130
EG035T: Total Red	coverable Mercury by FIMS (QCLot: 2707801)						
ES1937483-080	VC13_0.3-0.4	EG035T: Mercury	7439-97-6	5 mg/kg	95.6	70.0	130
EG035T: Total Red	coverable Mercury by FIMS (QCLot: 2710606)						
ES1937483-006	VC07_0.2-0.4	EG035T: Mercury	7439-97-6	5 mg/kg	91.0	70.0	130
EP066: Polychlorir	nated Biphenyls (PCB) (QCLot: 2701079)						
ES1937483-008	VC09_0.4-0.6	EP066: Total Polychlorinated biphenyls		1 mg/kg	84.0	70.0	130
EP075(SIM)B: Poly	nuclear Aromatic Hydrocarbons (QCLot: 2701078)						
ES1937483-008	VC09_0.4-0.6	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	128	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	# 140	70.0	130
EP075(SIM)B: Poly	nuclear Aromatic Hydrocarbons (QCLot: 2701090)						
ES1937483-024	VC03_0.0-0.2	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	114	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	110	70.0	130
EP075(SIM)B: Poly	nuclear Aromatic Hydrocarbons (QCLot: 2701091)						
ES1937483-058	VC06_0.7-0.8	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	93.8	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	92.2	70.0	130
EP075(SIM)B: Poly	nuclear Aromatic Hydrocarbons (QCLot: 2701122)						
ES1937404-028	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	100	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	98.0	70.0	130
EP090: Organotin	Compounds (QCLot: 2713069)						
ES1937483-053	VC02_0.0-0.5	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	106	20.0	130
Sub-Matrix: WATER				Ма	trix Spike (MS) Report		

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Work Order	: ES1937483
Client	: GHD PTY LTD
Project	: 12517046



Sub-Matrix: WATER			Γ	Ма	trix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Recovery Lir	nits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)C: L	eachable Metals by ICPAES (QCLot: 2706695)						
ES1937276-002	Anonymous	EG005C: Lead	7439-92-1	1 mg/L	93.8	70.0	130
EG005(ED093)C: L	eachable Metals by ICPAES (QCLot: 2706696)						
ES1937483-048	VC10_0.0-0.2	EG005C: Lead	7439-92-1	1 mg/L	106	70.0	130
EG035C: Leachabl	e Mercury by FIMS (QCLot: 2707496)						
ES1937483-001	VC11_0.0-0.2	EG035C: Mercury	7439-97-6	0.01 mg/L	88.1	70.0	130
EG035C: Leachabl	e Mercury by FIMS (QCLot: 2711136)						
ES1937422-017	Anonymous	EG035C: Mercury	7439-97-6	0.01 mg/L	84.9	70.0	130
EG035C: Leachabl	e Mercury by FIMS (QCLot: 2713255)						
ES1937483-080	VC13_0.3-0.4	EG035C: Mercury	7439-97-6	0.01 mg/L	73.4	70.0	130



QA/QC Compliance Assessment to assist with Quality Review							
Work Order	ES1937483	Page	: 1 of 16				
Client		Laboratory	: Environmental Division Sydney				
Contact	: SARAH ECCLESHALL	Telephone	: +61-2-8784 8555				
Project	: 12517046	Date Samples Received	: 13-Nov-2019				
Site	:	Issue Date	: 25-Nov-2019				
Sampler	:	No. of samples received	: 100				
Order number	:	No. of samples analysed	: 73				

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- NO Method Blank value outliers occur.
- <u>NO</u> Duplicate outliers occur.
- <u>NO</u> Laboratory Control outliers occur.
- Matrix Spike outliers exist please see following pages for full details.
- Surrogate recovery outliers exist for all regular sample matrices please see following pages for full details.

Outliers : Analysis Holding Time Compliance

• Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

• Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: SOIL

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	ES1937483008	VC09_0.4-0.6	Pyrene	129-00-0	140 %	70.0-130%	Recovery greater than upper data
							quality objective

Regular Sample Surrogates

Sub-Matrix: SOIL

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075(SIM)S: Phenolic Compound Surrogates	ES1937483-031	VC04_0.0-0.1	2-Chlorophenol-D4	93951-73-6	123 %	66.0-122	Recovery greater than upper data
						%	quality objective
EP075(SIM)T: PAH Surrogates	ES1937483-001	VC11_0.0-0.2	2-Fluorobiphenyl	321-60-8	129 %	70.0-122	Recovery greater than upper data
						%	quality objective
EP075(SIM)T: PAH Surrogates	ES1937483-003	VC11_1.0-1.2	2-Fluorobiphenyl	321-60-8	126 %	70.0-122	Recovery greater than upper data
						%	quality objective
EP075(SIM)T: PAH Surrogates	ES1937483-004	VC11_0.0-0.5	2-Fluorobiphenyl	321-60-8	123 %	70.0-122	Recovery greater than upper data
						%	quality objective
EP075(SIM)T: PAH Surrogates	ES1937483-005	VC11_0.5-1.0	2-Fluorobiphenyl	321-60-8	126 %	70.0-122	Recovery greater than upper data
						%	quality objective
EP075(SIM)T: PAH Surrogates	ES1937483-006	VC07_0.2-0.4	2-Fluorobiphenyl	321-60-8	127 %	70.0-122	Recovery greater than upper data
	E0 4007 400 000	N (000 0 / 0 0			107.0/	%	quality objective
EP075(SIM)T: PAH Surrogates	ES1937483-008	VC09_0.4-0.6	2-Fluorobiphenyl	321-60-8	127 %	70.0-122	Recovery greater than upper data
	E04007400.004	1004.07.00			404.0/	%	quality objective
EP075(SIM)1: PAH Surrogates	ES1937483-034	VC04_0.7-0.8	2-Fluorobiphenyl	321-60-8	124 %	70.0-122	Recovery greater than upper data
	E04007400.044	V(C00, 0, 0, 0, 0, 5			400.0/	%	quality objective
EP075(SIM)1: PAH Surrogates	ES1937483-011	VC09_0.0-0.5	2-Fluorobiphenyl	321-60-8	128 %	70.0-122	Recovery greater than upper data
	E04007400.040	V(000, 0, 5, 4, 0			405.0/	%	quality objective
EP075(SIM)1: PAH Surrogates	ES1937483-012	VC09_0.5-1.0	2-Fluorobiphenyl	321-60-8	125 %	70.0-122	Recovery greater than upper data
	E 21027492 015			001.00.0	105.0/	%	quality objective
EP075(SIM)1: PAH Surrogates	ES 193/403-015	VC07_0.7-0.8	2-Fluorobiphenyl	321-60-8	123 %	70.0-122	Recovery greater than upper data
ED075/SIMIT: DALL Surregator	ES1037/83 016	VC07 1012	0 Elucarabiah and	201.00.0	126 %	%	quality objective
EF075(SIM)1. FAH Sulfogales	L31957405-010	VC07_1.0-1.2	2-Fluorobipnenyi	321-60-8	120 /0	70.0-122	Recovery greater than upper data
	ES1027492 019	VC07 0 5 1 0		001.00.0	122 0/	%	
EP075(SIM)1. PAR Surrogates	E31937403-010	VC07_0.5-1.0	2-Fluorobipnenyi	321-60-8	133 70	70.0-122	Recovery greater than upper data
ED075/SIM)T: DAH Surrogates	ES1037/83-010	VC05_0_0_0_1	2 Elucrobinhonyl	201 60 8	128 %	% 70.0.100	quality objective
LF 075(SIM)T. FAIT Surroyates	201007400-010	V005_0.0-0.1	2-Fluorobiphenyi	321-00-0	120 /0	10.0-122	Recovery greater than upper data
EP075/SIM)T: PAH Surrogates	ES1937483-020	VC05_0.5-0.7	2 Elucrobinhonyl	221 60 9	128 %	70	quality objective
	201007400-020	000_0.0 0.1	2-riuoropiphenyi	321-00-0	120 /0	10.0-122	Recovery greater than upper data
EP075(SIM)T: PAH Surrogates	ES1937483-023	VC05_0.5-0.9	2 Elucrobinhonyl	221 60 9	126 %	70	quality objective
LF 075(SIM)1. FAIT SUITOYALES	L01907400-020	v000_0.0-0.8	∠-Fiuorobipnenyi	321-00-8	120 /0	10.0-122	Recovery greater than upper data
						70	

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Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted - Continued							
EP075(SIM)T: PAH Surrogates	ES1937483-049	VC10_0.5-0.6	2-Fluorobiphenyl	321-60-8	135 %	70.0-122	Recovery greater than upper data
						%	quality objective
EP075(SIM)T: PAH Surrogates	ES1937483-063	VC12_0.3-0.4	2-Fluorobiphenyl	321-60-8	129 %	70.0-122	Recovery greater than upper data
						%	quality objective
EP075(SIM)T: PAH Surrogates	ES1937483-066	VC12_1.0-1.1	2-Fluorobiphenyl	321-60-8	125 %	70.0-122	Recovery greater than upper data
						%	quality objective

Outliers : Analysis Holding Time Compliance

Method Date stratebin / Program Exaction / Program Date analyses Due for enalyses Due for enalyses <th>Matrix: SOIL</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	Matrix: SOIL							
Container / Client Sample (D(s) Date extraction	Method			Extraction / Preparation			Analysis	
Soli Glass Jar - Unpreserved Soli Glass Jar - Unpreserved 18-Nov-2019 13-Nov-2019 5 VC11_0.0-0.5, VC11_0.12, 18-Nov-2019 5 VC11_0.0-0.5, VC11_0.0-0.5, VC00_0.0-0.5,	Container / Client Sample ID(s)		Date extract	d Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
Soil Glass Jar - Unpreserved 18-Nov-2019 13-Nov-2019 5 VC11_0.0-0.2, VC11_0.5.1.0, VC09_0.4-0.6, VC09_0.7-0.8,	EA055: Moisture Content (Dried @ 105-110°C	C)						
VC11_0.0-0.2, VC11_0.1.2, 18-Nov-2019 13-Nov-2019 5 VC11_0.0-0.5, VC10_0.5.1.0, VC09_0.0.6, VC09_0.0.6, VC09_0.0.6, VC09_0.0.6, VC09_0.0.6, VC09_0.0.6, VC07_0.5.0, VC03_0.0.0, VC03_0.0.0	Soil Glass Jar - Unpreserved							
VC11_0.0-0.5, VC11_0.5-1.0, VC09_0.4-0.6, VC09_0.7-0.8, VC09_0.0-0.5, VC09_0.0-0.5, VC09_0.5-1.0, VC07_0.5-0.6, VC07_0.7-0.8, VC07_10-1.2, VC05_0.5-0.7, VC05_0.5-0.9, VC03_0.0-0.2, VC03_0.4-0.6, VC03_0.0-0.2, VC03_0.4-0.6, VC03_0.0-1.1, VC04_0.0-0.1, VC02_0.0-1.2, VC03_0.4-0.6, VC03_0.0-0,2, VC03_0.4-0.6, VC03_0.0-0,2, VC03_0.4-0.6, VC03_0.0-1,1,5, VC04_0.0-0.1, VC02_0.0-1,5, VC02_0.0-0,5 Soli Glass Jar - Unpreserved VC02_0.0-0,5 VC02_0.0-0,5 VC12_0.0-0,5 VC12_0.0-0,5	VC11_0.0-0.2,	VC11_1.0-1.2,				18-Nov-2019	13-Nov-2019	5
VC09_0.4-0.6, VC09_0.7-0.8, VC09_0.8-1.0, VC09_0.0-0.5, VC09_0.5-1.0, VC07_0.5-0.6, VC07_0.7-0.8, VC07_0.10-1.2, VC07_0.5-1.0, VC05_0.5-0.9, VC03_0.6-0.7, VC03_0.4-0.6, VC03_0.6-0.7, VC03_0.4-0.6, VC03_0.5-1.0, VC03_0.4-0.6, VC03_0.5-1.0, VC03_0.4-0.6, VC03_0.5-1.0, VC03_0.4-0.6, VC03_0.5-1.0, VC04_0.0-0.1, VC02_0.10-1.2, VC02_1.0-1.5, VC01_0.0-0,2, vc01_0.4-0.6, VC02_0.5-0.6 VC02_0.0-0.2, Soli Glass Jar - Unpreserved VC02_0.5-0.6 VC02_0.0-0.5 VC12_0.0-0.5 VC12_0.0-0.5	VC11_0.0-0.5,	VC11_0.5-1.0,						
VC09_0.8-1.0, VC09_0.0-0.5, VC09_0.5-1.0, VC07_0.5-0.6, VC07_0.7-0.8, VC07_1.0-1.2, VC07_0.5-1.0, VC05_0.5-0.7, VC03_0.5-0.7, VC03_0.4-0.6, VC03_0.6-0.7, VC03_0.4-0.6, VC03_0.6-0.7, VC03_0.4-0.6, VC03_0.6-0.7, VC03_0.4-0.6, VC03_0.6-0.7, VC03_0.4-0.6, VC03_0.6-0.7, VC03_0.4-0.6, VC03_0.6-1.1, VC04_0.0-0.1, VC02_0.5-1.0, VC02_1.0-1.5, VC01_0.0-0.2, vc01_0.4-0.6, VC02_0.5-1.0 VC02_0.0-0.2, VC01_0.0-0.2, vc01_0.4-0.6, VC02_0.5-1.0 VC02_0.0-0.2, Soil Glass Jar - Unpreserved VC02_0.5-0.6, VC02_0.0-0.5 Soil Glass Jar - Unpreserved VC12_0.0-0.5 Soil Glass Jar - Unpreserved VC12_0.0-0.5 VC12_0.0-0.5	VC09_0.4-0.6,	VC09_0.7-0.8,						
VC09_0.5-1.0, VC07_0.5-0.6, VC09_0.5-1.0, VC07_1.0-1.2, VC07_0.7-0.8, VC07_0.5-0, VC05_0.5-0.7, VC05_0.5-0, VC03_0.0-0.2, VC03_0.4-0, VC03_0.6-0.7, VC03_1.0-1.2, VC03_0.5-1.0, VC04_0.0-0.1, VC02_1.0-1.2, VC02_1.0-1.5, VC01_0.0-0.2, vC01_0.4-0.6, VC02_0.5-1.0, VC02_1.0-1.5, VC01_0.0-0.2, vC01_0.4-0.6, VC02_0.5-1.0, VC02_1.0-1.5, VC01_0.0-0.2, vC01_0.4-0.6, VC02_0.5-1.0, VC02_0.0-0.2, Soli Glass Jar - Unpreserved VC02_0.5-0, VC02_0.0-0.2, VC02_0.5-0,6, VC02_0.0-0.5 Soli Glass Jar - Unpreserved VC12_0.0-0.5 VC12_0.0-0.5 VC12_0.0-0.5 VC12_0.0-0.5 VC12_0.0-0.5 VC12_0.0-0.5	VC09_0.8-1.0,	VC09_0.0-0.5,						
VC07_0.7-0.8, VC07_1.0-1.2, VC07_0.5-1.0, VC05_0.0-0.1, VC05_0.5-0.7, VC05_0.5-0.9, VC03_0.0-0.2, VC03_0.4-0.6, VC03_0.6-0.7, VC03_0.1-1.2, VC03_0.5-1.0, VC04_0.0-0.1, VC02_1.0-1.2, VC02_1.0-1.5, VC02_0.5-1.0 VC02_1.0-1.5, VC02_0.5-1.0 VC02_1.0-1.6, VC02_0.5-1.0 VC02_0.0-0.2, VC01_0.0-0.2, vc01_0.4-0.6, VC02_0.5-1.0 VC02_0.0-0.2, VC07_0.2-0.4, VC02_0.0-0.2, VC02_0.5-0.6, VC02_0.0-0.5 Soil Glass Jar - Unpreserved VC12_0.0-0.5	VC09_0.5-1.0,	VC07_0.5-0.6,						
VC07_0.5-1.0, VC05_0.0-0.1, VC05_0.5-0.9, VC05_0.5-0.9, VC03_0.0-0.2, VC03_0.4-0.6, VC03_0.0-0.2, VC03_0.0-0.1, VC03_0.0-0.1, VC03_0.0-0.1, VC03_0.0-0.1, VC03_0.0-0.1, VC02_0.0-0.1, VC02_0.0-0.1, VC02_0.0-0.2, VC01_0.0-0.2, VC01_0.0-0.2, VC02_0.0-0.2, VC01_0.0-0.2, VC02_0.0-0.2, VC01_0.0-0.2, VC02_0.0-0.2, VC02_0.0-0.5 I3-Nov-2019 I3-N	VC07_0.7-0.8,	VC07_1.0-1.2,						
VC05_0.5-0.7, VC05_0.5-0.9, VC03_0.4-0.6, VC03_0.4-0.6, VC03_0.6-0.7, VC03_1.0-1.2, VC03_0.1-0.1, VC04_0.0-0.1, VC02_1.0-1.5, VC02_1.0-1.5, VC01_0.0-0.2, Image: Non-2019 13-Nov-2019 6 Soil Glass Jar - Unpreserved Image: Non-2019 Image: Non-2019 Image: Non-2019 13-Nov-2019 7 VC01_0.0-0.5 Image: Non-2019 Image: Non-2019 Image: Non-2019 Image: Non-2019 13-Nov-2019 7	VC07_0.5-1.0,	VC05_0.0-0.1,						
VC03_0.0-0.2, VC03_0.4-0.6, VC03_0.6-0.7, VC03_1.0-1.2, VC03_0.5-1.0, VC04_0.0-0.1, VC02_1.0-1.5, VC02_1.0-1.5, VC02_1.0-1.5, VC01_0.0-0.2, VC01_0.0-0.2, VC01_0.0-0.2, VC01_0.0-0.2, VC02_0.5-1.0, VC02_0.5-1.0, VC02_0.0-0, Image: Non-2019 Ima	VC05_0.5-0.7,	VC05_0.5-0.9,						
VC03_0.6-0.7, VC03_1.0-1.2, VC03_0.5-1.0, VC04_0.0-0.1, VC02_1.0-1.2, VC02_1.0-1.5, VC02_1.0-1.5, VC01_0.0-0.2, VC01_0.0-0.4-0.6, VC02_0.5-1.0 Image: Constraint of the state o	VC03_0.0-0.2,	VC03_0.4-0.6,						
VC03_0.5-1.0, VC04_0.0-0.1, VC02_1.0-1.5, VC02_1.0-1.5, VC02_1.0-1.5, VC02_0.5-1.0 Image: Constant of the state of the	VC03_0.6-0.7,	VC03_1.0-1.2,						
VC02_1.0-1.2, VC02_1.0-1.5, VC02_0.1-0.5, Image: Constraint of the state	VC03_0.5-1.0,	VC04_0.0-0.1,						
VC01_0.0-0.2, vc01_0.4-0.6, Image: constraint of the second of the	VC02_1.0-1.2,	VC02_1.0-1.5,						
VC02_0.5-1.0 Image: Constraint of the image: Constrainter of the image: Constrainter of the image: Constra	VC01_0.0-0.2,	vc01_0.4-0.6,						
Soil Glass Jar - Unpreserved VC02_0.0-0.2, VC02_0.0-0.2, Image: Provide the symbolic term of	VC02_0.5-1.0							
VC07_0.2-0.4, VC02_0.0-0.2, 19-Nov-2019 13-Nov-2019 6 VC02_0.5-0.6, VC02_0.0-0.5 VC02_0.0-0.5 19-Nov-2019 13-Nov-2019 6 Soil Glass Jar - Unpreserved 20-Nov-2019 13-Nov-2019 7	Soil Glass Jar - Unpreserved							
VC02_0.5-0.6, VC02_0.0-0.5 Image: Colored col	VC07_0.2-0.4,	VC02_0.0-0.2,				19-Nov-2019	13-Nov-2019	6
Soil Glass Jar - Unpreserved End Image: Figure 1 Figure 2 Fig	VC02_0.5-0.6,	VC02_0.0-0.5						
VC12_0.0-0.5 20-Nov-2019 13-Nov-2019 7	Soil Glass Jar - Unpreserved							
	VC12_0.0-0.5					20-Nov-2019	13-Nov-2019	7

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Work Order	: ES1937483
Client	: GHD PTY LTD
Project	12517046



Matrix: SOIL							
Method			Extraction / Preparation				
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content (Dried @ 105-110°C)	- Analysis Holding Time Compliance						
Soil Glass Jar - Unpreserved							
VC04_0.5-0.6,	VC04_0.7-0.8,				18-Nov-2019	14-Nov-2019	4
VC04_0.9-1.0,	VC10_0.0-0.2,						
VC10_0.5-0.6,	VC06_0.3-0.4,						
VC06_0.5-0.6,	VC06_0.7-0.8,						
VC06_0.8-0.9,	VC06_0.0-0.5,						
VC06_0.5-1.0,	VC12_0.8-0.9,						
VC12_1.0-1.1,	VC08_0.3-0.4,						
VC08_0.5-0.6,	VC08_0.7-0.8,						
VC08_1.0-1.1,	VC08_1.3-1.4,						
VC08_1.5-1.6,	VC08_0.0-0.5,						
VC08_0.5-1.0,	VC13_0.3-0.4,						
VC13_0.5-0.6,	VC13_0.7-0.8,						
VC13_1.0-1.1,	VC13_0.0-0.5,						
VC13_0.5-1.0,	VC14_0.0-0.1,						
VC14_0.3-0.4,	VC14-0.5-0.6,						
VC14_0.7-0.8,	VC14_1.3-1.4,						
VC14_0.0-0.5,	VC14_0.5-1.0						
Soil Glass Jar - Unpreserved							
VC12_0.3-0.4,	VC12_0.5-0.6				19-Nov-2019	14-Nov-2019	5
Soil Glass Jar - Unpreserved							
VC10_0.0-0.5					20-Nov-2019	14-Nov-2019	6
EN33: TCLP Leach							
Non-Volatile Leach: 14 day HT(e.g. SV organic	cs)						
VC11_0.0-0.2,	VC09_0.7-0.8,	14-Nov-2019	13-Nov-2019	1			
VC07_0.0-0.5,	VC05_0.0-0.1,						
VC03_0.0-0.2,	VC04_0.0-0.1,						
VC02_0.0-0.2,	VC01_0.0-0.2,						
VC02_0.0-0.5							
Non-Volatile Leach: 14 day HT(e.g. SV organic	cs)						
VC02_1.0-1.2		15-Nov-2019	13-Nov-2019	2			
Non-Volatile Leach: 14 day HT(e.g. SV organic	cs)						
VC04_0.7-0.8,	VC06_0.0-0.1	15-Nov-2019	14-Nov-2019	1			
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved							
VC09_0.4-0.6,	VC07_0.5-1.0,	14-Nov-2019	13-Nov-2019	1			
VC05_0.0-0.1							
EP075/SIM)B: Polynuclear Aromatic Hydrocart	one						

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Matrix: SOIL Method Extraction / Preparation Analysis Due for analysis Container / Client Sample ID(s) Date extracted Due for extraction Date analysed Days Days overdue overdue EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Analysis Holding Time Compliance Soil Glass Jar - Unpreserved VC11 0.0-0.2, VC11 1.0-1.2, 14-Nov-2019 13-Nov-2019 1 ----____ ----VC11 0.0-0.5, VC11 0.5-1.0, VC07_0.2-0.4, VC09_0.4-0.6, VC09_0.7-0.8, VC09_0.8-1.0, VC09 0.0-0.5, VC09 0.5-1.0, VC07_0.5-0.6, VC07_0.7-0.8, VC07_1.0-1.2, VC07_0.5-1.0, VC05 0.0-0.1, VC05_0.5-0.7, VC05 0.5-0.9 Soil Glass Jar - Unpreserved VC03_0.0-0.2, VC03_0.4-0.6, 14-Nov-2019 13-Nov-2019 1 ----____ ----VC03_0.6-0.7, VC03_1.0-1.2, VC03_0.5-1.0, VC04_0.0-0.1, VC02_0.0-0.2, VC02_0.5-0.6, VC02_1.0-1.2, VC02_1.0-1.5, VC01 0.0-0.2, vc01_0.4-0.6, VC02_0.5-1.0 Soil Glass Jar - Unpreserved 15-Nov-2019 14-Nov-2019 VC14_0.3-0.4, VC14-0.5-0.6, 1 ____ ____ ----VC14 0.7-0.8, VC14_1.3-1.4, VC14 0.0-0.5, VC14 0.5-1.0 EP090: Organotin Compounds Soil Glass Jar - Unpreserved VC12_0.0-0.5, VC02_0.0-0.5 20-Nov-2019 13-Nov-2019 7 ----____ ----Soil Glass Jar - Unpreserved VC10 0.0-0.5 20-Nov-2019 14-Nov-2019 6 ------------

Outliers : Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	Co	unt	Rate	e (%)	Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	32	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	32	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

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Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for <u>VOC in soils</u> vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive <u>or</u> Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: SOIL			Evaluation: $*$ = Holding time breach ; \checkmark = V						
Method Container / Client Sample ID(s)		Sample Date	E	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)									
VC11_0.0-0.2,	VC11_1.0-1.2,	30-Oct-2019				18-Nov-2019	13-Nov-2019		
VC11_0.0-0.5,	VC11_0.5-1.0,								
VC09_0.4-0.6,	VC09_0.7-0.8,								
VC09_0.8-1.0,	VC09_0.0-0.5,								
VC09_0.5-1.0,	VC07_0.5-0.6,								
VC07_0.7-0.8,	VC07_1.0-1.2,								
VC07_0.5-1.0,	VC05_0.0-0.1,								
VC05_0.5-0.7,	VC05_0.5-0.9,								
VC03_0.0-0.2,	VC03_0.4-0.6,								
VC03_0.6-0.7,	VC03_1.0-1.2,								
VC03_0.5-1.0,	VC04_0.0-0.1,								
VC02_1.0-1.2,	VC02_1.0-1.5,								
VC01_0.0-0.2,	vc01_0.4-0.6,								
VC02_0.5-1.0									
Soil Glass Jar - Unpreserved (EA055)									
VC07_0.2-0.4,	VC02_0.0-0.2,	30-Oct-2019				19-Nov-2019	13-Nov-2019	.	
VC02_0.5-0.6,	VC02_0.0-0.5								
Soil Glass Jar - Unpreserved (EA055)									
VC12_0.0-0.5		30-Oct-2019				20-Nov-2019	13-Nov-2019	*	
Soil Glass Jar - Unpreserved (EA055)									

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Matrix: SOIL					Evaluatior	i: × = Holding time	breach ; ✓ = Withi	in holding time.
Method Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110	0°C) - Continued							
VC04_0.5-0.6,	VC04_0.7-0.8,	31-Oct-2019				18-Nov-2019	14-Nov-2019	×
VC04_0.9-1.0,	VC10_0.0-0.2,							
VC10_0.5-0.6,	VC06_0.3-0.4,							
VC06_0.5-0.6,	VC06_0.7-0.8,							
VC06_0.8-0.9,	VC06_0.0-0.5,							
VC06_0.5-1.0,	VC12_0.8-0.9,							
VC12_1.0-1.1,	VC08_0.3-0.4,							
VC08_0.5-0.6,	VC08_0.7-0.8,							
VC08_1.0-1.1,	VC08_1.3-1.4,							
VC08_1.5-1.6,	VC08_0.0-0.5,							
VC08_0.5-1.0,	VC13_0.3-0.4,							
VC13_0.5-0.6,	VC13_0.7-0.8,							
VC13_1.0-1.1,	VC13_0.0-0.5,							
VC13_0.5-1.0,	VC14_0.0-0.1,							
VC14_0.3-0.4,	VC14-0.5-0.6,							
VC14_0.7-0.8,	VC14_1.3-1.4,							
VC14_0.0-0.5,	VC14_0.5-1.0							
Soil Glass Jar - Unpreserved (EA055)								
VC12_0.3-0.4,	VC12_0.5-0.6	31-Oct-2019				19-Nov-2019	14-Nov-2019	x
Soil Glass Jar - Unpreserved (EA055)								
VC10_0.0-0.5		31-Oct-2019				20-Nov-2019	14-Nov-2019	×

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Matrix: SOIL				n: 🗴 = Holding time	ne breach ; 🗸 = Within holding time			
Method Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005(ED093)T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
VC11_0.0-0.2,	VC11_1.0-1.2,	30-Oct-2019	18-Nov-2019	27-Apr-2020	~	19-Nov-2019	27-Apr-2020	✓
VC11_0.0-0.5,	VC11_0.5-1.0,							
VC09_0.4-0.6,	VC09_0.7-0.8,							
VC09_0.8-1.0,	VC09_0.0-0.5,							
VC09_0.5-1.0,	VC07_0.5-0.6,							
VC07_0.7-0.8,	VC07_1.0-1.2,							
VC07_0.5-1.0,	VC05_0.0-0.1,							
VC05_0.5-0.7,	VC05_0.5-0.9,							
VC03_0.0-0.2,	VC03_0.4-0.6,							
VC03_0.6-0.7,	VC03_1.0-1.2,							
VC03_0.5-1.0,	VC04_0.0-0.1,							
VC02 1.0-1.2,	VC02 1.0-1.5,							
VC01 0.0-0.2,	vc01 0.4-0.6,							
VC02 0.5-1.0								
 Soil Glass Jar - Unpreserved (EG005T)								
VC07_0.2-0.4,	VC02_0.0-0.2,	30-Oct-2019	19-Nov-2019	27-Apr-2020	1	19-Nov-2019	27-Apr-2020	 ✓
VC02_0.5-0.6								
Soil Glass Jar - Unpreserved (EG005T)								
VC04_0.5-0.6,	VC04_0.7-0.8,	31-Oct-2019	18-Nov-2019	28-Apr-2020	1	19-Nov-2019	28-Apr-2020	✓
VC04_0.9-1.0,	VC10_0.0-0.2,							
VC10_0.5-0.6,	VC06_0.3-0.4,							
VC06_0.5-0.6,	VC06_0.7-0.8,							
VC06_0.8-0.9,	VC06_0.0-0.5,							
VC06_0.5-1.0,	VC12_0.8-0.9,							
VC12_1.0-1.1,	VC08_0.3-0.4,							
VC08_0.5-0.6,	VC08_0.7-0.8,							
VC08 1.0-1.1,	VC08 1.3-1.4,							
VC08 1.5-1.6,	VC08 0.0-0.5,							
VC08 0.5-1.0.	VC13 0.3-0.4.							
VC13 0.5-0.6.	VC13 0.7-0.8.							
VC13 1.0-1.1.	VC13_0.0-0.5							
VC13 0.5-1.0.	VC14_0.0-0.1.							
VC14 0.3-0.4	VC14-0.5-0.6							
VC14 0 7-0 8	VC14 1 3-1 4							
VC14_0.0-0.5	VC14_0.5-1.0							
Soil Glass Jar - Unpreserved (EG005T)	10.01.0							
VC12 0.3-0.4.	VC12 0.5-0.6	31-Oct-2019	19-Nov-2019	28-Apr-2020	1	19-Nov-2019	28-Apr-2020	1

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Matrix: SOIL Evaluation: * = Holding time breach ; ✓ = With					in holding time				
Method		Sample Date		traction / Preparation		Analysis			
Container / Client Sample ID(s)				Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS									
Soil Glass Jar - Unpreserved (EG035T)									
VC11_0.0-0.2			30-Oct-2019	18-Nov-2019	27-Nov-2019	~	19-Nov-2019	27-Nov-2019	✓
Soil Glass Jar - Unpreserved (EG035T)			00.0-+ 0040	40 Nov 0040	07 Nov 0040		00 Nov 0040	07 Nov 0010	
VC07_0.5-0.6,	VC07_1.0-1.2,		30-Oct-2019	18-NOV-2019	27-NOV-2019	~	20-NOV-2019	27-NOV-2019	✓
VC05_0.0-0.1,	VC04_0.0-0.1,								
VC02_1.0-1.2,	VC01_0.0-0.2								
Soil Glass Jar - Unpreserved (EG0351)			30-Oct-2019	19-Nov-2019	27-Nov-2019		20-Nov-2019	27-Nov-2019	
Soil Class Jar Uppressrued (EC025T)	VC02_0.5-0.0		30-001-2013	13-1100-2013	27-1100-2013	✓	20-1407-2013	27-1100-2013	▼
	VC06_0.3-0.4		31-Oct-2019	18-Nov-2019	28-Nov-2019	1	20-Nov-2019	28-Nov-2019	
VC08_0.3-0.4	VC13_0.3-0.4					-			•
VC14_0.0-0.1	VC14_07-08								
	V014_0.7 0.0								
EN33: ICLP Leach	(0-)								
VC11 0 0-0 2			30-Oct-2019	14-Nov-2019	13-Nov-2019	**			
VC07_0.0.0.5	VC05_0.0_0_1		00 000 2010	14 1101 2010		*			
VC03_0.0.0.2	VC05_0.0-0.1,								
VC02_0.0-0.2,	VC04_0.0-0.1,								
VC02_0.0-0.2,	VC01_0.0-0.2,								
VC02_0.0-0.5	(20)								
VC02 1 0-1 2	53a)		30-Oct-2019	15-Nov-2019	13-Nov-2019	~			
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN3	(3a)					<u> </u>			
VC10 0.0-0.2.	VC12 0.8-0.9.		31-Oct-2019	14-Nov-2019	14-Nov-2019	1			
VC08_0.0-0.1	VC13 0.0-0.1					_			
VC14 0.0-0.1.	VC14_0.7-0.8								
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN3	(3a)								
VC04_0.7-0.8,	VC06_0.0-0.1		31-Oct-2019	15-Nov-2019	14-Nov-2019	x			
Non-Volatile Leach: 28 day HT(e.g. Hg, CrVI) (EN33a)									
VC07_0.2-0.4,	VC07_0.5-0.6,		30-Oct-2019	18-Nov-2019	27-Nov-2019	~			
VC07_1.0-1.2,	VC02_0.5-0.6								
Non-Volatile Leach: 28 day HT(e.g. Hg, CrVI) (EN33a)									
VC06_0.3-0.4,	VC08_0.3-0.4		31-Oct-2019	18-Nov-2019	28-Nov-2019	~			
Non-Volatile Leach: 28 day HT(e.g. Hg, CrVI) (EN33a)					00 NL 00 (0				
VC13_0.3-0.4			31-Oct-2019	19-Nov-2019	28-Nov-2019	~			
EP066: Polychlorinated Biphenyls (PCB)									
Soil Glass Jar - Unpreserved (EP066)								04 D	
VC09_0.4-0.6,	VC07_0.5-1.0,		30-Oct-2019	14-Nov-2019	13-Nov-2019	*	17-Nov-2019	24-Dec-2019	 ✓
VC05_0.0-0.1									
Soil Glass Jar - Unpreserved (EP066)					14 Nov 0010			04 Dec 0040	
VC12_0.3-0.4,	VC12_1.0-1.1,		31-Oct-2019	14-Nov-2019	14-NOV-2019	~	17-Nov-2019	24-Dec-2019	 ✓
VC08 0.3-0.4									

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Matrix: SOIL					Evaluation: \star = Holding time breach ; \checkmark = Within holding time				
Method			Ex	traction / Preparation		Analysis			
Container / Client Sample ID(s)			Date extracted Due for extraction		Evaluation	Date analysed	Due for analysis	Evaluation	
EP075(SIM)B: Polynuclear Aromatic	Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM))								
VC11_0.0-0.2,	VC11_1.0-1.2,	30-Oct-2019	14-Nov-2019	13-Nov-2019	<u></u>	15-Nov-2019	24-Dec-2019	✓	
VC11_0.0-0.5,	VC11_0.5-1.0,								
VC07_0.2-0.4,	VC09_0.4-0.6,								
VC09_0.7-0.8,	VC09_0.8-1.0,								
VC09_0.0-0.5,	VC09_0.5-1.0,								
VC07_0.5-0.6,	VC07_0.7-0.8,								
VC07_1.0-1.2,	VC07_0.5-1.0,								
VC05_0.0-0.1,	VC05_0.5-0.7,								
VC05_0.5-0.9									
Soil Glass Jar - Unpreserved (EP075(SIM))								
VC03_0.0-0.2,	VC03_0.4-0.6,	30-Oct-2019	14-Nov-2019	13-Nov-2019	<u>.</u>	16-Nov-2019	24-Dec-2019	✓	
VC03_0.6-0.7,	VC03_1.0-1.2,								
VC03_0.5-1.0,	VC04_0.0-0.1,								
VC02_0.0-0.2,	VC02_0.5-0.6,								
VC02_1.0-1.2,	VC02_1.0-1.5,								
VC01_0.0-0.2,	vc01_0.4-0.6,								
VC02_0.5-1.0									
Soil Glass Jar - Unpreserved (EP075(SIM))								
VC12_0.3-0.4,	VC12_1.0-1.1,	31-Oct-2019	14-Nov-2019	14-Nov-2019	1	15-Nov-2019	24-Dec-2019	✓	
VC08_0.3-0.4									
Soil Glass Jar - Unpreserved (EP075(SIM))								
VC04_0.5-0.6,	VC04_0.7-0.8,	31-Oct-2019	14-Nov-2019	14-Nov-2019	1	16-Nov-2019	24-Dec-2019	✓	
VC04_0.9-1.0,	VC10_0.0-0.2,								
VC10_0.5-0.6,	VC06_0.3-0.4,								
VC06_0.5-0.6									
Soil Glass Jar - Unpreserved (EP075(SIM))								
VC06_0.7-0.8,	VC06_0.8-0.9,	31-Oct-2019	14-Nov-2019	14-Nov-2019	-	18-Nov-2019	24-Dec-2019	✓	
VC06_0.0-0.5,	VC06_0.5-1.0,								
VC12_0.5-0.6,	VC12_0.8-0.9,								
VC08_0.5-0.6,	VC08_0.7-0.8,								
VC08_1.0-1.1,	VC08_1.3-1.4,								
VC08_1.5-1.6,	VC08_0.0-0.5,								
VC08_0.5-1.0,	VC13_0.3-0.4,								
VC13_0.5-0.6,	VC13_0.7-0.8,								
VC13_1.0-1.1,	VC13_0.0-0.5,								
VC13_0.5-1.0,	VC14_0.0-0.1								
Soil Glass Jar - Unpreserved (EP075(SIM))								
VC14_0.3-0.4,	VC14-0.5-0.6,	31-Oct-2019	15-Nov-2019	14-Nov-2019	<u>*</u>	16-Nov-2019	25-Dec-2019	✓	
VC14_0.7-0.8,	VC14_1.3-1.4,								
VC14 0.0-0.5,	VC14 0.5-1.0								

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Matrix: SOIL					Evaluation	: × = Holding time	breach ; ✓ = With	in holding time
Method			Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved (EP090) VC12_0.0-0.5,	VC02_0.0-0.5	30-Oct-2019	20-Nov-2019	13-Nov-2019	×	21-Nov-2019	30-Dec-2019	✓
Soil Glass Jar - Unpreserved (EP090) VC10_0.0-0.5		31-Oct-2019	20-Nov-2019	14-Nov-2019	×	21-Nov-2019	30-Dec-2019	1
Matrix: WATER					Evaluation	: × = Holding time	breach ; ✓ = Withi	in holding time
Method		Sample Date	E>	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005(ED093)C: Leachable Metals b	y ICPAES							
Clear Plastic Bottle - Nitric Acid; Unfil	tered (EG005C)							
VC11_0.0-0.2,	VC09_0.7-0.8,	14-Nov-2019	18-Nov-2019	12-May-2020	1	18-Nov-2019	12-May-2020	✓
VC07_0.0-0.5,	VC05_0.0-0.1,							
VC03_0.0-0.2,	VC04_0.0-0.1,							
VC02_0.0-0.2,	VC01_0.0-0.2,							
VC10_0.0-0.2,	VC02_0.0-0.5,							
VC12_0.8-0.9,	VC08_0.0-0.1,							
VC13 0.0-0.1,	VC14 0.0-0.1,							
VC14 0.7-0.8	_							
Clear Plastic Bottle - Nitric Acid; Unfil	tered (EG005C)							
VC04_0.7-0.8,	VC02_1.0-1.2,	15-Nov-2019	18-Nov-2019	13-May-2020	1	18-Nov-2019	13-May-2020	✓
VC06_0.0-0.1								
EG035C: Leachable Mercury by FIMS	5							
Clear Plastic Bottle - Nitric Acid; Unfil	tered (EG035C)							
VC11_0.0-0.2,	VC05_0.0-0.1,	14-Nov-2019				18-Nov-2019	12-Dec-2019	✓
VC04_0.0-0.1,	VC01_0.0-0.2,							
VC10_0.0-0.2,	VC02_0.0-0.5,							
VC14_0.0-0.1,	VC14_0.7-0.8							
Clear Plastic Bottle - Nitric Acid; Unfil	tered (EG035C)							
VC02_1.0-1.2		15-Nov-2019				18-Nov-2019	13-Dec-2019	✓
Clear Plastic Bottle - Nitric Acid; Unfil	tered (EG035C)							
VC07_0.2-0.4,	VC07_0.5-0.6,	18-Nov-2019				19-Nov-2019	16-Dec-2019	 ✓
VC07_1.0-1.2,	VC02_0.5-0.6,							
VC06_0.3-0.4,	VC08_0.3-0.4							
Clear Plastic Bottle - Nitric Acid; Unfil	tered (EG035C)							
VC13 0.3-0.4		19-Nov-2019				20-Nov-2019	17-Dec-2019	

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Matrix: WATER					Evaluation	: × = Holding time	breach ; ✓ = With	n holding time
Method		Sample Date	Ex	traction / Preparation		Analysis		
Container / Client Sample ID(s)			Date extracted Due for extraction		Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic I	Hydrocarbons							
Amber Glass Bottle - Unpreserved (EF	2075(SIM))							
VC11_0.0-0.2,	VC09_0.7-0.8,	14-Nov-2019	18-Nov-2019	21-Nov-2019	1	18-Nov-2019	28-Dec-2019	✓
VC07_0.0-0.5,	VC05_0.0-0.1,							
VC03_0.0-0.2,	VC04_0.0-0.1,							
VC02_0.0-0.2,	VC01_0.0-0.2,							
VC10_0.0-0.2,	VC02_0.0-0.5,							
VC12_0.8-0.9,	VC08_0.0-0.1,							
VC13_0.0-0.1,	VC14_0.0-0.1,							
VC14_0.7-0.8	_							
Amber Glass Bottle - Unpreserved (EF	P075(SIM))							
VC04_0.7-0.8,	VC02_1.0-1.2,	15-Nov-2019	18-Nov-2019	22-Nov-2019	1	18-Nov-2019	28-Dec-2019	✓
VC06 0.0-0.1								

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Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: SOIL				Evaluatio	on: × = Quality Co	ntrol frequency	not within specification ; 🗸 = Quality Control frequency within specification.
Quality Control Sample Type		Сс	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	00	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	10	95	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Analysis	EP090	1	3	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	8	78	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	7	58	12.07	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	10	95	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Organotin Analysis	EP090	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	78	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	58	6.90	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	5	95	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Organotin Analysis	EP090	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	78	5.13	5.00	~	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TCLP for Non & Semivolatile Analytes	EN33a	7	44	15.91	9.09	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	58	6.90	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	5	95	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Organotin Analysis	EP090	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	78	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	58	6.90	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	5	95	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix: WATER				Evaluatio	$n: \mathbf{x} = Quality Co$	ntrol frequency	not within specification : \checkmark = Quality Control frequency within specification
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Leachable Mercury by FIMS	EG035C	5	27	18.52	10.00	1	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	4	32	12.50	10.00	<u> </u>	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	32	0.00	10.00	<u> </u>	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Leachable Mercury by FIMS	EG035C	3	27	11.11	5.00	1	NEPM 2013 B3 & ALS QC Standard
Leachable Metals by ICPAES	EG005C	2	32	6.25	5.00		NEPM 2013 B3 & ALS QC Standard
· · ·						-	

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Matrix: WATER				Evaluation	n: × = Quality Co	ntrol frequency n	not within specification ; \checkmark = Quality Control frequency within specification.			
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification			
Analytical Methods	Method	00	Reaular	Actual	Expected	Evaluation				
Laboratory Control Samples (LCS) - Continued										
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard			
Method Blanks (MB)										
Leachable Mercury by FIMS	EG035C	3	27	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard			
Leachable Metals by ICPAES	EG005C	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard			
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard			
Matrix Spikes (MS)										
Leachable Mercury by FIMS	EG035C	3	27	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard			
Leachable Metals by ICPAES	EG005C	2	32	6.25	5.00	1	NEPM 2013 B3 & ALS QC Standard			
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	32	0.00	5.00	×	NEPM 2013 B3 & ALS QC Standard			

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Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 6.1 and Table 1 (14 day holding time).
Leachable Metals by ICPAES	EG005C	SOIL	In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Leachable Mercury by FIMS	EG035C	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
Organotin Analysis	EP090	SOIL	In house: Referenced to USEPA SW 846 - 8270D Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quanitified against an established calibration curve.
Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.

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Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Separatory Funnel Extraction of Liquids	ORG14	SOIL	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3). ALS default excludes sediment which may be resident in the container.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Organotin Sample Preparation	ORG35	SOIL	In house: 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.

Б		(a	Date		Chromium R	educible Sulphur]
ļ	Lab report	Sample ID	20/10/2019	10	X]
1	ES1936029	VC11_0.0-0.1	30/10/2019	20-	<u>+</u>		
2	ES1936029	VC11_0.5-0.6	30/10/2019	- <u>w</u>	×		1 . .
3	ES1936029	VC11_1.0-1.1	30/10/2019	10	<u>^</u>		nvironmental Division
4	ES1936029	VC09_0.0-0.1	20/10/2019	28	╂────	s	Sydney
S	ES1936029	VC09_0.5-0.6	5 30/10/2019	2			FS1937554
6	ES1936029	VC09_0.9-1.0	1 20/10/2019	<u></u>	1×		
7	ES1936029	VC07_0.0-0	1 30/10/2019	71	+^		- 唐川 郡道,明之教等(曹) []]
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12	E\$1936029	VC05_0.8-1.	0 30/10/201	<u>, 16</u>	+^]
13	ES1936029	VC03_0.0-0.	<u>1 30/10/2013</u>	<u>ין וא</u>	+		
14	E\$1936029	VC03_0.5-0.	1 20/10/201		×		
ß	ES1936029	VC03_10-1.	1 30/10/201				Chromium site /
16	ES1936029	VC01_0.0-0	1 30/10/201		_ <u>^</u>		ALS BRISBANE
17	ES1936029	9 vc01_0.5-0.	6 30/10/201	0 10			6 = 10, 17(183
Ø	ES193602	9 VC01_1.0-1	.1 30/10/201			Subcon / Borward L	ab Spic WOLS19319
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72	ES193602	9 VC02_1.5-1	1.6 30/10/201	<u>9 11.</u>		Connote / Courier:	(J) > (2) A
23	ES193602	9 VC10_0.0-0).1 30/10/20	19 VS		WU No:	
ĬĢ	ES193602	9 VC10_0.5-0).6 30/10/20		_ <u>_</u>	Attached By PO / 1	nternal Sheet:
25	ES193602	9 VC04_0.0-0	0.1 30/10/20	10 70	_ _		
Ú	ES193602	9 VC04_0.9-1	1.0 30/10/20	10 10			-1
2	7 ES193618	33 VC06_0.0-0	0.1 31/10/20		<u> </u>		
Ø	ES193618	33 VC06_0.5-	0.6 31/10/20	10 74			
2	9 ES193618	33 VC12_0.0-	$0.1 \ 31/10/20$	$19 0^{-1}$	_ <u>_</u>		
30	3 ES19361	83 VC12_0.5-	0.6 31/10/20	19 7C			7
3	(ES19361	83 VC12_1.0-	1.1 31/10/20	19 <u>28</u>			
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1	62 1FS19361	183 IVC14 1.3	5-1,4 31/10/2				

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SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: ES1937554			
Client Contact Address	E GHD PTY LTD E SARAH ECCLESHALL E LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Laboratory Contact Address	: Enviro : Custor : 277-28 NSW /	nmental Division Sydney mer Services ES 39 Woodpark Road Smithfield Australia 2164
E-mail Telephone Facsimile	: sarah.eccleshall@ghd.com : :	E-mail Telephone Facsimile	: ALSEr : +61-2- : +61-2-	nviro.Sydney@ALSGlobal.com 8784 8555 8784 8500
Project Order number C-O-C number Site Sampler	: 12517046 : : :	Page Quote number QC Level	: 1 of 3 : ES201 : NEPM	9GHDSER0030 (SY/522/19) 2013 B3 & ALS QC Standard
Dates Date Samples Receive Client Requested Due Date	ed : 12-Nov-2019 17:22 : 22-Nov-2019	Issue Date Scheduled Reporti	ng Date	: 13-Nov-2019 : 22-Nov-2019
Delivery Detail	ls			

Mode of Delivery	Indefined	Security Seal	· Not Available
	Ondenned	county cour	
No. of coolers/boxes	:	Temperature	: 4.1'c
Receipt Detail	:	No. of samples received / analysed	: 42 / 21

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- This work order is a split from ES1937483 & ES199005.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- EA033 Analysis to be conducted by ALS Brisbane.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical
 analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this
 temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS
 recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

۲033 ۲ Suite for Acid Sulphate Soils

is requested

SOIL

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold No analy	SOIL - E/ Chromiur
ES1937554-001	30-Oct-2019 00:00	VC11_0.0-0.1		✓
ES1937554-002	30-Oct-2019 00:00	VC11_0.5-0.6	 ✓ 	
ES1937554-003	30-Oct-2019 00:00	VC11_1.0-1.1		✓
ES1937554-004	30-Oct-2019 00:00	VC09_0.0-0.1	 ✓ 	
ES1937554-005	30-Oct-2019 00:00	VC09_0.5-0.6	 ✓ 	
ES1937554-006	30-Oct-2019 00:00	VC09_0.9-1.0		✓
ES1937554-007	30-Oct-2019 00:00	VC07_0.0-0.1		✓
ES1937554-008	30-Oct-2019 00:00	VC07_0.5-0.6	✓	
ES1937554-009	30-Oct-2019 00:00	VC07_1.0-1.1		✓
ES1937554-010	30-Oct-2019 00:00	VC05_0.0-0.1		✓
ES1937554-011	30-Oct-2019 00:00	VC05_0.5-0.6	 ✓ 	
ES1937554-012	30-Oct-2019 00:00	VC05_0.8-1.0		✓
ES1937554-013	30-Oct-2019 00:00	VC03_0.0-0.1	 ✓ 	
ES1937554-014	30-Oct-2019 00:00	VC03_0.5-0.6	 ✓ 	
ES1937554-015	30-Oct-2019 00:00	VC03_10-1.1		✓
ES1937554-016	30-Oct-2019 00:00	VC01_0.0-0.1		✓
ES1937554-017	30-Oct-2019 00:00	vc01_0.5-0.6	 ✓ 	
ES1937554-018	30-Oct-2019 00:00	VC01_1.0-1.1		✓
ES1937554-019	30-Oct-2019 00:00	VC02_0.0-0.1		✓
ES1937554-020	30-Oct-2019 00:00	VC02_0.5-0.6	1	
ES1937554-021	30-Oct-2019 00:00	VC02_0.9-1.0	✓	
ES1937554-022	30-Oct-2019 00:00	VC02_1.5-1.6		✓
ES1937554-023	30-Oct-2019 00:00	VC10_0.0-0.1	✓	
ES1937554-024	30-Oct-2019 00:00	VC10_0.5-0.6		✓
ES1937554-025	30-Oct-2019 00:00	VC04_0.0-0.1	✓	
ES1937554-026	30-Oct-2019 00:00	VC04_0.9-1.0		✓
ES1937554-027	30-Oct-2019 00:00	VC06_0.0-0.1		✓
ES1937554-028	30-Oct-2019 00:00	VC06_0.5-0.6	 ✓ 	
ES1937554-029	30-Oct-2019 00:00	VC12_0.0-0.1		✓
ES1937554-030	30-Oct-2019 00:00	VC12_0.5-0.6	 ✓ 	
ES1937554-031	30-Oct-2019 00:00	VC12_1.0-1.1	✓	
ES1937554-032	30-Oct-2019 00:00	VC08_0.0-0.1	✓	
ES1937554-033	30-Oct-2019 00:00	VC08_0.5-0.6		✓
ES1937554-034	30-Oct-2019 00:00	VC08_1.0-1.1	✓	
ES1937554-035	30-Oct-2019 00:00	VC08_1.5-1.6		✓



			(On Hold) SOIL No analysis requested	SOIL - EA033 Chromium Suite for Acid Sulphate Soils
ES1937554-036	30-Oct-2019 00:00	VC13_0.0-0.1	✓	
ES1937554-037	30-Oct-2019 00:00	VC13_0.5-0.6		✓
ES1937554-038	30-Oct-2019 00:00	VC13_1.0-1.1	✓	
ES1937554-039	30-Oct-2019 00:00	VC14_0.0-0.1		✓
ES1937554-040	30-Oct-2019 00:00	VC14_0.5-0.6	✓	
ES1937554-041	30-Oct-2019 00:00	VC14_1.0-1.1	✓	
ES1937554-042	30-Oct-2019 00:00	VC14_1.3-1.4		✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
SARAH ECCLESHALL		
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	sarah.eccleshall@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	sarah.eccleshall@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sarah.eccleshall@ghd.com
- Chain of Custody (CoC) (COC)	Email	sarah.eccleshall@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	sarah.eccleshall@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	sarah.eccleshall@ghd.com
- EDI Format - XTab (XTAB)	Email	sarah.eccleshall@ghd.com
 Electronic SRN for ESdat (ESRN_ESDAT) 	Email	sarah.eccleshall@ghd.com



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: ES1937554			
Client Contact Address	E GHD PTY LTD E SARAH ECCLESHALL E LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Laboratory Contact Address	: Enviro : Custor : 277-28 NSW /	nmental Division Sydney mer Services ES 39 Woodpark Road Smithfield Australia 2164
E-mail Telephone Facsimile	: sarah.eccleshall@ghd.com : :	E-mail Telephone Facsimile	: ALSEr : +61-2- : +61-2-	nviro.Sydney@ALSGlobal.com .8784 8555 .8784 8500
Project Order number C-O-C number Site Sampler	: 12517046 : : :	Page Quote number QC Level	: 1 of 3 : ES201 : NEPM	19GHDSER0030 (SY/522/19) I 2013 B3 & ALS QC Standard
Dates Date Samples Rece Client Requested Do Date	ived : 12-Nov-2019 17:22 ue : 22-Nov-2019	Issue Date Scheduled Reporti	ng Date	: 13-Nov-2019 : 22-Nov-2019
Delivery Deta	nils			

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	:	Temperature	: 4.1'c
Receipt Detail	:	No. of samples received / analysed	: 42 / 21

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- This work order is a split from ES1937483 & ES1990050.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- EA033 Analysis to be conducted by ALS Brisbane.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical
 analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this
 temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS
 recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

۲033 ۲ Suite for Acid Sulphate Soils

is requested

SOIL

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold No analy	SOIL - E/ Chromiur
ES1937554-001	30-Oct-2019 00:00	VC11_0.0-0.1		✓
ES1937554-002	30-Oct-2019 00:00	VC11_0.5-0.6	 ✓ 	
ES1937554-003	30-Oct-2019 00:00	VC11_1.0-1.1		✓
ES1937554-004	30-Oct-2019 00:00	VC09_0.0-0.1	 ✓ 	
ES1937554-005	30-Oct-2019 00:00	VC09_0.5-0.6	 ✓ 	
ES1937554-006	30-Oct-2019 00:00	VC09_0.9-1.0		✓
ES1937554-007	30-Oct-2019 00:00	VC07_0.0-0.1		✓
ES1937554-008	30-Oct-2019 00:00	VC07_0.5-0.6	✓	
ES1937554-009	30-Oct-2019 00:00	VC07_1.0-1.1		✓
ES1937554-010	30-Oct-2019 00:00	VC05_0.0-0.1		✓
ES1937554-011	30-Oct-2019 00:00	VC05_0.5-0.6	 ✓ 	
ES1937554-012	30-Oct-2019 00:00	VC05_0.8-1.0		✓
ES1937554-013	30-Oct-2019 00:00	VC03_0.0-0.1	 ✓ 	
ES1937554-014	30-Oct-2019 00:00	VC03_0.5-0.6	✓	
ES1937554-015	30-Oct-2019 00:00	VC03_10-1.1		✓
ES1937554-016	30-Oct-2019 00:00	VC01_0.0-0.1		✓
ES1937554-017	30-Oct-2019 00:00	vc01_0.5-0.6	 ✓ 	
ES1937554-018	30-Oct-2019 00:00	VC01_1.0-1.1		✓
ES1937554-019	30-Oct-2019 00:00	VC02_0.0-0.1		✓
ES1937554-020	30-Oct-2019 00:00	VC02_0.5-0.6	 ✓ 	
ES1937554-021	30-Oct-2019 00:00	VC02_0.9-1.0	✓	
ES1937554-022	30-Oct-2019 00:00	VC02_1.5-1.6		✓
ES1937554-023	30-Oct-2019 00:00	VC10_0.0-0.1	✓	
ES1937554-024	30-Oct-2019 00:00	VC10_0.5-0.6		✓
ES1937554-025	30-Oct-2019 00:00	VC04_0.0-0.1	✓	
ES1937554-026	30-Oct-2019 00:00	VC04_0.9-1.0		✓
ES1937554-027	30-Oct-2019 00:00	VC06_0.0-0.1		✓
ES1937554-028	30-Oct-2019 00:00	VC06_0.5-0.6	 ✓ 	
ES1937554-029	30-Oct-2019 00:00	VC12_0.0-0.1		✓
ES1937554-030	30-Oct-2019 00:00	VC12_0.5-0.6	 ✓ 	
ES1937554-031	30-Oct-2019 00:00	VC12_1.0-1.1	✓	
ES1937554-032	30-Oct-2019 00:00	VC08_0.0-0.1	✓	
ES1937554-033	30-Oct-2019 00:00	VC08_0.5-0.6		✓
ES1937554-034	30-Oct-2019 00:00	VC08_1.0-1.1	✓	
ES1937554-035	30-Oct-2019 00:00	VC08_1.5-1.6		✓



			(On Hold) SOIL No analysis requested	SOIL - EA033 Chromium Suite for Acid Sulphate Soils
ES1937554-036	30-Oct-2019 00:00	VC13_0.0-0.1	✓	
ES1937554-037	30-Oct-2019 00:00	VC13_0.5-0.6		✓
ES1937554-038	30-Oct-2019 00:00	VC13_1.0-1.1	✓	
ES1937554-039	30-Oct-2019 00:00	VC14_0.0-0.1		✓
ES1937554-040	30-Oct-2019 00:00	VC14_0.5-0.6	✓	
ES1937554-041	30-Oct-2019 00:00	VC14_1.0-1.1	✓	
ES1937554-042	30-Oct-2019 00:00	VC14_1.3-1.4		✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
SARAH ECCLESHALL		
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	sarah.eccleshall@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	sarah.eccleshall@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sarah.eccleshall@ghd.com
- Chain of Custody (CoC) (COC)	Email	sarah.eccleshall@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	sarah.eccleshall@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	sarah.eccleshall@ghd.com
- EDI Format - XTab (XTAB)	Email	sarah.eccleshall@ghd.com
 Electronic SRN for ESdat (ESRN_ESDAT) 	Email	sarah.eccleshall@ghd.com



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: ES1937554			
Client Contact Address	E GHD PTY LTD E SARAH ECCLESHALL E LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Laboratory Contact Address	: Enviro : Custor : 277-28 NSW /	nmental Division Sydney mer Services ES 39 Woodpark Road Smithfield Australia 2164
E-mail Telephone Facsimile	: sarah.eccleshall@ghd.com : :	E-mail Telephone Facsimile	: ALSEr : +61-2- : +61-2-	nviro.Sydney@ALSGlobal.com .8784 8555 .8784 8500
Project Order number C-O-C number Site Sampler	: 12517046 : : :	Page Quote number QC Level	: 1 of 3 : ES201 : NEPM	19GHDSER0030 (SY/522/19) I 2013 B3 & ALS QC Standard
Dates Date Samples Rece Client Requested Do Date	ived : 12-Nov-2019 17:22 ue : 22-Nov-2019	Issue Date Scheduled Reporti	ng Date	: 13-Nov-2019 : 22-Nov-2019
Delivery Deta	nils			

,			
Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	:	Temperature	: 4.1'c
Receipt Detail	:	No. of samples received / analysed	: 42 / 21

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- This work order is a split from ES1937483 & ES1990050.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- EA033 Analysis to be conducted by ALS Brisbane.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical
 analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this
 temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS
 recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

۲033 ۲ Suite for Acid Sulphate Soils

is requested

SOIL

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold No analys	SOIL - E/ Chromiur
ES1937554-001	31-Oct-2019 00:00	VC11_0.0-0.1		✓
ES1937554-002	30-Oct-2019 00:00	VC11_0.5-0.6	✓	
ES1937554-003	30-Oct-2019 00:00	VC11_1.0-1.1		✓
ES1937554-004	30-Oct-2019 00:00	VC09_0.0-0.1	 ✓ 	
ES1937554-005	30-Oct-2019 00:00	VC09_0.5-0.6	 ✓ 	
ES1937554-006	30-Oct-2019 00:00	VC09_0.9-1.0		✓
ES1937554-007	30-Oct-2019 00:00	VC07_0.0-0.1		✓
ES1937554-008	30-Oct-2019 00:00	VC07_0.5-0.6	1	
ES1937554-009	30-Oct-2019 00:00	VC07_1.0-1.1		✓
ES1937554-010	30-Oct-2019 00:00	VC05_0.0-0.1		✓
ES1937554-011	30-Oct-2019 00:00	VC05_0.5-0.6	 ✓ 	
ES1937554-012	30-Oct-2019 00:00	VC05_0.8-1.0		✓
ES1937554-013	30-Oct-2019 00:00	VC03_0.0-0.1	 ✓ 	
ES1937554-014	30-Oct-2019 00:00	VC03_0.5-0.6	 ✓ 	
ES1937554-015	30-Oct-2019 00:00	VC03_10-1.1		✓
ES1937554-016	30-Oct-2019 00:00	VC01_0.0-0.1		✓
ES1937554-017	30-Oct-2019 00:00	vc01_0.5-0.6	1	
ES1937554-018	30-Oct-2019 00:00	VC01_1.0-1.1		✓
ES1937554-019	30-Oct-2019 00:00	VC02_0.0-0.1		✓
ES1937554-020	30-Oct-2019 00:00	VC02_0.5-0.6	 ✓ 	
ES1937554-021	30-Oct-2019 00:00	VC02_0.9-1.0	 ✓ 	
ES1937554-022	30-Oct-2019 00:00	VC02_1.5-1.6		✓
ES1937554-023	30-Oct-2019 00:00	VC10_0.0-0.1	 ✓ 	
ES1937554-024	30-Oct-2019 00:00	VC10_0.5-0.6		✓
ES1937554-025	30-Oct-2019 00:00	VC04_0.0-0.1	1	
ES1937554-026	30-Oct-2019 00:00	VC04_0.9-1.0		✓
ES1937554-027	30-Oct-2019 00:00	VC06_0.0-0.1		✓
ES1937554-028	31-Oct-2019 00:00	VC06_0.5-0.6	 ✓ 	
ES1937554-029	31-Oct-2019 00:00	VC12_0.0-0.1		✓
ES1937554-030	31-Oct-2019 00:00	VC12_0.5-0.6	 ✓ 	
ES1937554-031	31-Oct-2019 00:00	VC12_1.0-1.1	1	
ES1937554-032	31-Oct-2019 00:00	VC08_0.0-0.1	1	
ES1937554-033	31-Oct-2019 00:00	VC08_0.5-0.6		✓
ES1937554-034	31-Oct-2019 00:00	VC08_1.0-1.1	1	
ES1937554-035	31-Oct-2019 00:00	VC08_1.5-1.6		✓



			(On Hold) SOIL No analysis requested	SOIL - EA033 Chromium Suite for Acid Sulphate Soils
ES1937554-036	31-Oct-2019 00:00	VC13_0.0-0.1	✓	
ES1937554-037	31-Oct-2019 00:00	VC13_0.5-0.6		✓
ES1937554-038	31-Oct-2019 00:00	VC13_1.0-1.1	✓	
ES1937554-039	31-Oct-2019 00:00	VC14_0.0-0.1		✓
ES1937554-040	31-Oct-2019 00:00	VC14_0.5-0.6	✓	
ES1937554-041	31-Oct-2019 00:00	VC14_1.0-1.1	1	
ES1937554-042	31-Oct-2019 00:00	VC14_1.3-1.4		1

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
SARAH ECCLESHALL		
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	sarah.eccleshall@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	sarah.eccleshall@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sarah.eccleshall@ghd.com
- Chain of Custody (CoC) (COC)	Email	sarah.eccleshall@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	sarah.eccleshall@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	sarah.eccleshall@ghd.com
- EDI Format - XTab (XTAB)	Email	sarah.eccleshall@ghd.com
 Electronic SRN for ESdat (ESRN_ESDAT) 	Email	sarah.eccleshall@ghd.com


SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: ES1937554					
Client Contact Address	: GHD PTY LTD : SARAH ECCLESHALL : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Laboratory Contact Address	 Environmental Division Sydney Customer Services ES 277-289 Woodpark Road Smithfield NSW Australia 2164 			
E-mail Telephone Facsimile	: sarah.eccleshall@ghd.com : :	E-mail Telephone Facsimile	: ALSEr : +61-2- : +61-2-	nviro.Sydney@ALSGlobal.com •8784 8555 •8784 8500		
Project Order number C-O-C number Site Sampler	: 12517046 : : :	Page Quote number QC Level	: 1 of 3 : ES201 : NEPM	19GHDSER0030 (SY/522/19) I 2013 B3 & ALS QC Standard		
Dates Date Samples Rece Client Requested D Date	eived : 12-Nov-2019 17:22 ue : 22-Nov-2019	Issue Date Scheduled Reportir	ng Date	: 18-Nov-2019 : 22-Nov-2019		
Delivery Deta	ails					

: Undefined	Security Seal	: Not Available
:	Temperature	: 4.1'c
:	No. of samples received / analysed	: 42 / 22
	: Undefined :	: Undefined Security Seal : Temperature : No. of samples received / analysed

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- This work order is a split from ES1937483 & ES1990050.
- This work order is a rebatch of ES1936029/ES1936183 and a split from ES1937483/ES1990050
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- *18/11/2019*: SRN has been resent to acknowledge addition of AVS-SEM to samples 'VC07_0.0-0.1', 'VC02_0.5-0.6' & 'VC12_0.0-0.1' received by ALS from Sarah Eccleshall, 15/11/2019. For any further information regarding these adjustments please contact client services at ALSEnviro.Sydney@alsglobal.com.
- EA033 Analysis to be conducted by ALS Brisbane.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical
 analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this
 temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS
 recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

tasks. Packages may contain additional analyses, such									
as the determin	ation of moisture	content and preparation			aneo				
tasks, that are included in the package.									
If no sampling	time is provided,	the sampling time will		ate S	s pu				
default 00:00 on	the date of samplin	ig. If no sampling date		nlpha	/S) a				
laboratory and	displayed in bra	ckets without a time		cid S	s (A)				
component			estec	for A	VS_S	с т С			
Matrix: SOIL			requ	33 Suite	38-A' e Sul	55-1(onten			
			old) S alysis	EA0	EA0 olatil	EA0 C			
Laboratory sample	Client sampling	Client sample ID	Dn Ho	OIL -	OIL - cid V	OIL - loistu			
ES1937554-001	30-Oct-2019 00:00	VC11 0.0-0.1	SZ	<u>∽ ⊖</u>	S A	<u>v ></u>			
ES1937554-002	30-Oct-2019 00:00	VC11 0.5-0.6	1						
ES1937554-003	30-Oct-2019 00:00	 VC11_1.0-1.1		✓					
ES1937554-004	30-Oct-2019 00:00	 VC09_0.0-0.1	1						
ES1937554-005	30-Oct-2019 00:00	 VC09_0.5-0.6	1						
ES1937554-006	30-Oct-2019 00:00	VC09 0.9-1.0		✓					
ES1937554-007	30-Oct-2019 00:00	VC07_0.0-0.1		· •	✓	1			
ES1937554-008	30-Oct-2019 00:00	VC07_0.5-0.6	1		-	-			
ES1937554-009	30-Oct-2019 00:00	VC07_1.0-1.1		1					
ES1937554-010	30-Oct-2019 00:00	VC05_0.0-0.1		· •					
ES1937554-011	30-Oct-2019 00:00	VC05_0.5-0.6	1						
ES1937554-012	30-Oct-2019 00:00	VC05_0.8-1_0	-	1					
ES1937554-013	30-Oct-2019 00:00	VC03_0.0-0.1	1						
ES1937554-014	30-Oct-2019 00:00	VC03_0.5-0.6	· •						
ES1937554-015	30-Oct-2019 00:00	VC03_10-1_1	•	1					
ES1937554-016	30-Oct-2019 00:00	VC01_0_0_0_1		· •					
ES1937554-017	30-Oct-2019 00:00	vc01_0.5-0.6	1	•					
ES1937554-018	30-Oct-2019 00:00	VC01_1.0-1.1	-	1					
ES1937554-019	30-Oct-2019 00:00	VC02_0.0-0.1		•					
ES1937554-020	30-Oct-2019 00:00	VC02_0.5-0.6			1	1			
ES1937554-021	30-Oct-2019 00:00	VC02_0.9-1.0	1		•	-			
ES1037554-022	30-Oct-2019 00:00	VC02_0.5 1.6	•	1					
ES1937554-023	30-Oct-2019 00:00	VC10_0.0-0.1	1	•					
ES1937554-024	30-Oct-2019 00:00	VC10_0.5-0.6	•	1					
ES1937554-025	30-Oct-2019 00:00	VC04_0.0-0.1	1	•					
ES1937554-026	30-Oct-2019 00:00	VC04_0.9-1.0	-	1					
ES1937554-027	31-Oct-2019 00:00	VC06_0_0-0_1		· •					
ES1937554-028	31-Oct-2019 00:00	VC06_0.5-0.6	1						
ES1937554-029	31-Oct-2019 00:00	VC12_0.0-0.1	-	1	1	1			
ES1937554-030	31-Oct-2019 00:00	VC12_0.5-0.6	1	-	-	-			
ES1937554-031	31-Oct-2019 00:00	VC12_1.0-1.1	· •						
ES1937554-032	31-Oct-2019 00:00	VC08_0.0-0.1	· •						
ES1937554_033	31_Oct_2019 00:00	VC08_0.5-0.6	-	1					
ES1937554-034	31-Oct-2019 00:00	VC08_1.0-1.1	1	-					
ES1037554 035	31_Oct_2019 00:00	VC08_1.5-1.6		1					
201901004-000	51-001-2019 00.00	v000_1.5-1.0							



			(On Hold) SOIL No analysis requested	SOIL - EA033 Chromium Suite for Acid Sulphate Soils	SOIL - EA038-AVS_SEM Acid Volatile Sulphides (AVS) and Simultaneously	SOIL - EA055-103 Moisture Content
ES1937554-036	31-Oct-2019 00:00	VC13_0.0-0.1	✓			
ES1937554-037	31-Oct-2019 00:00	VC13_0.5-0.6		1		
ES1937554-038	31-Oct-2019 00:00	VC13_1.0-1.1	1			
ES1937554-039	31-Oct-2019 00:00	VC14_0.0-0.1		1		
ES1937554-040	31-Oct-2019 00:00	VC14_0.5-0.6	1			
ES1937554-041	31-Oct-2019 00:00	VC14_1.0-1.1	✓			
ES1937554-042	31-Oct-2019 00:00	VC14_1.3-1.4		1		

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
SARAH ECCLESHALL		
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	sarah.eccleshall@ghd.com
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	sarah.eccleshall@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sarah.eccleshall@ghd.com
- Chain of Custody (CoC) (COC)	Email	sarah.eccleshall@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	sarah.eccleshall@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	sarah.eccleshall@ghd.com
- EDI Format - XTab (XTAB)	Email	sarah.eccleshall@ghd.com
 Electronic SRN for ESdat (ESRN_ESDAT) 	Email	sarah.eccleshall@ghd.com



CERTIFICATE OF ANALYSIS Work Order : ES1937554 Page : 1 of 7 Amendment :1 Client Laboratory GHD PTY LTD : Environmental Division Svdnev Contact : SARAH ECCLESHALL Contact : Customer Services ES Address Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000 Telephone Telephone : +61-2-8784 8555 : -----Project : 12517046 **Date Samples Received** : 12-Nov-2019 17:22 Order number Date Analysis Commenced : 18-Nov-2019 · ____ C-O-C number Issue Date · 10-Dec-2019 11:18 · ____ Sampler · ____ Site · ____ Quote number : SY/522/19 Accreditation No. 825 No. of samples received : 42 Accredited for compliance with ISO/IEC 17025 - Testing No. of samples analysed : 22

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

- Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting
 - ^ = This result is computed from individual analyte detections at or above the level of reporting
 - ø = ALS is not NATA accredited for these tests.
 - ~ = Indicates an estimated value.
- ASS: EA033 (CRS Suite):Retained Acidity not required because pH KCl greater than or equal to 4.5
- Amendment (10/12/2019): This report has been amended to allow the distribution of an reports not previously provided. All analysis results are as per the previous report.
- ASS: EA033 (CRS Suite): Laboratory determinations of ANC needs to be corroborated by effectiveness of the measured ANC in relation to incubation ANC. Unless corroborated, the results of ANC testing should be discounted when determining Net Acidity for comparison with action criteria, or for the determination of the acidity hazard and required liming amounts.
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.

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Work Order	ES1937554 Amendment 1
Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID		VC11_0.0-0.1	VC11_1.0-1.1	VC09_0.9-1.0	VC07_0.0-0.1	VC07_1.0-1.1	
	Cl	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937554-001	ES1937554-003	ES1937554-006	ES1937554-007	ES1937554-009
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
рН КСІ (23А)		0.1	pH Unit	9.2	9.2	8.9	9.2	8.9
Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S	0.195	0.286	0.015	0.107	0.023
acidity - Chromium Reducible Sulfur		10	mole H+ / t	121	178	<10	67	14
(a-22B)								
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)		0.01	% CaCO3	35.1	22.1	0.77	28.0	1.34
acidity - Acid Neutralising Capacity		10	mole H+ / t	7010	4410	153	5590	269
(a-19A2)								
sulfidic - Acid Neutralising Capacity		0.01	% pyrite S	11.2	7.07	0.24	8.96	0.43
(s-19A2)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)		0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)		10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate		1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.19	0.29	<0.02	0.11	0.02
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	121	178	<10	67	14
Liming Rate excluding ANC		1	kg CaCO3/t	9	13	<1	5	1
EA038 / EG005 (ED093): Simultaneously E	Extracted Metal	S						
Copper	7440-50-8	1.0	mg/kg				48.1	
Silver	7440-22-4	1.0	mg/kg				<1.0	
EA038 / EG005(ED093): Acid Volatile Sulp	ohides & Simult	aneously	Extracted Met	als				
Copper	7440-50-8	0.01	mmol/kg				0.76	
Silver	7440-22-4	0.01	mmol/kg				<0.01	

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Work Order	ES1937554 Amendment 1
Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			VC05_0.0-0.1	VC05_0.8-1.0	VC03_10-1.1	VC01_0.0-0.1	VC01_1.0-1.1
	Ci	lient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937554-010	ES1937554-012	ES1937554-015	ES1937554-016	ES1937554-018
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
рН КСІ (23А)		0.1	pH Unit	9.1	7.4	7.0	9.0	9.2
Titratable Actual Acidity (23F)		2	mole H+/t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S	0.020	0.010	0.021	0.161	0.023
acidity - Chromium Reducible Sulfur		10	mole H+ / t	12	<10	13	101	14
(a-22B)								
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)		0.01	% CaCO3	0.98	0.22	0.25	9.53	0.47
acidity - Acid Neutralising Capacity		10	mole H+ / t	196	45	50	1900	93
(a-19A2)								
sulfidic - Acid Neutralising Capacity		0.01	% pyrite S	0.31	0.07	0.08	3.05	0.15
(s-19A2)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)		0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)		10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate		1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.02	<0.02	0.02	0.16	0.02
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	12	<10	13	101	14
Liming Rate excluding ANC		1	kg CaCO3/t	<1	<1	<1	8	1

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Work Order	ES1937554 Amendment 1
Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID		VC02_0.0-0.1	VC02_0.5-0.6	VC02_1.5-1.6	VC10_0.5-0.6	VC04_0.9-1.0	
	Cl	ient sampli	ng date / time	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00	30-Oct-2019 00:00
Compound	CAS Number	LOR	Unit	ES1937554-019	ES1937554-020	ES1937554-022	ES1937554-024	ES1937554-026
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
рН КСІ (23А)		0.1	pH Unit	8.9		8.1	6.7	7.2
Titratable Actual Acidity (23F)		2	mole H+/t	<2		<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02		<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S	0.274		0.022	0.019	0.011
acidity - Chromium Reducible Sulfur		10	mole H+ / t	171		14	12	<10
(a-22B)								
EA033-C: Acid Neutralising Capacity								
Acid Neutralising Capacity (19A2)		0.01	% CaCO3	14.8		0.76	0.35	0.43
acidity - Acid Neutralising Capacity		10	mole H+ / t	2960		151	69	86
(a-19A2)								
sulfidic - Acid Neutralising Capacity		0.01	% pyrite S	4.75		0.24	0.11	0.14
(s-19A2)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5		1.5	1.5	1.5
Net Acidity (sulfur units)		0.02	% S	<0.02		<0.02	<0.02	<0.02
Net Acidity (acidity units)		10	mole H+ / t	<10		<10	<10	<10
Liming Rate		1	kg CaCO3/t	<1		<1	<1	<1
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.27		0.02	<0.02	<0.02
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	171		14	12	<10
Liming Rate excluding ANC		1	kg CaCO3/t	13		1	<1	<1
EA038 / EG005 (ED093): Simultaneously E	Extracted Metals	5						
Copper	7440-50-8	1.0	mg/kg		7.1			
Silver	7440-22-4	1.0	mg/kg		<1.0			
EA038 / EG005(ED093): Acid Volatile Sulp	hides & Simult	aneously	Extracted Met	als				
Copper	7440-50-8	0.01	mmol/kg		0.11			
Silver	7440-22-4	0.01	mmol/kg		<0.01			

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Work Order	ES1937554 Amendment 1
Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID		VC06_0.0-0.1	VC12_0.0-0.1	VC08_0.5-0.6	VC08_1.5-1.6	VC13_0.5-0.6			
	Cl	ient sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00	31-Oct-2019 00:00		
Compound	CAS Number	LOR	Unit	ES1937554-027	ES1937554-029	ES1937554-033	ES1937554-035	ES1937554-037		
				Result	Result	Result	Result	Result		
EA033-A: Actual Acidity										
рН КСІ (23А)		0.1	pH Unit	8.9	9.1	9.2	9.0	9.0		
Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	<2	<2	<2		
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02		
EA033-B: Potential Acidity										
Chromium Reducible Sulfur (22B)		0.005	% S	0.610	0.087	0.295	0.056	0.040		
acidity - Chromium Reducible Sulfur		10	mole H+ / t	381	54	184	35	25		
(a-22B)										
EA033-C: Acid Neutralising Capacity										
Acid Neutralising Capacity (19A2)		0.01	% CaCO3	12.5	16.4	21.2	1.27	1.11		
acidity - Acid Neutralising Capacity		10	mole H+ / t	2500	3280	4230	254	222		
(a-19A2)										
sulfidic - Acid Neutralising Capacity		0.01	% pyrite S	4.00	5.26	6.78	0.41	0.36		
(s-19A2)										
EA033-E: Acid Base Accounting										
ANC Fineness Factor		0.5	-	1.5	1.5	1.5	1.5	1.5		
Net Acidity (sulfur units)		0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02		
Net Acidity (acidity units)		10	mole H+ / t	<10	<10	<10	<10	<10		
Liming Rate		1	kg CaCO3/t	<1	<1	<1	<1	<1		
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.61	0.09	0.29	0.06	0.04		
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	381	54	184	35	25		
Liming Rate excluding ANC		1	kg CaCO3/t	28	4	14	3	2		
EA038 / EG005 (ED093): Simultaneously E	Extracted Metal	S								
Copper	7440-50-8	1.0	mg/kg		31.5					
Silver	7440-22-4	1.0	mg/kg		<1.0					
EA038 / EG005(ED093): Acid Volatile Sulp	hides & Simult	aneously	Extracted Met	als						
Copper	7440-50-8	0.01	mmol/kg		0.50					
Silver	7440-22-4	0.01	mmol/kg		<0.01					

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Work Order	ES1937554 Amendment 1
Client	: GHD PTY LTD
Project	12517046



Sub-Matrix: SOIL (Matrix: SOIL)	Sub-Matrix: SOIL Client sample ID (Matrix: SOIL)		VC14_0.0-0.1	VC14_1.3-1.4							
	C	lient sampli	ng date / time	31-Oct-2019 00:00	31-Oct-2019 00:00						
Compound	CAS Number	LOR	Unit	ES1937554-039	ES1937554-042						
				Result	Result						
EA033-A: Actual Acidity											
рН КСІ (23А)		0.1	pH Unit	9.1	8.9						
Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2						
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02						
EA033-B: Potential Acidity	EA033-B: Potential Acidity										
Chromium Reducible Sulfur (22B)		0.005	% S	0.358	0.030						
acidity - Chromium Reducible Sulfur		10	mole H+ / t	224	18						
(a-22B)											
EA033-C: Acid Neutralising Capacity											
Acid Neutralising Capacity (19A2)		0.01	% CaCO3	48.0	1.65						
acidity - Acid Neutralising Capacity		10	mole H+ / t	9590	330						
(a-19A2)											
sulfidic - Acid Neutralising Capacity		0.01	% pyrite S	15.4	0.53						
(s-19A2)											
EA033-E: Acid Base Accounting											
ANC Fineness Factor		0.5	-	1.5	1.5						
Net Acidity (sulfur units)		0.02	% S	<0.02	<0.02						
Net Acidity (acidity units)		10	mole H+ / t	<10	<10						
Liming Rate		1	kg CaCO3/t	<1	<1						
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.36	0.03						
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	224	18						
Liming Rate excluding ANC		1	kg CaCO3/t	17	1						



QUALITY CONTROL REPORT · ES1937554 Work Order Page : 1 of 6 :1 Amendment GHD PTY LTD Laboratory : Environmental Division Sydney Contact : SARAH ECCLESHALL Contact : Customer Services ES Address Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000 Telephone Telephone : -----: +61-2-8784 8555 Date Samples Received : 12517046 : 12-Nov-2019 Order number Date Analysis Commenced : 18-Nov-2019 · ____ Issue Date · 10-Dec-2019 C-O-C number Sampler · ____ · ____ Quote number : SY/522/19

Accreditation No. 825

Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

: 42

: 22

Signatories

No. of samples received

No. of samples analysed

Client

Project

Site

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

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Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key: Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA038 / EG005 (ED0	93): Simultaneously Ex	tracted Metals (QC Lot: 2719143)							
ES1937554-007	VC07_0.0-0.1	EG005-SEM_1: Copper	7440-50-8	1	mg/kg	48.1	48.2	0.00	0% - 20%
		EG005-SEM_1: Silver	7440-22-4	1	mg/kg	<1.0	<1.0	0.00	No Limit
EA033-A: Actual Act	dity (QC Lot: 2705451)								
EB1929789-042	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.00	No Limit
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	8.7	8.7	0.00	0% - 20%
ES1937554-007 VC07_0.0-0.1	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.00	No Limit	
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	9.2	9.2	0.00	0% - 20%
EA033-A: Actual Act	dity (QC Lot: 2705452)								
ES1937554-027	VC06_0.0-0.1	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.00	No Limit
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	8.9	8.9	0.00	0% - 20%
EA033-A: Actual Aci	dity (QC Lot: 2714262)								
EB1929954-001	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.00	No Limit
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	8.6	8.6	0.00	0% - 20%
EB1930803-002	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.00	No Limit
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	8.7	8.7	0.00	0% - 20%
EA033-A: Actual Act	dity (QC Lot: 2716904)								
EB1931066-001	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.00	No Limit
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	8.4	8.4	0.00	0% - 20%



Sub-Matrix: SOIL]			Laboratory I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA033-A: Actual Acid	lity (QC Lot: 2716904)	- continued							
EM1919394-001	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.00	No Limit
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	10.5	10.5	0.00	0% - 20%
EA033-B: Potential A	cidity (QC Lot: 270545	1)							
EB1929789-042	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.689	0.705	2.27	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	430	440	2.27	0% - 20%
		(a-22B)							
ES1937554-007	VC07_0.0-0.1	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.107	0.104	2.51	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	67	65	2.51	No Limit
		(a-22B)							
EA033-B: Potential A	cidity (QC Lot: 270545	2)							
ES1937554-027	VC06_0.0-0.1	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.610	0.617	1.05	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	381	385	1.05	0% - 20%
		(a-22B)							
EA033-B: Potential A	cidity (QC Lot: 271426	2)							
EB1929954-001	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.969	0.938	3.22	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	604	585	3.22	0% - 20%
		(a-22B)							
EB1930803-002	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.021	0.020	7.60	No Limit
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	13	12	0.00	No Limit
		(a-22B)							
EA033-B: Potential A	cidity (QC Lot: 271690	4)							
EB1931066-001	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.833	0.834	0.00	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	520	520	0.00	0% - 20%
		(a-22B)							
EM1919394-001	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.125	0.124	0.00	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	78	78	0.00	No Limit
		(a-22B)							
EA033-C: Acid Neutra	alising Capacity (QC L	ot: 2705451)							
EB1929789-042	Anonymous	EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	9.30	9.28	0.268	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity		0.01	% pyrite S	2.98	2.97	0.00	0% - 20%
		(s-19A2)		40		4000	4050	0.000	00/ 000/
		EA033: acidity - Acid Neutralising Capacity		10	mole H+ / t	1860	1850	0.268	0% - 20%
ES1037554 007		(a-19A2)		0.01	% CaCO3	28.0	27.0	0.162	0% 20%
E31937354-007	VC07_0.0-0.1	EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCOS	20.0	27.9 8.05	0.102	0% - 20%
		(c-1002)		0.01	70 pyrite S	0.30	0.95	0.102	0 /0 - 20 /0
		(σ ⁻ ισκ2) ΕΔ033: acidity - Acid Neutralising Canacity		10	mole H+/t	5590	5580	0 162	0% - 20%
		(a-19A2)		10		0000		0.102	0,0 20,0
EA033-C: Acid Neutr	alising Capacity (QC L	ot: 2705452)			1		1		1



Sub Matrix: SOII]			Laboratory	Duplicate (DUP) Report	•	
Laboratory sample ID	Client sample ID	Mothod: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA033-C: Acid Neut	ralising Capacity (QC	Lot: 2705452) - continued							
ES1937554-027	VC06_0.0-0.1	EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	12.5	12.5	0.282	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)		0.01	% pyrite S	4.00	4.01	0.282	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)		10	mole H+ / t	2500	2500	0.282	0% - 20%
EA033-C: Acid Neut	ralising Capacity (QC	Lot: 2714262)							
EB1929954-001	Anonymous	EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	6.77	6.66	1.63	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)		0.01	% pyrite S	2.17	2.13	1.63	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)		10	mole H+ / t	1350	1330	1.63	0% - 20%
EB1930803-002	Anonymous	EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	8.09	7.98	1.36	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)		0.01	% pyrite S	2.59	2.56	1.36	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)		10	mole H+ / t	1620	1600	1.36	0% - 20%
EA033-C: Acid Neut	ralising Capacity (QC	Lot: 2716904)							
EB1931066-001	Anonymous	EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	4.45	4.42	0.586	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)		0.01	% pyrite S	1.42	1.42	0.00	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)		10	mole H+ / t	889	884	0.586	0% - 20%
EM1919394-001	Anonymous	EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	2.76	2.75	0.377	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)		0.01	% pyrite S	0.88	0.88	0.00	0% - 20%
		EA033: acidity - Acid Neutralising Capacity		10	mole H+ / t	552	550	0.377	0% - 20%



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

				Method Blank (MB)	Laboratory Control Spike (LCS) Report					
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High		
EA038 / EG005 (ED093): Simultaneously Extracted Metal	s (QCLot: 271914	.3)								
EG005-SEM_1: Copper	7440-50-8	1	mg/kg	<1.0	14.507 mg/kg	82.3	70.0	130		
EG005-SEM_1: Silver	7440-22-4	1	mg/kg	<1.0	2.1 mg/kg	88.6	70.0	130		
EA033-A: Actual Acidity (QCLot: 2705451)										
EA033: pH KCI (23A)			pH Unit		4.4 pH Unit	102	91.0	107		
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	20.1 mole H+ / t	122	70.0	124		
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02						
EA033-A: Actual Acidity (QCLot: 2705452)										
EA033: pH KCI (23A)			pH Unit		4.4 pH Unit	102	91.0	107		
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	20.1 mole H+ / t	118	70.0	124		
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02						
EA033-A: Actual Acidity (QCLot: 2714262)	EA033-A: Actual Acidity (QCLot: 2714262)									
EA033: pH KCI (23A)			pH Unit		4.4 pH Unit	97.7	91.0	107		
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	20.1 mole H+ / t	106	70.0	124		
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02						
EA033-A: Actual Acidity (QCLot: 2716904)										
EA033: pH KCl (23A)			pH Unit		4.4 pH Unit	100	91.0	107		
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	20.1 mole H+ / t	89.2	70.0	124		
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02						
EA033-B: Potential Acidity (QCLot: 2705451)										
EA033: Chromium Reducible Sulfur (22B)		0.005	% S	<0.005	0.256 % S	90.9	77.0	121		
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10						
EA033-B: Potential Acidity (QCLot: 2705452)										
EA033: Chromium Reducible Sulfur (22B)		0.005	% S	<0.005	0.256 % S	88.0	77.0	121		
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10						
EA033-B: Potential Acidity (QCLot: 2714262)										
EA033: Chromium Reducible Sulfur (22B)		0.005	% S	<0.005	0.256 % S	92.0	77.0	121		
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10						
EA033-B: Potential Acidity (QCLot: 2716904)										
EA033: Chromium Reducible Sulfur (22B)		0.005	% S	<0.005	0.256 % S	92.6	77.0	121		
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10						
EA033-C: Acid Neutralising Capacity (QCLot: 2705451)										
EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	<0.01	10 % CaCO3	101	91.0	112		
EA033: acidity - Acid Neutralising Capacity (a-19A2)		10	mole H+ / t	<10						



Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EA033-C: Acid Neutralising Capacity (QCLot: 2705451)	- continued								
EA033: sulfidic - Acid Neutralising Capacity (s-19A2)		0.01	% pyrite S	<0.01					
EA033-C: Acid Neutralising Capacity (QCLot: 2705452)									
EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	<0.01	10 % CaCO3	99.8	91.0	112	
EA033: acidity - Acid Neutralising Capacity (a-19A2)		10	mole H+ / t	<10					
EA033: sulfidic - Acid Neutralising Capacity (s-19A2)		0.01	% pyrite S	<0.01					
EA033-C: Acid Neutralising Capacity (QCLot: 2714262)									
EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	<0.01	10 % CaCO3	100	91.0	112	
EA033: acidity - Acid Neutralising Capacity (a-19A2)		10	mole H+ / t	<10					
EA033: sulfidic - Acid Neutralising Capacity (s-19A2)		0.01	% pyrite S	<0.01					
EA033-C: Acid Neutralising Capacity (QCLot: 2716904)									
EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	<0.01	10 % CaCO3	100	91.0	112	
EA033: acidity - Acid Neutralising Capacity (a-19A2)		10	mole H+ / t	<10					
EA033: sulfidic - Acid Neutralising Capacity (s-19A2)		0.01	% pyrite S	<0.01					

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

• No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



	QA/QC Complianc	QA/QC Compliance Assessment to assist with Quality Review							
Work Order	: ES1937554	Page	: 1 of 6						
Amendment	: 1								
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney						
Contact	: SARAH ECCLESHALL	Telephone	: +61-2-8784 8555						
Project	: 12517046	Date Samples Received	: 12-Nov-2019						
Site	:	Issue Date	: 10-Dec-2019						
Sampler	:	No. of samples received	: 42						
Order number	:	No. of samples analysed	: 22						

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- <u>NO</u> Method Blank value outliers occur.
- <u>NO</u> Duplicate outliers occur.
- <u>NO</u> Laboratory Control outliers occur.
- <u>NO</u> Matrix Spike outliers occur.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

• <u>NO</u> Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

• NO Quality Control Sample Frequency Outliers exist.



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for <u>VOC in soils</u> vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive <u>or</u> Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: SOIL			Evaluation: * = Holding time breach ; * = Within holding							
Method		Sample Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation		
EA033-A: Actual Acidity										
Snap Lock Bag - frozen (EA033)										
VC11_0.0-0.1,	VC11_1.0-1.1,	30-Oct-2019	18-Nov-2019	29-Oct-2020	✓	18-Nov-2019	16-Feb-2020	✓		
VC09_0.9-1.0,	VC07_0.0-0.1,									
VC07_1.0-1.1,	VC05_0.0-0.1,									
VC05_0.8-1.0,	VC03_10-1.1,									
VC01_0.0-0.1,	VC01_1.0-1.1,									
VC02_0.0-0.1,	VC02_1.5-1.6,									
VC10_0.5-0.6										
Snap Lock Bag - frozen (EA033)										
VC04_0.9-1.0		30-Oct-2019	21-Nov-2019	29-Oct-2020	✓	21-Nov-2019	19-Feb-2020	✓		
Snap Lock Bag - frozen (EA033)										
VC06_0.0-0.1,	VC08_0.5-0.6,	31-Oct-2019	18-Nov-2019	30-Oct-2020	1	18-Nov-2019	16-Feb-2020	✓		
VC08_1.5-1.6,	VC13_0.5-0.6,									
VC14_0.0-0.1,	VC14_1.3-1.4									
Snap Lock Bag - frozen (EA033)										
VC12_0.0-0.1		31-Oct-2019	22-Nov-2019	30-Oct-2020	1	22-Nov-2019	20-Feb-2020	 ✓ 		

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Work Order	: ES1937554 Amendment 1
Client	: GHD PTY LTD
Project	12517046



Matrix: SOIL				: × = Holding time	= Holding time breach ; \checkmark = Within holding time			
Method		Sample Date	Ex	traction / Preparation		Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-B: Potential Acidity								
Snap Lock Bag - frozen (EA033)								
VC11_0.0-0.1,	VC11_1.0-1.1,	30-Oct-2019	18-Nov-2019	29-Oct-2020	~	18-Nov-2019	16-Feb-2020	✓
VC09_0.9-1.0,	VC07_0.0-0.1,							
VC07_1.0-1.1,	VC05_0.0-0.1,							
VC05_0.8-1.0,	VC03_10-1.1,							
VC01_0.0-0.1,	VC01_1.0-1.1,							
VC02_0.0-0.1,	VC02_1.5-1.6,							
VC10_0.5-0.6								
Snap Lock Bag - frozen (EA033)								
VC04_0.9-1.0		30-Oct-2019	21-Nov-2019	29-Oct-2020	1	21-Nov-2019	19-Feb-2020	 ✓
Snap Lock Bag - frozen (EA033)								
VC06_0.0-0.1,	VC08_0.5-0.6,	31-Oct-2019	18-Nov-2019	30-Oct-2020	1	18-Nov-2019	16-Feb-2020	 ✓
VC08_1.5-1.6,	VC13_0.5-0.6,							
VC14_0.0-0.1,	VC14_1.3-1.4							
Snap Lock Bag - frozen (EA033)								
VC12_0.0-0.1		31-Oct-2019	22-Nov-2019	30-Oct-2020	✓	22-Nov-2019	20-Feb-2020	✓
EA033-C: Acid Neutralising Capacity								
Snap Lock Bag - frozen (EA033)								
VC11_0.0-0.1,	VC11_1.0-1.1,	30-Oct-2019	18-Nov-2019	29-Oct-2020	1	18-Nov-2019	16-Feb-2020	 ✓
VC09_0.9-1.0,	VC07_0.0-0.1,							
VC07_1.0-1.1,	VC05_0.0-0.1,							
VC05_0.8-1.0,	VC03_10-1.1,							
VC01_0.0-0.1,	VC01_1.0-1.1,							
VC02_0.0-0.1,	VC02_1.5-1.6,							
VC10_0.5-0.6								
Snap Lock Bag - frozen (EA033)								
VC04_0.9-1.0		30-Oct-2019	21-Nov-2019	29-Oct-2020	✓	21-Nov-2019	19-Feb-2020	✓
Snap Lock Bag - frozen (EA033)								
VC06_0.0-0.1,	VC08_0.5-0.6,	31-Oct-2019	18-Nov-2019	30-Oct-2020	~	18-Nov-2019	16-Feb-2020	✓
VC08_1.5-1.6,	VC13_0.5-0.6,							
VC14_0.0-0.1,	VC14_1.3-1.4							
Snap Lock Bag - frozen (EA033)								
VC12_0.0-0.1		31-Oct-2019	22-Nov-2019	30-Oct-2020	\checkmark	22-Nov-2019	20-Feb-2020	 ✓



Matrix: SOIL			Evaluation: × = Holding time							
Method	Sample Date	Ex	traction / Preparation		Analysis					
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation		
EA033-D: Retained Acidity										
Snap Lock Bag - frozen (EA033)										
VC11_0.0-0.1,	VC11_1.0-1.1,	30-Oct-2019	18-Nov-2019	29-Oct-2020	1	18-Nov-2019	16-Feb-2020	✓		
VC09_0.9-1.0,	VC07_0.0-0.1,									
VC07_1.0-1.1,	VC05_0.0-0.1,									
VC05_0.8-1.0,	VC03_10-1.1,									
VC01_0.0-0.1,	VC01_1.0-1.1,									
VC02_0.0-0.1,	VC02_1.5-1.6,									
VC10_0.5-0.6										
Snap Lock Bag - frozen (EA033) VC04_0.9-1.0		30-Oct-2019	21-Nov-2019	29-Oct-2020	~	21-Nov-2019	19-Feb-2020	1		
Snap Lock Bag - frozen (EA033)										
VC06_0.0-0.1,	VC08_0.5-0.6,	31-Oct-2019	18-Nov-2019	30-Oct-2020	1	18-Nov-2019	16-Feb-2020	✓		
VC08_1.5-1.6,	VC13_0.5-0.6,									
VC14_0.0-0.1,	VC14_1.3-1.4									
Snap Lock Bag - frozen (EA033)										
VC12_0.0-0.1		31-Oct-2019	22-Nov-2019	30-Oct-2020	✓	22-Nov-2019	20-Feb-2020	 ✓ 		
EA033-E: Acid Base Accounting										
Snap Lock Bag - frozen (EA033)										
VC11_0.0-0.1,	VC11_1.0-1.1,	30-Oct-2019	18-Nov-2019	29-Oct-2020	1	18-Nov-2019	16-Feb-2020	✓		
VC09_0.9-1.0,	VC07_0.0-0.1,									
VC07_1.0-1.1,	VC05_0.0-0.1,									
VC05_0.8-1.0,	VC03_10-1.1,									
VC01_0.0-0.1,	VC01_1.0-1.1,									
VC02_0.0-0.1,	VC02_1.5-1.6,									
VC10_0.5-0.6										
Snap Lock Bag - frozen (EA033)										
VC04_0.9-1.0		30-Oct-2019	21-Nov-2019	29-Oct-2020	√	21-Nov-2019	19-Feb-2020	✓		
Snap Lock Bag - frozen (EA033)										
VC06_0.0-0.1,	VC08_0.5-0.6,	31-Oct-2019	18-Nov-2019	30-Oct-2020	~	18-Nov-2019	16-Feb-2020	✓		
VC08_1.5-1.6,	VC13_0.5-0.6,									
VC14_0.0-0.1,	VC14_1.3-1.4									
Snap Lock Bag - frozen (EA033) VC12_0.0-0.1		31-Oct-2019	22-Nov-2019	30-Oct-2020	1	22-Nov-2019	20-Feb-2020	~		
EA038 / EG005 (ED093): Simultaneously Extrac	cted Metals									
Snap Lock Bag - frozen (EG005-SEM_1)										
VC07_0.0-0.1,	VC02_0.5-0.6	30-Oct-2019	22-Nov-2019	29-Oct-2020	-	22-Nov-2019	20-Feb-2020	✓		
Snap Lock Bag - frozen (EG005-SEM_1) VC12 0.0-0.1		31-Oct-2019	22-Nov-2019	30-Oct-2020	1	22-Nov-2019	20-Feb-2020	1		



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: SOIL			Evaluation: * = Quality Control frequency not within specification ; 🗸 = Quality Control frequency within specification				
Quality Control Sample Type		Co	ount	Rate (%)			Quality Control Specification
Analytical Methods	Method	00	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
1M HCI Extractable Metals	EG005-SEM_1	1	3	33.33	10.00	\checkmark	NEPM 2013 B3 & ALS QC Standard
Chromium Suite for Acid Sulphate Soils	EA033	7	66	10.61	10.00	\checkmark	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
1M HCI Extractable Metals	EG005-SEM_1	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chromium Suite for Acid Sulphate Soils	EA033	4	66	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
1M HCI Extractable Metals	EG005-SEM_1	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chromium Suite for Acid Sulphate Soils	EA033	4	66	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCI; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
1M HCI Extractable Metals	EG005-SEM 1	SOIL	In house: Referenced to Simpson et al. 2005; Handbook for Sediment Quality Assessment. AVS is defined as the fraction of sulfides extracted from sediments by cold digestion using HCI. The remaining solution is then run on the ICP to determine concentration of various metals and SEM is calculated as sum of Cd, Cu, Ni, Pb, Zn in mmol/kg.
Simultaneously Extractable Metals (SEM)	EG005-SEM 2	SOIL	In house: Referenced to Simpson et al. 2005; Handbook for Sediment Quality Assessment. AVS is defined as the fraction of sulfides extracted from sediments by cold digestion using HCI. The remaining solution is then run on the ICP to determine concentration of various metals and SEM is calculated as sum of Cd, Cu, Ni, Pb, Zn in mmol/kg.
Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
1M HCI Extraction for Metals in Sediments (1 hour)	EN71-SEM	SOIL	In house: Referenced to Simpson et al. 2005; Handbook for Sediment Quality Assessment. 2g of as received sample is leached at room temperature for 1 hour in 1N hydrochloric acid.



Vishal Patel

From:	Angus Harding
Sent:	Friday, 15 November 2019 4:12 PM
To:	Vishal Patel
Cc:	Loren Schiavon; Helen Simpson
Subject:	FW: [EXTERNAL] - Additional analyses for project 12517046

Hey Vishal,

Could we please organise the compositing of the samples listed below so that we have enough volume to run porewater and elutriates. I believe samples should be in ES1937483.

Let me know if you need help or more details.

Cheers.

Kind Regards,

Angus Harding

Client Services Officer, Environmental Sydney



T +61 2 8784 8555 <u>F</u> +61 2 8784 8500 <u>D</u> +61 2 8784 8503 <u>angus.harding@alsglobal.com</u> 277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA

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From: Sarah.Eccleshall@ghd.com [mailto:Sarah.Eccleshall@ghd.com] Sent: Friday, 15 November 2019 9:43 AM To: Angus Harding <angus.harding@ALSGlobal.com>; Brenda Hong <Brenda.Hong@alsglobal.com> Cc: Carmen Yi <Carmen.Yi@ghd.com>; Helen Simpson <helen.simpson@alsglobal.com> Subject: RE: [EXTERNAL] - Additional analyses for project 12517046

Hi,

Thanks for the extra info.

After our chat on the phone Angus and having reviewed our sample requirements and what we have left in terms of material we have come up with the following plan. The plan would be to take what remaining samples which fall within the same depth intervals as the homogenised samples we have and create composite samples for <u>opficwater</u> testing. This would comprise any remaining material the 0.0-0.5 depth intervals already requested plus the additional samples for each core (i.e. VC02. VC07, VC12) as in the table below.

Samples analysed using SEM/AVS should not be homogenised according to the NAGD, so can the material for these please be extracted from FD03, VC120.3-0.4 and VC02_0.0-0.2 prior to homogenisation.

1) Prioritise elutriate for the samples requested for PAH, PCB and copper, mercury and silver, using scaled down elutriation process

2) Porewater for PAH, PCB and copper, mercury and silver

Sample		Samples which can be combined		_				
VC07_0.0-0.5	417	FD03, VC07_0.2-0.4, VC07_0.0- 0.2	#6,13	ESI93	16023 #	82	5- 685 -	-697
VC12_0.0-0.5	#zg	VC12_0.0-0.1, VC12_0.3-0.4 VC12_0.5-0.6	++62,63	,64	5.954	-361		
VC02_0.0-0.5	# 53	VC02_0.0-0.2; VC02_0.5-0.6	#38,33					

I hope this makes sense, please give me a call if anything needs clarifying.

Thanks for all your help with this.

Sarah Eccleshall PhD MSc BSc Hons Graduate Environmental Scientist Contamination & Environmental Management

GHD Proudly employee owned T: 161 2 9239 7715 | M: +61 459 546 332 | E: <u>sarah.eccleshall@ghd.com</u> Level 15 133 Castlereagh Street Sydney NSW 2000 Australia | www.ghd.com

Connect

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

Please consider our environment before printing this email

From: Angus Harding <<u>angus.harding@ALSGlobai.com</u>> Sent: Thursday, 14 November 2019 4:30 PM



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: ES1938004		
Client Contact Address	E GHD PTY LTD E SARAH ECCLESHALL E LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Laboratory Contact Address	 Environmental Division Sydney Customer Services ES 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail Telephone Facsimile	: sarah.eccleshall@ghd.com : :	E-mail Telephone Facsimile	: ALSEnviro.Sydney@ALSGlobal.com : +61-2-8784 8555 : +61-2-8784 8500
Project Order number C-O-C number Site Sampler	: 12517046 : : :	Page Quote number QC Level	: 1 of 3 : ES2019GHDSER0030 (SY/522/19) : NEPM 2013 B3 & ALS QC Standard
Dates Date Samples Receiv Client Requested Due Date	red : 15-Nov-2019 16:15 e : 26-Nov-2019	Issue Date Scheduled Reporting	: 18-Nov-2019 Date : 26-Nov-2019
Delivery Detail	/s : Samples On Hand	Security Seal	: Not Available

No. of samples received / analysed

: 15/7

General Comments

Receipt Detail

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Rebatch of ES1937483 and ES1936029.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

ES1938004-004	: [30-Oct-2019]	: VC07_0.0-0.5 - ELUTRIATE
ES1938004-008	:[31-Oct-2019]	: VC12_0.0-0.5 - ELUTRIATE
ES1938004-011	: [30-Oct-2019]	: VC02_0.0-0.5 - ELUTRIATE
ES1938004-012	: [30-Oct-2019]	: SALTWATER - ELUTRIATE
ES1938004-013	: [30-Oct-2019]	: VC07_0.0-0.5 - PORE WATER
ES1938004-014	:[31-Oct-2019]	: VC12_0.0-0.5 - PORE WATER
ES1938004-015	:[30-Oct-2019]	: VC02_0.0-0.5 - PORE WATER

Summary of Sample(s) and Requested Analysis

Some items des process necessa tasks. Packages as the determine tasks, that are inclu lf no sampling default 00:00 on is provided, the laboratory and component Matrix: SOIL	cribed below may ry for the executi may contain ad ation of moisture uded in the package. time is provided, the date of samplin sampling date wi displayed in bra	be part of a laboratory on of client requested ditional analyses, such content and preparation the sampling time will g. If no sampling date II be assumed by the ckets without a time <i>Client sample ID</i>	DIL - EG035T-LL btal Mercury - Low Level	DIL - EG093-T otal Metals by ORC - Ultra Trace in Saline	DIL - EN020 ample Compositing	DIL - EN68-2/3 eparation of Elutriates for 2-3 analysis	DIL - EN82 Drewater Extraction	DIL - EP131B tra Trace PCB's	JIL - EP132B(PAH) tra Trace Polynuctear Aromatic Compounds
ID ES1938004-001	30-Oct-2019 00:00	ED03	o ⊢	o ⊢	ഗഗ	ഗപ	ഗ്	ທ ⊃	v ⊃
ES1938004-002	30-Oct-2019 00:00	VC07_02-04							
ES1038004-002	30-Oct-2019 00:00	VC07_0.0_0.2			•				
ES1938004-003	30 Oct 2019 00:00			1	•			1	1
E31930004-004		VO07_0.0-0.3 ELUTRI	v	v		v		¥	v
ES1938004-005	31-Oct-2019 00:00	VC12_0.0-0.1			√				
ES1938004-006	31-Oct-2019 00:00	VC12_0.3-0.4			✓				
ES1938004-007	31-Oct-2019 00:00	VC12_0.5-0.6			✓				
ES1938004-008	31-Oct-2019 00:00	VC12_0.0-0.5 ELUTRI	✓	✓		✓		✓	✓
ES1938004-009	30-Oct-2019 00:00	VC02_0.0-0.2			✓				
ES1938004-010	30-Oct-2019 00:00	VC02_0.5-0.6			1				
ES1938004-011	30-Oct-2019 00:00	VC02_0.0-0.5 ELUTRI	✓	✓		✓		✓	✓
ES1938004-012	30-Oct-2019 00:00	SALTWATER ELUTRIATE	✓	✓		✓		✓	✓
ES1938004-013	30-Oct-2019 00:00	VC07_0.0-0.5 PORE W	✓	✓			✓	✓	✓
ES1938004-014	31-Oct-2019 00:00	VC12_0.0-0.5 PORE W	✓	✓			✓	✓	✓
ES1938004-015	30-Oct-2019 00:00	VC02_0.0-0.5 PORE W	✓	1			1	1	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

....

Matrix: SOIL				Evaluation: × = Ho	olding time bre	ach ; ✓ = Withiı	n holding time.
Method		Due for	Due for	Samples R	eceived	Instructions	Received
Client Sample ID(s)	Container	extraction	analysis	Date	Evaluation	Date	Evaluation
EN68a: Seawater El	utriate Testing Procedure						
SALTWATER	Non-Volatile Leach: 14 day HT(¢	13-Nov-2019		15-Nov-2019	×		
VC02_0.0-0.5	Non-Volatile Leach: 14 day HT(¢	13-Nov-2019		15-Nov-2019	*		
VC07_0.0-0.5	Non-Volatile Leach: 14 day HT(ϵ	13-Nov-2019		15-Nov-2019	*		
VC12_0.0-0.5	Non-Volatile Leach: 14 day HT(¢	14-Nov-2019		15-Nov-2019	×		
EN82: Porewater Ex	traction		-	-			-
VC02_0.0-0.5	Non-Volatile Leach: 14 day HT(¢	13-Nov-2019		15-Nov-2019	×		
VC07_0.0-0.5	Non-Volatile Leach: 14 day HT(e	13-Nov-2019		15-Nov-2019	×		

Issue Date Page Work Order Client	: 18-Nov-2019 : 3 of 3 : ES1938004 Amendment 0 : GHD PTY LTD					
VC12_0.0-0.5	Non-Volatile Leach: 14 day HT(14-Nov-2019		15-Nov-2019	*		
Requested	Deliverables					
Accounts Paya _ A4 - AU Tax GHD LAB REPO	ble Australia < Invoice (INV) ORTS		Email a	accountspa	ayableAU@ghd.c	om
- A4 - AU Tax	(Invoice (INV)		Email g	ghdlabrepc	orts@ghd.com	
SARAH ECCLE	SHALL					
 *AU Interpret 	etive QC Report - DEFAULT (Anon QCI Rep) (C	QCI)	Email s	sarah.eccle	eshall@ghd.com	
- *AU QC Re	port - DEFAULT (Anon QC Rep) - NATA (QC)		Email s	sarah.eccle	eshall@ghd.com	
- A4 - AU Sar	mple Receipt Notification - Environmental HT (S	RN)	Email s	sarah.eccle	eshall@ghd.com	
- AU Certifica	te of Analysis - NATA (With Guidelines) (COA_	GL)	Email s	arah.eccle	eshall@ghd.com	
- Chain of Cu	stody (CoC) (COC)		Email s	arah.eccle	eshall@ghd.com	
- EDI Format	- ENMRG (ENMRG)		Email s	arah.eccle	eshall@ghd.com	
- EDI Format	- ESDAT (ESDAT)		Email s	arah.eccle	eshall@ghd.com	
- EDI Format	- XTab (XTAB)		Email s	arah.eccle	eshall@ghd.com	

Email

sarah.eccleshall@ghd.com

- Electronic SRN for ESdat (ESRN_ESDAT)



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: ES1938004			
Client Contact Address	: GHD PTY LTD : SARAH ECCLESHALL : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Laboratory Contact Address	: Enviro : Custor : 277-28 NSW /	onmental Division Sydney mer Services ES 89 Woodpark Road Smithfield Australia 2164
E-mail Telephone Facsimile	: sarah.eccleshall@ghd.com : :	E-mail Telephone Facsimile	: ALSEr : +61-2- : +61-2-	nviro.Sydney@ALSGlobal.com -8784 8555 -8784 8500
Project Order number C-O-C number Site Sampler	: 12517046 : : :	Page Quote number QC Level	: 1 of 3 : ES201 : NEPM	19GHDSER0030 (SY/522/19) I 2013 B3 & ALS QC Standard
Dates Date Samples Receive Client Requested Due Date	ed : 15-Nov-2019 16:15 : 26-Nov-2019	Issue Date Scheduled Reportir	ng Date	: 25-Nov-2019 : 26-Nov-2019
Delivery Details Mode of Delivery No. of coolers/boxes	S : Samples On Hand :	Security Seal Temperature		: Not Available : 4.1'C

No. of samples received / analysed : 15 / 7

General Comments

Receipt Detail

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Rebatch of ES1937483 and ES1936029.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

ES1938004-004	:[30-Oct-2019]	: VC07_0.0-0.5 - ELUTRIATE
ES1938004-008	:[31-Oct-2019]	: VC12_0.0-0.5 - ELUTRIATE
ES1938004-011	:[30-Oct-2019]	: VC02_0.0-0.5 - ELUTRIATE
ES1938004-012	:[30-Oct-2019]	: SALTWATER - ELUTRIATE
ES1938004-013	:[30-Oct-2019]	: VC07_0.0-0.5 - PORE WATER
ES1938004-014	:[31-Oct-2019]	: VC12_0.0-0.5 - PORE WATER
ES1938004-015	:[30-Oct-2019]	: VC02_0.0-0.5 - PORE WATER

Summary of Sample(s) and Requested Analysis

Some items des process necessa tasks. Packages as the determin tasks, that are incl lf no sampling default 00:00 on is provided, the laboratory and component Matrix: SOIL Laboratory sample ID	cribed below may ry for the executi may contain ad ation of moisture uded in the package. time is provided, the date of samplin sampling date wi displayed in bra	be part of a laboratory on of client requested ditional analyses, such content and preparation the sampling time will g. If no sampling date Il be assumed by the ckets without a time <i>Client sample ID</i>	SOIL - EG035T-LL Total Mercury - Low Level	SOIL - EG093-T Total Metals by ORC - Ultra Trace in Saline	SOIL - EN020 Sample Compositing	SOIL - EN68-2/3 Preparation of Elutriates for 2-3 analysis	SOIL - EN82 Porewater Extraction	SOIL - EP131B Ultra Trace PCB's	SOIL - EP132-LL Super Ultra Trace PAH
ES1938004-001	30-Oct-2019 00:00	FD03			✓				
ES1938004-002	30-Oct-2019 00:00	VC07_0.2-0.4			✓				
ES1938004-003	30-Oct-2019 00:00	VC07_0.0-0.2			✓				
ES1938004-004	30-Oct-2019 00:00	VC07_0.0-0.5 ELUTRI	✓	✓		✓		✓	✓
ES1938004-005	31-Oct-2019 00:00	VC12_0.0-0.1			✓				
ES1938004-006	31-Oct-2019 00:00	VC12_0.3-0.4			✓				
ES1938004-007	31-Oct-2019 00:00	VC12_0.5-0.6			✓				
ES1938004-008	31-Oct-2019 00:00	VC12_0.0-0.5 ELUTRI	✓	✓		✓		✓	✓
ES1938004-009	30-Oct-2019 00:00	VC02_0.0-0.2			✓				
ES1938004-010	30-Oct-2019 00:00	VC02_0.5-0.6			✓				
ES1938004-011	30-Oct-2019 00:00	VC02_0.0-0.5 ELUTRI	✓	✓		✓		✓	✓
ES1938004-012	30-Oct-2019 00:00	SALTWATER ELUTRIATE	✓	✓		✓		✓	✓
ES1938004-013	30-Oct-2019 00:00	VC07_0.0-0.5 PORE W	✓	✓			✓	✓	✓
ES1938004-014	31-Oct-2019 00:00	VC12_0.0-0.5 PORE W	✓	✓			✓	✓	✓
ES1938004-015	30-Oct-2019 00:00	VC02_0.0-0.5 PORE W	✓	✓			✓	1	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

....

Matrix: SOIL				Evaluation: × = Ho	olding time bre	ach ; ✓ = Withir	n holding time.
Method		Due for	Due for	Samples R	eceived	Instructions Received	
Client Sample ID(s)	Container	extraction	analysis	Date	Evaluation	Date	Evaluation
EN68a: Seawater El	utriate Testing Procedure						
SALTWATER	Non-Volatile Leach: 14 day HT(¢	13-Nov-2019		15-Nov-2019	×		
VC02_0.0-0.5	Non-Volatile Leach: 14 day HT(¢	13-Nov-2019		15-Nov-2019	*		
VC07_0.0-0.5	Non-Volatile Leach: 14 day HT(ϵ	13-Nov-2019		15-Nov-2019	*		
VC12_0.0-0.5	Non-Volatile Leach: 14 day HT(¢	14-Nov-2019		15-Nov-2019	×		
EN82: Porewater Ex	traction		-	-			-
VC02_0.0-0.5	Non-Volatile Leach: 14 day HT(¢	13-Nov-2019		15-Nov-2019	×		
VC07_0.0-0.5	Non-Volatile Leach: 14 day HT(e	13-Nov-2019		15-Nov-2019	×		

Issue Date Page Work Order Client	25-Nov-2019 3 of 3 ES1938004 Amendment 0 GHD PTY LTD					
VC12_0.0-0.5	Non-Volatile Leach: 14 day HT(14-Nov-2019		15-Nov-2019	×		
Requested	Deliverables					
Accounts Paya _ A4 - AU Tax GHD LAB REPO	ble Australia : Invoice (INV) DRTS		Email a	accountspa	ayableAU@ghd.c	om
- A4 - AU Tax	(INV)		Email g	ghdlabrepo	rts@ghd.com	
SARAH ECCLE	SHALL					
 *AU Interpret 	tive QC Report - DEFAULT (Anon QCI Rep) (C	QCI)	Email s	arah.eccle	eshall@ghd.com	
- *AU QC Re	port - DEFAULT (Anon QC Rep) - NATA (QC)		Email s	arah.eccle	shall@ghd.com	
- A4 - AU Sar	nple Receipt Notification - Environmental HT (S	RN)	Email s	arah.eccle	shall@ghd.com	
 AU Certifica 	te of Analysis - NATA (With Guidelines) (COA_	GL)	Email s	arah.eccle	shall@ghd.com	
 Chain of Cu 	stody (CoC) (COC)		Email s	arah.eccle	shall@ghd.com	
- EDI Format	- ENMRG (ENMRG)		Email s	arah.eccle	shall@ghd.com	
- EDI Format	- ESDAT (ESDAT)		Email s	arah.eccle	shall@ghd.com	
- EDI Format	- XTab (XTAB)		Email s	arah.eccle	eshall@ghd.com	

Email

sarah.eccleshall@ghd.com

- Electronic SRN for ESdat (ESRN_ESDAT)



CERTIFICATE OF ANALYSIS with GUIDELINE COMPARISON

Work Order	ES1938004	Page	: 1 of 6
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: SARAH ECCLESHALL	Contact	: Customer Services ES
Address	ELEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	:	Telephone	: +61-2-8784 8555
Project	: 12517046		
Order number	:		
C-O-C number	:	No. of samples receive	d : 15
Site	:	No. of samples analyse	ed : 4
Sampled by	:	Issue Date	: 03-Dec-2019 12:15
Quote number	: ES2019GHDSER0030 (SY/522/19)	Date Samples Receive	^d : 15-Nov-2019 16:15

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to Assist with Quality Review and Sample Receipt Notification.





Accreditation No. 825 Accredited for compliance with ISO/IEC 17025 - Testing

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Position (Accreditation Category)

Celine Conceicao Edwandy Fadjar Senior Spectroscopist (Sydney Inorganics, Smithfield, NSW) Organic Coordinator (Sydney Organics, Smithfield, NSW)



The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits, the associated uncertainty **must be** considered. Refer to the ALS Contract <u>Terms and Conditions</u> for details, and EnviroMail 53 for a guide on how to interpret the measurement of uncertainty (MU).

Red shading is applied where the result is equal to or greater than the guideline upper limit or the result is equal to or lower than the guideline lower limit. Any shading applied **does not** take into account measurement uncertainty.

Work Order Specific Comments

- EN68: This analysis in accordance with National Ocean Disposal Guidelines, Commonwealth of Australia, 2002 (modified). Results reported are those determined on a 1:4 sediment/seawater elutriate without blank correction.
- EG093: Samples containing high levels of sulfate may precipitate barium under the acidic conditions of this method and may therefore bias results low.

Sub-Matrix: COMPOSITE		Clie	ent sample ID	VC07_0.0-0.5	;	Guideline c	omparison not	requested for
				ELUTRIATE			sample	
		Laborate	ory sample ID	ES193800400	4			
	Clier	nt samplii	ng date / time	30-Oct-2019 15	:00			
Parameter	CAS Number	LOR		Result	MU			
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date		-	-	2019-11-27				
Sub-Matrix: COMPOSITE		Clie	ent sample ID	VC12_0.0-0.5 ELUTRIATE	;	Guideline c	omparison not sample	requested for
		Laborate	ory sample ID	ES193800400	8			
	Clier	nt samplii	ng date / time	31-Oct-2019 15:	:00			
Parameter	CAS Number	LOR		Result	MU			
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date		-	-	2019-11-27				
					i			
Sub-Matrix: COMPOSITE	Client sample ID		VC02_0.0-0.5		Guideline comparison not requested for			
				ELUTRIATE			sample	
		Laborate	ory sample ID	ES193800401	1			
	Cliei	nt samplii	ng date / time	30-Oct-2019 15:	:00			
Parameter	CAS Number	LOR		Result	MU			
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date		-	-	2019-11-27				
		Clin	ant comple ID					
Sub-Matrix: SEDIMENI		Clie	ent sample ID	SALTWATER		Guideline c	omparison not	requested for
		1 - 1 1		ELUIRIATE	-		sample	
		Laborate	ory sample ID	ES193800401	2			
	Clier	nt samplii	ng date / time	30-Oct-2019 15:	:00			
Parameter	CAS Number	LOR		Result	MU			
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date		-	-	2019-11-27				



Sub-Matrix: ELUTRIATE		Clie	ent sample ID	VC07_0.0-0.5 ELUTRIATE		Guideline comparison not re sample		requested for	
		Laborato	ory sample ID	ES193800400	4				
	Clie	ent samplir	ng date / time	30-Oct-2019 15:	:00				
Parameter	CAS Number	LOR		Result	MU				
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L	<0.00004					
EG093T: Total Metals in Saline Water by ORC-ICP	MS								
Copper	7440-50-8	1	µg/L	<1					
Silver	7440-22-4	0.1	µg/L	<0.1					
EP131B: Polychlorinated Biphenyls (as Aroclors)									
Total Polychlorinated biphenyls		0.10	µg/L	<0.10					
Aroclor 1016	12674-11-2	0.10	µg/L	<0.10					
Aroclor 1221	11104-28-2	0.10	µg/L	<0.10					
Aroclor 1232	11141-16-5	0.10	µg/L	<0.10					
Aroclor 1242	53469-21-9	0.10	µg/L	<0.10					
Aroclor 1248	12672-29-6	0.10	µg/L	<0.10					
Aroclor 1254	11097-69-1	0.10	µg/L	<0.10					
Aroclor 1260	11096-82-5	0.10	µg/L	<0.10					
EP132B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.02	µg/L	<0.02					
Acenaphthylene	208-96-8	0.02	µg/L	<0.02					
Acenaphthene	83-32-9	0.02	µg/L	<0.02					
Fluorene	86-73-7	0.02	µg/L	<0.02					
Phenanthrene	85-01-8	0.02	µg/L	<0.02					
Anthracene	120-12-7	0.02	µg/L	<0.02					
Fluoranthene	206-44-0	0.02	µg/L	<0.02					
Pyrene	129-00-0	0.02	µg/L	<0.02					
Benz(a)anthracene	56-55-3	0.02	µg/L	<0.02					
Chrysene	218-01-9	0.02	µg/L	<0.02					
Benzo(b+j)fluoranthene	205-99-2	0.02	µg/L	<0.02					
	205-82-3								
Benzo(k)fluoranthene	207-08-9	0.02	µg/L	<0.02					
Benzo(a)pyrene	50-32-8	0.005	µg/L	<0.005					
Indeno(1.2.3.cd)pyrene	193-39-5	0.02	µg/L	<0.02					
Dibenz(a.h)anthracene	53-70-3	0.02	µg/L	<0.02					
Benzo(g.h.i)perylene	191-24-2	0.02	µg/L	<0.02					
Total PAH		0.005	µg/L	<0.005					
Benzo(a)pyrene TEQ (zero)		0.005	µg/L	< 0.005					



Sub-Matrix: ELUTRIATE		Clie	ent sample ID	VC12_0.0-0.5 ELUTRIATE	0.0-0.5 Guideline comparison RIATE sampl		ot requested for	
		Laborato	ory sample ID	ES1938004008				
	Clie	ent samplir	ng date / time	31-Oct-2019 15:00				
Parameter	CAS Number	LOR		Result M	IU			
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004				
EG093T: Total Metals in Saline Water by ORC-I	CPMS							
Copper	7440-50-8	1	µg/L	<1				
Silver	7440-22-4	0.1	µg/L	<0.1				
EP131B: Polychlorinated Biphenyls (as Aroclo	rs)							
Total Polychlorinated biphenyls		0.10	µg/L	<0.10				
Aroclor 1016	12674-11-2	0.10	µg/L	<0.10				
Aroclor 1221	11104-28-2	0.10	µg/L	<0.10				
Aroclor 1232	11141-16-5	0.10	µg/L	<0.10				
Aroclor 1242	53469-21-9	0.10	µg/L	<0.10				
Aroclor 1248	12672-29-6	0.10	µg/L	<0.10				
Aroclor 1254	11097-69-1	0.10	µg/L	<0.10				
Aroclor 1260	11096-82-5	0.10	µg/L	<0.10				
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.02	µg/L	<0.02				
Acenaphthylene	208-96-8	0.02	µg/L	<0.02				
Acenaphthene	83-32-9	0.02	µg/L	<0.02				
Fluorene	86-73-7	0.02	µg/L	<0.02				
Phenanthrene	85-01-8	0.02	µg/L	<0.02				
Anthracene	120-12-7	0.02	µg/L	<0.02				
Fluoranthene	206-44-0	0.02	µg/L	<0.02				
Pyrene	129-00-0	0.02	µg/L	<0.02				
Benz(a)anthracene	56-55-3	0.02	µg/L	<0.02				
Chrysene	218-01-9	0.02	µg/L	<0.02				
Benzo(b+j)fluoranthene	205-99-2	0.02	µg/L	<0.02				
	205-82-3							
Benzo(k)fluoranthene	207-08-9	0.02	µg/L	<0.02				
Benzo(a)pyrene	50-32-8	0.005	µg/L	<0.005				
Indeno(1.2.3.cd)pyrene	193-39-5	0.02	µg/L	<0.02				
Dibenz(a.h)anthracene	53-70-3	0.02	µg/L	<0.02				
Benzo(g.h.i)perylene	191-24-2	0.02	µg/L	<0.02				
Total PAH		0.005	µg/L	<0.005				
Benzo(a)pyrene TEQ (zero)		0.005	µg/L	<0.005				



Sub-Matrix: ELUTRIATE		Clie	nt sample ID	VC02_0.0-0.5 ELUTRIATE	Guideline o	Guideline comparison not requested for sample		
		Laborato	ory sample ID	ES1938004011				
	Clie	ent samplir	ng date / time	30-Oct-2019 15:00				
Parameter	CAS Number	LOR		Result MI	J			
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004				
EG093T: Total Metals in Saline Water by ORC	-ICPMS							
Copper	7440-50-8	1	µg/L	<1				
Silver	7440-22-4	0.1	µg/L	<0.1				
EP131B: Polychlorinated Biphenyls (as Aroc	lors)							
Total Polychlorinated biphenyls		0.10	µg/L	<0.10				
Aroclor 1016	12674-11-2	0.10	µg/L	<0.10				
Aroclor 1221	11104-28-2	0.10	µg/L	<0.10				
Aroclor 1232	11141-16-5	0.10	µg/L	<0.10				
Aroclor 1242	53469-21-9	0.10	µg/L	<0.10				
Aroclor 1248	12672-29-6	0.10	µg/L	<0.10				
Aroclor 1254	11097-69-1	0.10	µg/L	<0.10				
Aroclor 1260	11096-82-5	0.10	µg/L	<0.10				
EP132B: Polynuclear Aromatic Hydrocarbon	S							
Naphthalene	91-20-3	0.02	µg/L	<0.02				
Acenaphthylene	208-96-8	0.02	µg/L	<0.02				
Acenaphthene	83-32-9	0.02	µg/L	<0.02				
Fluorene	86-73-7	0.02	µg/L	<0.02				
Phenanthrene	85-01-8	0.02	µg/L	<0.02				
Anthracene	120-12-7	0.02	µg/L	<0.02				
Fluoranthene	206-44-0	0.02	µg/L	<0.02				
Pyrene	129-00-0	0.02	µg/L	<0.02				
Benz(a)anthracene	56-55-3	0.02	µg/L	<0.02				
Chrysene	218-01-9	0.02	µg/L	<0.02				
Benzo(b+j)fluoranthene	205-99-2	0.02	µg/L	<0.02				
	205-82-3							
Benzo(k)fluoranthene	207-08-9	0.02	µg/L	<0.02				
Benzo(a)pyrene	50-32-8	0.005	µg/L	< 0.005				
Indeno(1.2.3.cd)pyrene	193-39-5	0.02	µg/L	<0.02				
Dibenz(a.h)anthracene	53-70-3	0.02	µg/L	<0.02				
Benzo(g.h.i)perylene	191-24-2	0.02	µg/L	<0.02				
Total PAH		0.005	µg/L	< 0.005				
Benzo(a)pyrene TEQ (zero)		0.005	µg/L	<0.005				


Analytical Results

Sub-Matrix: ELUTRIATE	Client sample ID		SALTWATER ELUTRIATE	Guideline comparison not requested for sample		
	Laborat	ory sample ID	ES1938004012			
c	lient sampli	ng date / time	30-Oct-2019 15:00			
Parameter CAS Numb	er LOR		Result MU			
EG035T: Total Mercury by FIMS						
Mercury 7439-97-	6 0.00004	mg/L	<0.00004			
EG093T: Total Metals in Saline Water by ORC-ICPMS						
Copper 7440-50-	3 1	µg/L	<1			
Silver 7440-22-	0.1	µg/L	<0.1			
EP131B: Polychlorinated Biphenyls (as Aroclors)						
Total Polychlorinated biphenyls	- 0.10	µg/L	<0.10			
Aroclor 1016 12674-11-2	2 0.10	µg/L	<0.10			
Aroclor 1221 11104-28-	2 0.10	µg/L	<0.10			
Aroclor 1232 11141-16-	5 0.10	µg/L	<0.10			
Aroclor 1242 53469-21-	0.10	µg/L	<0.10			
Aroclor 1248 12672-29-	6 0.10	µg/L	<0.10			
Aroclor 1254 11097-69-	0.10	µg/L	<0.10			
Aroclor 1260 11096-82-	5 0.10	µg/L	<0.10			
EP132B: Polynuclear Aromatic Hydrocarbons						
Naphthalene 91-20-	3 0.02	µg/L	<0.02			
Acenaphthylene 208-96-	3 0.02	µg/L	<0.02			
Acenaphthene 83-32-	0.02	µg/L	<0.02			
Fluorene 86-73-	0.02	µg/L	<0.02			
Phenanthrene 85-01-	3 0.02	µg/L	<0.02			
Anthracene 120-12-	0.02	µg/L	<0.02			
Fluoranthene 206-44-	0.02	µg/L	<0.02			
Pyrene 129-00-	0.02	µg/L	<0.02			
Benz(a)anthracene 56-55-	3 0.02	µg/L	<0.02			
Chrysene 218-01-	0.02	µg/L	<0.02			
Benzo(b+j)fluoranthene 205-99-	0.02	µg/L	<0.02			
205-82-	3					
Benzo(k)fluoranthene 207-08-	0.02	µg/L	<0.02			
Benzo(a)pyrene 50-32-	3 0.005	µg/L	<0.005			
Indeno(1.2.3.cd)pyrene 193-39-	5 0.02	µg/L	<0.02			
Dibenz(a.h)anthracene 53-70-	3 0.02	µg/L	<0.02			
Benzo(g.h.i)perylene 191-24-2	2 0.02	µg/L	<0.02			
Total PAH	- 0.005	µg/L	<0.005			
Benzo(a)pyrene TEQ (zero)	- 0.005	µg/L	<0.005			

Key:

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

~ = Indicates an estimated value.

ø = ALS is not NATA accredited for these tests.



QUALITY CONTROL REPORT

Work Order	: ES1938004	Page	: 1 of 4
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: SARAH ECCLESHALL	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	:	Telephone	: +61-2-8784 8555
Project	: 12517046	Date Samples Received	: 15-Nov-2019
Order number	:	Date Analysis Commenced	: 25-Nov-2019
C-O-C number	:	Issue Date	03-Dec-2019
Sampler	:		Hac-MRA NATA
Site	:		
Quote number	: SY/522/19		Accreditation No. 925
No. of samples received	: 15		Accredited for compliance with
No. of samples analysed	: 4		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

Page	: 2 of 4
Work Order	: ES1938004
Client	: GHD PTY LTD
Project	12517046



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key: Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

- CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
- LOR = Limit of reporting
- RPD = Relative Percentage Difference
- # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: WATER			Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG035T: Total Mercu	ry by FIMS (QC Lot: 272911	4)							
ES1938004-004	VC07_0.0-0.5 ELUTRIATE	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG093T: Total Metals	EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 2734492)								
ES1938004-004	VC07_0.0-0.5 ELUTRIATE	EG093A-T: Silver	7440-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: WATER					Laboratory Control Spike (LCS) Report			
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG035T: Total Mercury by FIMS (QCLot: 2729114	.)							
EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	105	85.0	105
EG093T: Total Metals in Saline Water by ORC-ICPI	MS (QCLot: 2734492)							
EG093A-T: Copper	7440-50-8	1	µg/L	<1	10 µg/L	92.1	84.0	128
EG093A-T: Silver	7440-22-4	0.1	µg/L	<0.1	2 µg/L	90.0	70.0	130
EP131B: Polychlorinated Biphenyls (as Aroclors)	(QCLot: 2729028)							
EP131B: Total Polychlorinated biphenyls		0.1	µg/L	<0.10				
EP131B: Aroclor 1254	11097-69-1		µg/L		1 µg/L	71.5	51.0	133
EP132B: Polynuclear Aromatic Hydrocarbons (Q0	CLot: 2729031)							
EP132-LL: Naphthalene	91-20-3	0.02	µg/L	<0.02	0.25 µg/L	91.5	62.0	136
EP132-LL: Acenaphthylene	208-96-8	0.02	µg/L	<0.02	0.25 µg/L	87.4	68.0	128
EP132-LL: Acenaphthene	83-32-9	0.02	µg/L	<0.02	0.25 µg/L	91.2	69.0	121
EP132-LL: Fluorene	86-73-7	0.02	µg/L	<0.02	0.25 µg/L	89.2	69.0	131
EP132-LL: Phenanthrene	85-01-8	0.02	µg/L	<0.02	0.25 µg/L	86.0	69.0	137
EP132-LL: Anthracene	120-12-7	0.02	µg/L	<0.02	0.25 µg/L	82.1	64.0	120
EP132-LL: Fluoranthene	206-44-0	0.02	µg/L	<0.02	0.25 µg/L	86.4	63.0	129
EP132-LL: Pyrene	129-00-0	0.02	µg/L	<0.02	0.25 µg/L	80.5	67.0	127
EP132-LL: Benz(a)anthracene	56-55-3	0.02	µg/L	<0.02	0.25 µg/L	87.6	72.0	132
EP132-LL: Chrysene	218-01-9	0.02	µg/L	<0.02	0.25 µg/L	92.0	65.0	125
EP132-LL: Benzo(b+j)fluoranthene	205-99-2	0.02	µg/L	<0.02	0.25 µg/L	92.4	66.0	130
	205-82-3							
EP132-LL: Benzo(k)fluoranthene	207-08-9	0.02	µg/L	<0.02	0.25 µg/L	84.4	64.0	130
EP132-LL: Benzo(a)pyrene	50-32-8	0.005	µg/L	<0.005	0.25 µg/L	82.3	61.0	125
EP132-LL: Indeno(1.2.3.cd)pyrene	193-39-5	0.02	µg/L	<0.02	0.25 µg/L	90.7	67.0	131
EP132-LL: Dibenz(a.h)anthracene	53-70-3	0.02	µg/L	<0.02	0.25 µg/L	91.4	67.0	135
EP132-LL: Benzo(g.h.i)perylene	191-24-2	0.02	µg/L	<0.02	0.25 µg/L	97.7	66.0	130
EP132-LL: Total PAH		0.005	µg/L	<0.005				

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER			Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery Li	mits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High

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Work Order	ES1938004
Client	: GHD PTY LTD
Project	: 12517046



						(
Sub-Matrix: WATER	Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery L	imits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
EG035T: Total Mei	EG035T: Total Mercury by FIMS (QCLot: 2729114)							
ES1938004-008	VC12_0.0-0.5 ELUTRIATE	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	96.0	70.0	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 2734492)								
ES1938004-008	VC12_0.0-0.5 ELUTRIATE	EG093A-T: Copper	7440-50-8	50 µg/L	105	70.0	130	



	QA/QC Compliance Assessment to assist with Quality Review					
Work Order	ES1938004	Page	: 1 of 5			
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney			
Contact	: SARAH ECCLESHALL	Telephone	: +61-2-8784 8555			
Project	: 12517046	Date Samples Received	: 15-Nov-2019			
Site	:	Issue Date	: 03-Dec-2019			
Sampler	:	No. of samples received	: 15			
Order number	:	No. of samples analysed	: 4			

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- <u>NO</u> Method Blank value outliers occur.
- <u>NO</u> Duplicate outliers occur.
- <u>NO</u> Laboratory Control outliers occur.
- <u>NO</u> Matrix Spike outliers occur.
- For all regular sample matrices, <u>NO</u> surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

• Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

• Quality Control Sample Frequency Outliers exist - please see following pages for full details.

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Work Order	: ES1938004
Client	: GHD PTY LTD
Project	12517046



Outliers : Analysis Holding Time Compliance

Matrix:	SOIL	
maun.	0012	

Method Extraction / Preparation						
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days
			overdue			overdue
EN68: Seawater Elutriate Testing Procedure						
Non-Volatile Leach: 14 day HT(e.g. SV organics)						
VC07_0.0-0.5 - ELUTRIATE, VC02_0.0-0.5 - ELUTRIATE,	26-Nov-2019	13-Nov-2019	13			
SALTWATER - ELUTRIATE						
Non-Volatile Leach: 14 day HT(e.g. SV organics)						
VC12_0.0-0.5 - ELUTRIATE	26-Nov-2019	14-Nov-2019	12			

Outliers : Frequency of Quality Control Samples

Matrix: WATER

Matrix: SOIL

Quality Control Sample Type	Co	unt	Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH Compounds in Water	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH Compounds in Water	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Evaluation: >	= Holdina	time breach :	√ =	Within	holding	time
---------------	-----------	---------------	-----	--------	---------	------

Method			Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EN68: Seawater Elutriate Testing Procedure									
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN68a) VC07_0.0-0.5 - ELUTRIATE, SALTWATER - ELUTRIATE	VC02_0.0-0.5 - ELUTRIATE,	30-Oct-2019	26-Nov-2019	13-Nov-2019	¥				
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN68a) VC12_0.0-0.5 - ELUTRIATE		31-Oct-2019	26-Nov-2019	14-Nov-2019	×				
Matrix: WATER					Evaluation	: × = Holding time	breach ; ✓ = Withi	n holding time.	

Evaluation	x =	Holding	time	breach;	✓ :	= Within	holding	time
------------	------------	---------	------	---------	-----	----------	---------	------

Method	Sample Date	Sample Date Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	

Page	: 3 of 5
Work Order	: ES1938004
Client	: GHD PTY LTD
Project	: 12517046



Matrix: WATER					Evaluation	: × = Holding time	breach ; 🗸 = Withi	n holding time
Method			Ex	traction / Preparation		Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Mercury by FIMS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035T-LL)							
VC07_0.0-0.5 - ELUTRIATE,	VC12_0.0-0.5 - ELUTRIATE,	26-Nov-2019				28-Nov-2019	24-Dec-2019	✓
VC02_0.0-0.5 - ELUTRIATE,	SALTWATER - ELUTRIATE							
EG093T: Total Metals in Saline Water by ORC-ICF	MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-T)							
VC07_0.0-0.5 - ELUTRIATE,	VC12_0.0-0.5 - ELUTRIATE,	26-Nov-2019	30-Nov-2019	24-May-2020	~	30-Nov-2019	24-May-2020	✓
VC02_0.0-0.5 - ELUTRIATE,	SALTWATER - ELUTRIATE							
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Amber Glass Bottle - Unpreserved (EP131B)								
VC07_0.0-0.5 - ELUTRIATE,	VC12_0.0-0.5 - ELUTRIATE,	26-Nov-2019	28-Nov-2019	03-Dec-2019	~	28-Nov-2019	07-Jan-2020	✓
VC02_0.0-0.5 - ELUTRIATE,	SALTWATER - ELUTRIATE							
EP132B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP132-LL)								
VC07_0.0-0.5 - ELUTRIATE,	VC12_0.0-0.5 - ELUTRIATE,	26-Nov-2019	28-Nov-2019	03-Dec-2019	~	28-Nov-2019	07-Jan-2020	✓
VC02_0.0-0.5 - ELUTRIATE,	SALTWATER - ELUTRIATE							

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Work Order	: ES1938004
Client	: GHD PTY LTD
Project	12517046



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: WATER	Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification								
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification		
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation			
Laboratory Duplicates (DUP)									
PAH Compounds in Water	EP132-LL	0	4	0.00	10.00	×	NEPM 2013 B3 & ALS QC Standard		
PCB's (Ultra-trace)	EP131B	0	4	0.00	10.00	×	NEPM 2013 B3 & ALS QC Standard		
Total Mercury by FIMS - Low Level	EG035T-LL	1	4	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	4	25.00	9.52	✓	NEPM 2013 B3 & ALS QC Standard		
Laboratory Control Samples (LCS)									
PAH Compounds in Water	EP132-LL	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
PCB's (Ultra-trace)	EP131B	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Mercury by FIMS - Low Level	EG035T-LL	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	4	25.00	4.76	✓	NEPM 2013 B3 & ALS QC Standard		
Method Blanks (MB)									
PAH Compounds in Water	EP132-LL	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
PCB's (Ultra-trace)	EP131B	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Mercury by FIMS - Low Level	EG035T-LL	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	4	25.00	4.76	✓	NEPM 2013 B3 & ALS QC Standard		
Matrix Spikes (MS)									
PAH Compounds in Water	EP132-LL	0	4	0.00	5.00	×	NEPM 2013 B3 & ALS QC Standard		
PCB's (Ultra-trace)	EP131B	0	4	0.00	5.00	×	NEPM 2013 B3 & ALS QC Standard		
Total Mercury by FIMS - Low Level	EG035T-LL	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	4	25.00	4.76	✓	NEPM 2013 B3 & ALS QC Standard		

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Work Order	ES1938004
Client	: GHD PTY LTD
Project	12517046



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS - Low Level	EG035T-LL	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
PCB's (Ultra-trace)	EP131B	SOIL	In house: Referenced to USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/µECD/µECD). This method is compliant with NEPM (2013) Schedule B(3)
PAH Compounds in Water	EP132-LL	SOIL	In house, Samples are extracted into solvent in original containers. Determination by large volume injection GCMS in selected ion monitoring (SIM) mode.
Preparation Methods	Method	Matrix	Method Descriptions
Sample Compositing	* EN020	SOIL	Equal weights of each original soil are taken, then mixed and homogenised. The combined mixture is labelled as a new sample.
Digestion for Total Recoverable Metals - ORC	EN25-ORC	SOIL	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Seawater Elutriate Testing Procedure	EN68a	SOIL	 USEPA Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Guide, 1991, EPA-503/8-91/001, USEPA and US Army Corps of Engineers. ANZECC Interim Ocean Disposal Guidelines, December, 1998 This Procedure outlines the preparation of leachate designed to simulate release of contaminants from sediment during the disposal of dredged material. Release can occur by physical processes or a variety of chemical changes such as oxidation of metal sulphides and release of contaminants adsorbed to particles or organic matter.
Porewater Extraction	EN82	SOIL	Extraction of porewater from sediment samples using centrifuge.
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	SOIL	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with echange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM (2013) Schedule B(3). ALS default excludes sediment which may be resident in the container.
Sep. Funnel Extraction of Liquids (Ultra-trace pesticides.)	ORG14-UTP	SOIL	In house: Referenced to USEPA 3510 Samples are extracted into dichloromethane, concentrated and exchanged into an apporpriate solvent for GPC and florisil cleanup as required. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Vishal 13111/2019 1425

Vishal Patel

From:Alice CarneySent:Tuesday, 19 November 2019 2:24 PMTo:Vishal PatelSubject:RESULTS & EDD for ALS Workorder : ES1936922 | Your Reference: 12517046Attachments:ES1936922_COC.pdf

Hey Vishal,

Can you please arrange this re-batch for me?

WO: ES1936922

Sample: #1 BH05_4.6-4.7 S-829, 1 B95 in Baisbanc. Analysis: TCLP lead, TCLP benzo(a)pyrene, chromium reducible sulfur suite TAT: Standard

Best regards,

Alice Carney

Client Services Officer, Environmental Sydney



<u>T</u> +61 2 8784 8555 <u>D</u> +61 2 8784 8504 <u>F</u> +61 2 8784 8500

Al<u>ice.carney@alsglobal.com</u> 277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA

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Environmental Division Sydney Work Order Reference ES1938255



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From: Carmen Yi [mailto:Carmen.Yi@ghd.com] Sent: Tuesday, 19 November 2019 2:00 PM To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com> Cc: Sarah.Eccleshall@ghd.com Subject: [EXTERNAL] - RE: RESULTS & EDD for ALS Workorder : ES1936922 | Your Reference: 12517046

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi ALS team,

Could I please have the following additional analysis scheduled in for samples from ES1936922 (refer attached COC)?

BH05_4.6-4.7: TCLP lead, TCLP benzo(a)pyrene, chromium reducible sulfur suite

Please analyse on standard turnaround time and allow for extraction of samples to meet relevant holding time requirements. Any questions please feel free to contact me.

Kind Regards,

Carmen Yi

Senior Environmental Engineer – Contamination and Environment Management

GHD

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T: +61 2 9239 7630 ! M: +61 451 962 988 ! E: <u>carmen.yi@ghd.com</u> Level 15, 133 Castlereagh Street, Sydney NSW 2000 Australia <u>} www.ghd.com</u>



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From: <u>angel-no-reply@alsglobal.com</u> <<u>angel-no-reply@alsglobal.com</u>> Sent: Friday, 15 November 2019 3:18 PM To: Sarah Eccleshall <<u>Sarah Eccleshall@ghd.com</u>> Subject: RESULTS & EDD for ALS Workorder : ES1936922 | Your Reference: 12517046



Deliverables for ALS Workorder ES1936922

Project: 12517046

Dear SARAH ECCLESHALL,

Please find enclosed the following deliverables for ES1936922;

- ES1936922_0_COA.pdf
- ES1936922_0_ENMRG.CSV
- 12517046.ESDAT_ES1936922_0.Chemistry2e.CSV
- 12517046.ESDAT_ES1936922_0.Header.XML
- 12517046.ESDAT_ES1936922_0.Sample2e.CSV
- ES1936922_0_QC.pdf
- ES1936922_0_QC1.pdf
- ES1936922_COC.pdf

Report Recipients

- SARAH ECCLESHALL
 - O ES1936922_0_COA.pdf (Email)
 - O ES1936922_0_ENMRG.CSV (Email)
 - 0 12517046.ESDAT_ES1936922_0.Chemistry2e.CSV (Email)
 - 0 12517046.ESDAT_ES1936922_0.Header.XML (Email)
 - O 12517046.ESDAT_ES1936922_0.Sample2e.CSV (Email)
 - O ES1936922_0_QC.pdf (Email)
 - O ES1936922_0_QCLpdf (Email)
 - O ES1936922_COC.pdf (Email)

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CERTIFICATE OF ANALYSIS

Work Order	ES1938255	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	Environmental Division Sydney
Contact	: Jessica Watson	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	;	Telephone	: +61-2-8784 8555
Project	: 12517046	Date Samples Received	: 08-Nov-2019 23:30
Order number	: 12517046	Date Analysis Commenced	: 20-Nov-2019
C-O-C number	:	Issue Date	: 25-Nov-2019 17:23
Sampler	: CARMEN YI		Hac-MRA NATA
Site	:		
Quote number	: SY/522/19		Accreditation No. 935
No. of samples received	: 1		Accredited for compliance with
No. of samples analysed	: 1		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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Work Order	: ES1938255
Client	: GHD PTY LTD
Project	12517046



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

 Key :
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

 LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- ASS: EA033 (CRS Suite):Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA033 (CRS Suite): Laboratory determinations of ANC needs to be corroborated by effectiveness of the measured ANC in relation to incubation ANC. Unless corroborated, the results of ANC testing should be discounted when determining Net Acidity for comparison with action criteria, or for the determination of the acidity hazard and required liming amounts.
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.

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Work Order	ES1938255
Client	: GHD PTY LTD
Project	: 12517046



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)	x: SOIL Client sample ID OIL)		BH05_4.6-4.7	 	 	
	Cl	ient sampli	ng date / time	07-Nov-2019 00:00	 	
Compound	CAS Number	LOR	Unit	ES1938255-001	 	
				Result	 	
EA033-A: Actual Acidity						
рН КСІ (23А)		0.1	pH Unit	8.6	 	
Titratable Actual Acidity (23F)		2	mole H+ / t	<2	 	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	 	
EA033-B: Potential Acidity						
Chromium Reducible Sulfur (22B)		0.005	% S	1.20	 	
acidity - Chromium Reducible Sulfur		10	mole H+ / t	746	 	
EA033-C: Acid Neutralising Canacity						
Acid Neutralising Capacity (19A2)		0.01	% CaCO3	16.5	 	
acidity - Acid Neutralising Capacity		10	mole H+/t	3300	 	
(a-19A2)						
sulfidic - Acid Neutralising Capacity		0.01	% pyrite S	5.28	 	
(s-19A2)						
EA033-E: Acid Base Accounting						
ANC Fineness Factor		0.5	-	1.5	 	
Net Acidity (sulfur units)		0.02	% S	<0.02	 	
Net Acidity (acidity units)		10	mole H+ / t	<10	 	
Liming Rate		1	kg CaCO3/t	<1	 	
Net Acidity excluding ANC (sulfur units)		0.02	% S	1.20	 	
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	746	 	
Liming Rate excluding ANC		1	kg CaCO3/t	56	 	
EN33: TCLP Leach						
Initial pH		0.1	pH Unit	9.2	 	
After HCI pH		0.1	pH Unit	5.4	 	
Extraction Fluid Number		1	-	2	 	
Final pH		0.1	pH Unit	6.3	 	

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Work Order	ES1938255
Client	: GHD PTY LTD
Project	: 12517046



Analytical Results

Sub-Matrix: TCLP LEACHATE (Matrix: WATER)		Clie	ent sample ID	BH05_4.6-4.7				
	Cli	ient sampli	ng date / time	07-Nov-2019 00:00				
Compound	CAS Number	LOR	Unit	ES1938255-001				
				Result				
EG005(ED093)C: Leachable Metals by I	CPAES							
Lead	7439-92-1	0.1	mg/L	<0.1				
EP075(SIM)B: Polynuclear Aromatic Hy	/drocarbons							
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5				
EP075(SIM)S: Phenolic Compound Sur	rogates							
Phenol-d6	13127-88-3	1.0	%	29.6				
2-Chlorophenol-D4	93951-73-6	1.0	%	61.5				
2.4.6-Tribromophenol	118-79-6	1.0	%	69.8				
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	85.6				
Anthracene-d10	1719-06-8	1.0	%	90.4				
4-Terphenyl-d14	1718-51-0	1.0	%	74.3				

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Work Order	: ES1938255
Client	: GHD PTY LTD
Project	: 12517046



Surrogate Control Limits

ry Limits (%)
High
44
94
125
104
113
112
_



QUALITY CONTROL REPORT

Work Order	ES1938255	Page	: 1 of 3
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Jessica Watson	Contact	: Customer Services ES
Address	LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	:	Telephone	: +61-2-8784 8555
Project	: 12517046	Date Samples Received	: 08-Nov-2019
Order number	: 12517046	Date Analysis Commenced	: 20-Nov-2019
C-O-C number	:	Issue Date	25-Nov-2019
Sampler	: CARMEN YI		Hac-MRA NATA
Site	:		
Quote number	: SY/522/19		Accreditation No. 825
No. of samples received	: 1		Accredited for compliance with
No. of samples analysed	: 1		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full. This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

Page	: 2 of 3
Work Order	: ES1938255
Client	: GHD PTY LTD
Project	: 12517046



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key: Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

- CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
- LOR = Limit of reporting
- RPD = Relative Percentage Difference
- # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL						Laboratory I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA033-A: Actual Act	idity (QC Lot: 2719707)								
EM1919404-001	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.00	No Limit
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	6.4	6.4	0.00	0% - 20%
ES1938255-001	BH05_4.6-4.7	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.00	No Limit
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	8.6	8.6	0.00	0% - 20%
EA033-B: Potential	Acidity (QC Lot: 2719707)								
EM1919404-001	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.010	0.010	0.00	No Limit
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	<10	<10	0.00	No Limit
		(a-22B)							
ES1938255-001	BH05_4.6-4.7	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	1.20	1.22	2.17	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	746	762	2.17	0% - 20%
		(a-22B)							
EA033-C: Acid Neut	ralising Capacity (QC Lot: :	2719707)							
ES1938255-001	BH05_4.6-4.7	EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	16.5	16.5	0.122	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity		0.01	% pyrite S	5.28	5.28	0.00	0% - 20%
		(s-19A2)							
		EA033: acidity - Acid Neutralising Capacity		10	mole H+ / t	3300	3290	0.122	0% - 20%
		(a-19A2)							
Sub-Matrix: WATER						Laboratory I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005(ED093)C: Le	achable Metals by ICPAES	(QC Lot: 2718641)							
EM1919589-003	Anonymous	EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EA033-A: Actual Acidity (QCLot: 2719707)									
EA033: pH KCI (23A)			pH Unit		4.4 pH Unit	100	91.0	107	
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	20.1 mole H+ / t	86.3	70.0	124	
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02					
EA033-B: Potential Acidity (QCLot: 2719707)									
EA033: Chromium Reducible Sulfur (22B)		0.005	% S	<0.005	0.256 % S	90.7	77.0	121	
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10					
EA033-C: Acid Neutralising Capacity (QCLot: 2719707	7)								
EA033: Acid Neutralising Capacity (19A2)		0.01	% CaCO3	<0.01	10 % CaCO3	102	91.0	112	
EA033: acidity - Acid Neutralising Capacity (a-19A2)		10	mole H+ / t	<10					
EA033: sulfidic - Acid Neutralising Capacity (s-19A2)		0.01	% pyrite S	<0.01					
EN33: TCLP Leach (QCLot: 2712544)									
EN33a: Initial pH		0.1	pH Unit	1.0					
EN33a: After HCl pH		0.1	pH Unit	1.0					
EN33a: Final pH		0.1	pH Unit	1.0					
Sub-Matrix: WATER				Method Blank (MB)		Laboratory Control Spike (LC	S) Report		
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EG005(ED093)C: Leachable Metals by ICPAES (QCLo	t: 2718641)								
EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	0.1 mg/L	101	80.0	118	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (C	QCLot: 2716275)								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	79.1	63.3	117	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER					Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery L	imits (%)		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High		
EG005(ED093)C: L	eachable Metals by ICPAES (QCLot: 2718641)								
ES1938255-001	BH05_4.6-4.7	EG005C: Lead	7439-92-1	1 mg/L	101	70.0	130		



QA/QC Compliance Assessment to assist with Quality Review						
Work Order	ES1938255	Page	: 1 of 5			
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney			
Contact	: Jessica Watson	Telephone	: +61-2-8784 8555			
Project	: 12517046	Date Samples Received	: 08-Nov-2019			
Site	:	Issue Date	: 25-Nov-2019			
Sampler	: CARMEN YI	No. of samples received	: 1			
Order number	: 12517046	No. of samples analysed	: 1			

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- <u>NO</u> Method Blank value outliers occur.
- <u>NO</u> Duplicate outliers occur.
- <u>NO</u> Laboratory Control outliers occur.
- <u>NO</u> Matrix Spike outliers occur.
- For all regular sample matrices, <u>NO</u> surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

• NO Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

• Quality Control Sample Frequency Outliers exist - please see following pages for full details.

Page	: 2 of 5
Work Order	: ES1938255
Client	: GHD PTY LTD
Project	12517046



Outliers : Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual Expected		
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	2	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	2	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: SOIL				Evaluation	: × = Holding time	breach ; 🗸 = Withi	in holding time.
Method	Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-A: Actual Acidity							
Snap Lock Bag - frozen (EA033) BH05_4.6-4.7	07-Nov-2019	25-Nov-2019	06-Nov-2020	1	25-Nov-2019	23-Feb-2020	~
EA033-B: Potential Acidity							
Snap Lock Bag - frozen (EA033) BH05_4.6-4.7	07-Nov-2019	25-Nov-2019	06-Nov-2020	1	25-Nov-2019	23-Feb-2020	~
EA033-C: Acid Neutralising Capacity							
Snap Lock Bag - frozen (EA033) BH05_4.6-4.7	07-Nov-2019	25-Nov-2019	06-Nov-2020	1	25-Nov-2019	23-Feb-2020	✓
EA033-D: Retained Acidity							
Snap Lock Bag - frozen (EA033) BH05_4.6-4.7	07-Nov-2019	25-Nov-2019	06-Nov-2020	1	25-Nov-2019	23-Feb-2020	~
EA033-E: Acid Base Accounting							
Snap Lock Bag - frozen (EA033) BH05_4.6-4.7	07-Nov-2019	25-Nov-2019	06-Nov-2020	1	25-Nov-2019	23-Feb-2020	~
EN33: TCLP Leach							
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN33a) BH05_4.6-4.7	07-Nov-2019	20-Nov-2019	21-Nov-2019	1			
Matrix: WATER				Evaluation	: × = Holding time	breach ; ✓ = Withi	in holding time.
Method	Sample Date	Ex	traction / Preparation		_	Analysis	-
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation

Page	3 of 5
Work Order	ES1938255
Client	GHD PTY LTD
Project	12517046



Matrix: WATER				Evaluation	: × = Holding time	breach ; ✓ = Withi	n holding time
Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005(ED093)C: Leachable Metals by ICPAES							
Clear Plastic Bottle - Nitric Acid; Unspecified (EG005C) BH05_4.6-4.7	20-Nov-2019	22-Nov-2019	18-May-2020	4	22-Nov-2019	18-May-2020	~
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) BH05_4.6-4.7	20-Nov-2019	21-Nov-2019	27-Nov-2019	1	22-Nov-2019	31-Dec-2019	✓

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Work Order	ES1938255
Client	: GHD PTY LTD
Project	: 12517046



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: SOIL				Evaluatio	n: 🗴 = Quality Co	ntrol frequency r	not within specification ; \checkmark = Quality Control frequency within specification.
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Chromium Suite for Acid Sulphate Soils	EA033	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TCLP for Non & Semivolatile Analytes	EN33a	1	10	10.00	9.09	✓	NEPM 2013 B3 & ALS QC Standard
Matrix: WATER				Evaluatio	n: × = Quality Co	ntrol frequency r	not within specification ; 🗸 = Quality Control frequency within specification.
Quality Control Sample Type		Сс	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Leachable Metals by ICPAES	EG005C	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	2	0.00	10.00	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Leachable Metals by ICPAES	EG005C	1	1	100.00	5.00	\checkmark	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Leachable Metals by ICPAES	EG005C	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Leachable Metals by ICPAES	EG005C	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	2	0.00	5.00	£	NEPM 2013 B3 & ALS QC Standard

Page	5 of 5
Work Order	: ES1938255
Client	: GHD PTY LTD
Project	12517046



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Leachable Metals by ICPAES	EG005C	SOIL	In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
Separatory Funnel Extraction of Liquids	ORG14	SOIL	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3). ALS default excludes sediment which may be resident in the container.



Environmental Division

Sydney

Work Order

ES1990048

Kim Phan

From:Loren SchiavonSent:Thursday, 7 November 2019 10:26 AMTo:Kim PhanSubject:FW: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:Attachments:image001.png; image002.png; image003.png; image004.png

Hi Kim,

Can I get you to assist with this one?

We need to add in the testing requested below to two active work orders. Please leave the current due dates and email CS to send a prelim - we then need to create the separate batches for the dioxins. Vanessa has confirmed 10 days from receipt for the TBT.

Thanks.

Kind Regards Loren Schiavon Sample Administration Coordinator, Environmental

T +61 2 8784 8555 F +61 2 8784 8500 Loren.schiavon@alsglobal.com 277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA Subscribe Win a \$500 Visa offt card! Enter of ESI936024) Cubrye / Forward Lab (Split WO) Lab/ Auctoria: Brisbane Organised in / Date: Doxin Mennioished by / Date: 1-3 Connect / Convier: WO No: ESI900048 Attach By PO / Internal Sheet:

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-----Original Message-----From: Grace White Sent: Thursday, 7 November 2019 8:52 AM To: Loren Schiavon <loren.schiavon@alsglobal.com> Subject: FW: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:

Hey Loren,

Can you please organise making the below amendments?

Thank you!

Grace White Client Services Officer, Environmental Sydney

T +61 2 8784 8555 D +61 2 8784 8531 F +61 2 8784 8500 grace.white@alsglobal.com 277-289 Woodpark Road Smithfield, NSW, 2164

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-----Original Message-----From: Carmen Yi [mailto:Carmen.Yi@ghd.com] Sent: Wednesday, 6 November 2019 11:07 PM To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com> Cc: Sarah.Eccleshall@ghd.com; Brenda Hong <Brenda.Hong@alsglobal.com> Subject: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi ALS team,

We have now received approval to go ahead with the TBT, dioxin and SVOC tests for ES1936183 and ES1936029. Would you please test the following samples on standard turnaround time please?

ES1936183

VC08_1.0-1.5

VC12_0.0-0.5

ES1936029

VC01_0.5-1.0 (1) VC04_0.5-1.0 (2) VC07_0.0-0.5 (3)

Kind regards

Carmen Yi

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SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: ES1	990048						
Client : GHD PTY LTD Contact : CARMEN YI Address : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000			Laboratory Contact Address	: Envi : Cus : 277 NSV	nvironmental Division Sydney Customer Services ES 77-289 Woodpark Road Smithfield ISW Australia 2164			
E-mail Telephone Facsimile	: carme : +61 0 : +61 0	n.yi@ghd.com 2 9239 7100 2 9239 7199	E-mail Telephone Facsimile	: ALS : +61 : +61	Enviro.Sydney@alsglobal.com 2 8784 8555 2 8784 8500			
Project Order number	: 12517 :	046	Page	: 1 of	2			
C-O-C number Site	:		Quote number	:				
Sampler	: Sarah	Eccleshall	QC Level	: NEF	PM 2013 B3 & ALS QC Standard			
Dates								
Date Samples Rec	eived	: 31-OCT-2019	Issue Date		: 14-NOV-2019 18:15			
Client Requested [Due Date	: 28-NOV-2019	Scheduled Reportir	ng Date	28-NOV-2019			
Delivery Det	ails							
Mode of Delivery		: Client Drop off	Temperature		: 3.9' C - Ice present			
No. of coolers/boxe	es	: 4	No. of samples rec	eived	: 3			
Security Seal		: N/A	No. of samples ana	lysed	: 3			

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- SPLIT WORK ORDER FROM ES1936029.
- Samples received in appropriately pretreated and preserved containers.
- Dioxin analysis will be conducted by ALS Brisbane.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (14 days), Solid (60 days) from date of completion of work order.

Address 277-289 Woodpark Road Smithfield NSW Australia 2164 | PHONE +61-2-8784 8555 | Facsimile +61-2-8784 8500

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Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: SOIL

laboratory for p bracketed without Matrix: SOIL	processing purposes a time component.	s and will be sr	IMO IMS - Combined and Furans (SOILS)
Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - H Dioxins a
ES1990048-001	30-OCT-2019 15:00	VC01_0.5-1.0	✓
ES1990048-002	30-OCT-2019 15:00	VC04_0.5-1.0	✓
ES1990048-003	30-OCT-2019 15:00	VC07_0.0-0.5	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

CARMEN YI

- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	carmen.yi@ghd.com
 AU Certificate of Analysis - DIOXINS/HRMS (DIONA) 	Email	carmen.yi@ghd.com
- AU QC Report - DIOXINS/HRMS (DQCNA)	Email	carmen.yi@ghd.com
- Chain of Custody (CoC) (COC)	Email	carmen.yi@ghd.com
LAB REPORTS		
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	labreports@ghd.com
 AU Certificate of Analysis - DIOXINS/HRMS (DIONA) 	Email	labreports@ghd.com
- AU QC Report - DIOXINS/HRMS (DQCNA)	Email	labreports@ghd.com
- Chain of Custody (CoC) (COC)	Email	labreports@ghd.com
SARAH ECCLESHALL		
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	sarah.eccleshall@ghd.com
 AU Certificate of Analysis - DIOXINS/HRMS (DIONA) 	Email	sarah.eccleshall@ghd.com
 AU QC Report - DIOXINS/HRMS (DQCNA) 	Email	sarah.eccleshall@ghd.com
 Chain of Custody (CoC) (COC) 	Email	sarah.eccleshall@ghd.com
THE ACCOUNTS PAYABLE (Brisbane)		
- A4 - AU Tax Invoice (INV)	Email	ap-fss@ghd.com





		CE	R T IF IC A	ATE OF ANALYSIS		
Client	GHD PTY LTD		Laboratory :	Environmental Division Sydney		1 of 4
Contact	CARMEN YI		Contact	CUSTOMER.SERVICES.ES	Work Order:	ES1990048
Address:	LEVEL 15, 133 CASTLEREAGH STREET SYDI NSW, AUSTRALIA 2000	IEY	Address:	277-289 Woodpark Road Smithfield NSW 2164 Australia		
Project	12517046		Quote #		Received:	31 Oct 2019
Order #	- Not provided -				Issued	22 Nov 2019
C-O-C #	- Not provided -					
Site E-mail	- Not provided - carmen.yi@ghd.com		E-mail	ALSEnviro.Sydney@alsglobal.com	Number of Sa	amples
Phone	9239 7100		Phone	+61-2-8784 8555	Received:	3
Fax	9239 7199		Fax	+61-2-8784 8500	Analysed:	3
<u>Notes</u> LOR = Limit I-TEF = Inte I-TEQ = Inte WHO-TEF = WHO-TEQ = Samples a	of reporting rnational toxic equivalency factor rnational toxic equivalence - World Health Organistaion toxic equivalency factor = World Health Organisation toxic equivalence nalysed 'as received' results reported on 'dry weig	 I -TEQ(zero) and I -TEQ(0.5 LOR) I-TEQ(LOR) and 4 Totals LORs are 5 13C12 Rec(%) = 	d WHO-TEQ(zero) calcu and WHO-TEQ(0.5 zero) d WHO-TEQ(LOR) calcul e calculated by multiply = The absolute recover both quantitate and	lated treating <lor as="" concentration<br="" zero="">calculated treating <lor 0.5="" as="" concentration<br="" lor="">lated treating <lor as="" concentration<br="" lor="">ing the number of peaks by the individual LOR per compound y of Isotopically labelled compound added by the Laboratory to d measure extraction efficiency.</lor></lor></lor>	T = tetra Pe = penta Hx = hexa Hp =hepta O = octa CDD, dioxin = chlo CDF, furan = chlo	prinated dibenzo-p-dioxin rinated dibenzofuran

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Client : GHD PTY LTD

Project : 12517046



ALS Quote Reference : ----



ANALYTICAL RESULTS FOR DIOXINS AND FURANS

Method Code EP300	Laboratory San	nple ID:	ES1990048001		Qc Lot	Number:	4539274		Γ	Date Sampled:	30-Oct-2019
	Client Sample I	D: \	/C01_0.5-1.0		Sample	Matrix:	SOIL		Γ	Date Extracted:	21-Nov-2019
									Γ	Date Analysed:	21-Nov-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ ₃	I-TEF	I-TEQ1	I-TEQ ₂	I-TEQ ₃	13 C 12
	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	<0.5	0.5	1	0.00	0.25	0.50	1	0.00	0.25	0.50	103.7
12378-PeCDD	<2.5	2.5	1	0.00	1.25	2.50	0.5	0.00	0.62	1.25	102.1
123478-HxCDD	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	66.5
123678-HxCDD	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	75.8
123789-HxCDD	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	-
1234678-HpCDD	67.0	2.5	0.01	0.67	0.67	0.67	0.01	0.67	0.67	0.67	79.7
OCDD	23300.0	10.0	0.0003	6.99	6.99	6.99	0.001	23.30	23.30	23.30	75.0
2378-TCDF	<0.5	0.5	0.1	0.00	0.02	0.05	0.1	0.00	0.02	0.05	85.5
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.07	0.05	0.00	0.06	0.12	98.1
23478-PeCDF	<2.5	2.5	0.3	0.00	0.37	0.75	0.5	0.00	0.62	1.25	103.5
123478-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	57.6
123678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	77.4
234678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	74.1
123789-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	88.7
1234678-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	61.6
1234789-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	90.1
OCDF	<5.0	5.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.00	0.00	-
Total TEQ	-	-	-	7.66	10.50	13.33	-	23.97	26.46	28.95	-

Group Totals	Conc	LOR4	No. of Peaks
-	pg/g	pg/g	
Tetra-Dioxins	<6.5	6.5	13
Penta-Dioxins	<15.0	15.0	6
Hexa-Dioxins	19.7	7.5	3
Hepta-Dioxins	144.0	5.0	2
Octa-Dioxin	23300.0	10.0	1
Tetra-Furans	<0.5	0.5	1
Penta-Furans	<2.5	2.5	1
Hexa-Furans	<2.5	2.5	1
Hepta-Furans	<2.5	2.5	1
Octa-Furan	<5.0	5.0	1
S PCDD/Fs	23463.7]	

Client : GHD PTY LTD

Project : 12517046



ALS Quote Reference : ----



ANALYTICAL RESULTS FOR DIOXINS AND FURANS

Method Code EP300	Laboratory San	nple ID:	ES1990048002		Qc Lot	Number:	4539274		I	Date Sampled:	30-Oct-2019
	Client Sample I	D:	VC04_0.5-1.0		Sample	Matrix:	SOIL		I	Date Extracted:	21-Nov-2019
									I	Date Analysed:	21-Nov-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ ₃	I-TEF	I-TEQ1	I-TEQ ₂	I-TEQ ₃	13 C 12
	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	<0.5	0.5	1	0.00	0.25	0.50	1	0.00	0.25	0.50	87.2
12378-PeCDD	<2.5	2.5	1	0.00	1.25	2.50	0.5	0.00	0.62	1.25	92.8
123478-HxCDD	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	51.5
123678-HxCDD	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	69.7
123789-HxCDD	5.3	2.5	0.1	0.53	0.53	0.53	0.1	0.53	0.53	0.53	-
1234678-HpCDD	111.0	2.5	0.01	1.11	1.11	1.11	0.01	1.11	1.11	1.11	64.8
OCDD	34600.0	10.0	0.0003	10.38	10.38	10.38	0.001	34.60	34.60	34.60	64.2
2378-TCDF	<0.5	0.5	0.1	0.00	0.02	0.05	0.1	0.00	0.02	0.05	75.1
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.07	0.05	0.00	0.06	0.12	91.9
23478-PeCDF	<2.5	2.5	0.3	0.00	0.37	0.75	0.5	0.00	0.62	1.25	92.9
123478-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	45.4
123678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	61.8
234678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	64.9
123789-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	78.4
1234678-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	46.1
1234789-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	73.1
OCDF	<5.0	5.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.00	0.00	-
Total TEQ	-	-	-	12.02	14.73	17.44	-	36.24	38.61	40.97	-

Group Totals	Conc	LOR4	No. of Peaks
-	pg/g	pg/g	
Tetra-Dioxins	27.4	3.0	6
Penta-Dioxins	<17.5	17.5	7
Hexa-Dioxins	115.0	15.0	6
Hepta-Dioxins	252.0	5.0	2
Octa-Dioxin	34600.0	10.0	1
Tetra-Furans	<0.5	0.5	1
Penta-Furans	<2.5	2.5	1
Hexa-Furans	<2.5	2.5	1
Hepta-Furans	<2.5	2.5	1
Octa-Furan	<5.0	5.0	1
S PCDD/Fs	34994.4		
Project : 12517046

Work Order : ES1990048





Method Code EP300 Laboratory Sample ID: Client Sample ID:		nple ID: ID:	ES1990048003 VC07_0.0-0.5	048003Qc Lot Number:0-0.5Sample Matrix:			4539274 SOIL		[[Date Sampled: Date Extracted:	
	•				·				ſ	Date Analysed:	21-Nov-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ ₃	I-TEF	I-TEQ1	I-TEQ ₂	I-TEQ ₃	13 C 12
-	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	6.5	0.5	1	6.49	6.49	6.49	1	6.49	6.49	6.49	100.8
12378-PeCDD	7.8	2.5	1	7.83	7.83	7.83	0.5	3.92	3.92	3.92	109.9
123478-HxCDD	8.8	2.5	0.1	0.88	0.88	0.88	0.1	0.88	0.88	0.88	52.4
123678-HxCDD	31.0	2.5	0.1	3.10	3.10	3.10	0.1	3.10	3.10	3.10	71.9
123789-HxCDD	29.7	2.5	0.1	2.97	2.97	2.97	0.1	2.97	2.97	2.97	-
1234678-HpCDD	708.0	2.5	0.01	7.08	7.08	7.08	0.01	7.08	7.08	7.08	71.7
OCDD	19200.0	10.0	0.0003	5.76	5.76	5.76	0.001	19.20	19.20	19.20	61.7
2378-TCDF	4.6	0.5	0.1	0.46	0.46	0.46	0.1	0.46	0.46	0.46	85.7
12378-PeCDF	4.4	2.5	0.03	0.13	0.13	0.13	0.05	0.22	0.22	0.22	94.0
23478-PeCDF	5.7	2.5	0.3	1.71	1.71	1.71	0.5	2.86	2.86	2.86	99.8
123478-HxCDF	11.2	2.5	0.1	1.12	1.12	1.12	0.1	1.12	1.12	1.12	47.1
123678-HxCDF	5.6	2.5	0.1	0.56	0.56	0.56	0.1	0.56	0.56	0.56	66.3
234678-HxCDF	8.1	2.5	0.1	0.81	0.81	0.81	0.1	0.81	0.81	0.81	60.9
123789-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	74.8
1234678-HpCDF	123.0	2.5	0.01	1.23	1.23	1.23	0.01	1.23	1.23	1.23	52.1
1234789-HpCDF	8.8	2.5	0.01	0.09	0.09	0.09	0.01	0.09	0.09	0.09	78.3
OCDF	363.0	5.0	0.0003	0.11	0.11	0.11	0.001	0.36	0.36	0.36	-
Total TEQ	-	-	-	40.32	40.45	40.57	-	51.33	51.46	51.58	-

Group Totals	Conc	LOR4	No. of Peaks
	pg/g	pg/g	
Tetra-Dioxins	118.0	6.5	13
Penta-Dioxins	208.0	20.0	8
Hexa-Dioxins	1240.0	17.5	7
Hepta-Dioxins	2230.0	5.0	2
Octa-Dioxin	19200.0	10.0	1
Tetra-Furans	68.5	9.0	18
Penta-Furans	75.9	27.5	11
Hexa-Furans	151.0	27.5	11
Hepta-Furans	344.0	10.0	4
Octa-Furan	363.0	5.0	1
S PCDD/Fs	23998.4]	





	QUALT	Y COI	NTROL REPOR	ст	
Client	GHD PTY LTD	Laboratory :	Environmental Division Sydney		1 of 5
Contact	CARMEN YI	Contact	CUSTOMER.SERVICES.ES	Work Order:	ES1990048
Address:	LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address:	Smithfield NSW 2164 Australia	Work Order.	201000040
Project	12517046	Quote #		Received:	31 Oct 2019
Order #	- Not provided -			Issued	22 Nov 2019
C-O-C #	- Not provided -				
Site	- Not provided -				
E-mail	carmen.yi@ghd.com	E-mail	ALSEnviro.Sydney@alsglobal.co	Number of Sa	mples
Phone	9239 7100	Phone	+61-2-8784 8555	Received:	3
Fax	9239 7199	Fax	+61-2-8784 8500	Analysed:	4

Samples analysed 'as received', results reported on 'dry weight' basis.

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	NATA Accredited Laboratory - 825 This document is issued in	This document has been digitally signed by those names that appear on this report and are the authorised signatories. Digital signing has been carried out in compliance with procedures specified in 21 CFR Part 11.				
NAIA	accordance with NATA's accreditation requirements.	Signatory Peter Blow	Position HRMS Chemist	Department		
WORLD RECOGNISED	Accredited for compliance with ISO/IED 17025	T CICI DIOW		Brisbane)		
Environmet	tal 🐊 🛛 👔	www.alsg	lobal.com			

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Quality Control Report Laboratory Duplicates (DUP)

Original Result Duplicate Result					_
Laboratory Sample Id :	EP1990013001		5592649-026		
Client Sample Id :	Anonymous		Anonymous		
Sample Mass (g) :	10.0		10.0		
Qc Lot Number :	4539275		4539275		
Moisture Content (%) :					
Compound	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
2378-TCDD	<0.5	0.5	<0.5	0.5	-
12378-PeCDD	<2.5	2.5	<2.5	2.5	-
123478-HxCDD	<2.5	2.5	<2.5	2.5	-
123678-HxCDD	<2.5	2.5	<2.5	2.5	-
123789-HxCDD	<2.5	2.5	<2.5	2.5	-
1234678-HpCDD	20.8	2.5	20.7	2.5	0.5
OCDD	196.0	10.0	192.0	10.0	2.1
2378-TCDF	1.3	0.5	0.7	0.5	60.0
12378-PeCDF	<2.5	2.5	<2.5	2.5	-
23478-PeCDF	<2.5	2.5	<2.5	2.5	-
123478-HxCDF	<2.5	2.5	<2.5	2.5	-
123678-HxCDF	<2.5	2.5	<2.5	2.5	-
234678-HxCDF	<2.5	2.5	<2.5	2.5	-
123789-HxCDF	<2.5	2.5	<2.5	2.5	-
1234678-HpCDF	4.2	2.5	4.0	2.5	4.9
1234789-HpCDF	<2.5	2.5	<2.5	2.5	-
OCDF	9.3	5.0	8.4	5.0	10.2

Group Totals	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
Tetra-Dioxins	<0.5	0.5	<0.5	0.5	-
Penta-Dioxins	<15.0	15.0	<20.0	20.0	-
Hexa-Dioxins	<17.5	17.5	<20.0	20.0	-
Hepta-Dioxins	38.3	5.0	39.9	5.0	4.1
Octa-Dioxin	196.0	10.0	192.0	10.0	2.1
Tetra-Furans	34.5	9.0	16.5	9.0	70.6
Penta-Furans	<25.0	25.0	<29.9	29.9	-
Hexa-Furans	<30.0	30.0	<27.4	27.4	-
Hepta-Furans	10.1	10.0	10.2	10.0	1.0
Octa-Furan	9.3	5.0	8.4	5.0	10.2
S PCDD/Fs	288.2		267.0		7.6

<u>Notes</u> LOR = Limit of reporting T = tetra Pe = penta Hx = hexa Hp = hepta O = octa CDD, dioxin = chlorinated debenzo-p-dioxin CDF, furan = chlorinated debenzofuran RPD = relative per cent difference Permitted ranges for RPD are depencant upon the magnitude of the result in comparison to the LOR. Result < 10x LOR, no limit, result between 10x and 20x LOR, 50%; result > 20x LOR, 20% - = Where results are less than the LOR, no RPD is reported.



Quality Control Report Laboratory Duplicates (DUP)

	Original Result		Duplicate Result		_
Laboratory Sample Id :	ES1990048001		5592649-007		
Client Sample Id :	VC01_0.5-1.0		VC01_0.5-1.0		
Sample Mass (g) :	10.0		10.0		
Qc Lot Number :	4539275		4539275		
Moisture Content (%) :					
Compound	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
2378-TCDD	<0.5	0.5	<0.5	0.5	-
12378-PeCDD	<2.5	2.5	<2.5	2.5	-
123478-HxCDD	<2.5	2.5	<2.5	2.5	-
123678-HxCDD	<2.5	2.5	<2.5	2.5	-
123789-HxCDD	<2.5	2.5	<2.5	2.5	-
1234678-HpCDD	67.0	2.5	64.3	2.5	4.1
OCDD	23300.0	10.0	23100.0	10.0	0.9
2378-TCDF	<0.5	0.5	<0.5	0.5	-
12378-PeCDF	<2.5	2.5	<2.5	2.5	-
23478-PeCDF	<2.5	2.5	<2.5	2.5	-
123478-HxCDF	<2.5	2.5	<2.5	2.5	-
123678-HxCDF	<2.5	2.5	<2.5	2.5	-
234678-HxCDF	<2.5	2.5	<2.5	2.5	-
123789-HxCDF	<2.5	2.5	<2.5	2.5	-
1234678-HpCDF	<2.5	2.5	<2.5	2.5	-
1234789-HpCDF	<2.5	2.5	<2.5	2.5	-
OCDF	<5.0	5.0	<5.0	5.0	-

Group Totals	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
Tetra-Dioxins	<6.5	6.5	<6.5	6.5	-
Penta-Dioxins	<15.0	15.0	<20.0	20.0	-
Hexa-Dioxins	19.7	7.5	23.7	17.5	18.4
Hepta-Dioxins	144.0	5.0	133.0	5.0	7.9
Octa-Dioxin	23300.0	10.0	23100.0	10.0	0.9
Tetra-Furans	<0.5	0.5	<0.5	0.5	-
Penta-Furans	<2.5	2.5	<2.5	2.5	-
Hexa-Furans	<2.5	2.5	<2.5	2.5	-
Hepta-Furans	<2.5	2.5	<2.5	2.5	-
Octa-Furan	<5.0	5.0	<5.0	5.0	-
S PCDD/Fs	23463.7		23256.7		0.9

<u>Notes</u> LOR = Limit of reporting T = tetra Pe = penta Hx = hexa Hp = hepta O = octa CDD, dioxin = chlorinated debenzo-p-dioxin CDF, furan = chlorinated debenzofuran RPD = relative per cent difference Permitted ranges for RPD are depencant upon the magnitude of the result in comparison to the LOR. Result < 10x LOR, no limit, result between 10x and 20x LOR, 50%; result > 20x LOR, 20% - = Where results are less than the LOR, no RPD is reported.

: ES1990048 : ----



Quality Control Results Laboratory Control Samples(LCS)

Laboratory Sample Id :	5592649-010					
QC Lot Number :	4539275					
Sample Name :	BCR 529 Sandy so	il				
Compound	Conc	Lower 1	Upper 1	13 C 12	Lower 2	Upper 2
	pg/g	pg/g	pg/g	Rec(%)	(%)	(%)
2378-TCDD	4130.0	3900	5100	95.8	25	164
12378-PeCDD	470.0	390	490	96.5	25	181
123478-HxCDD	1390.0	900	1500	65.7	32	141
123678-HxCDD	5820.0	4500	6300	68.3	28	130
123789-HxCDD	3380.0	2600	3400	-	-	-
2378-TCDF	70.6	65	91	85.6	24	169
12378-PeCDF	158.0	110	170	99.3	24	185
23478-PeCDF	360.0	290	430	102.5	21	178
123478-HxCDF	3630.0	2900	3900	62.4	26	152
123678-HxCDF	1220.0	940	1240	85.0	26	123
234678-HxCDF	401.0	330	410	85.2	28	136
123789-HxCDF	566.0	12	32	102.3	29	147

<u>Notes</u>

1. Acceptable concentration limits are as quoted on the analytical certificate for the cerified reference material

2. Acceptable recovery limits are derived from EPA1613 Revision B

T = tetra

Pe = penta

Hx = hexa Hp = hepta

O = octa

: ES1990048 Work Order ALS Quote Reference :



Quality Control Report Method Blank (MB)

Laboratory Sample Qc Lot Number :	9 ID: 55 45	592649-001 539275						Sample Ma Date Extrac Date Analy	trix: :ted: sed:	2	SOIL 21-Nov-2019 21-Nov-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ3	I-TEF	I-TEQ1	I-TEQ ₂	I-TEQ₃	13C12
	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	<0.5	0.5	1	0.00	0.25	0.50	1	0.00	0.25	0.50	90.7
12378-PeCDD	<2.5	2.5	1	0.00	1.25	2.50	0.5	0.00	0.63	1.25	107.4
123478-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	57.1
123678-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	79.6
123789-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	-
1234678-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	66.6
OCDD	<10.0	10.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.01	0.01	38.6
2378-TCDF	<0.5	0.5	0.1	0.00	0.03	0.05	0.1	0.00	0.03	0.05	95.6
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.08	0.05	0.00	0.06	0.13	102.0
23478-PeCDF	<2.5	2.5	0.3	0.00	0.38	0.75	0.5	0.00	0.63	1.25	104.1
123478-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	50.5
123678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	81.5
234678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	73.9
123789-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	69.5
1234678-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	50.8
1234789-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	65.1
OCDF	<5.0	5.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.00	0.01	-
		Γ	S TEQ(WHO)	0.00	2.89	5.72	S TEQ(I)	0.00	2.55	5.04]

Group Totals	Conc	LOR4	No. of
	pg/g	pg/g	Peaks
Tetra-Dioxins	<0.5	0.5	1
Penta-Dioxins	<2.5	2.5	1
Hexa-Dioxins	<2.5	2.5	1
Hepta-Dioxins	<2.5	2.5	1
Octa-Dioxin	<10.0	10.0	1
Tetra-Furans	<0.5	0.5	1
Penta-Furans	<2.5	2.5	1
Hexa-Furans	<2.5	2.5	1
Hepta-Furans	<2.5	2.5	1
Octa-Furan	<5.0	5.0	1
S PCDD/Fs	0.00		

LOR = Limit of reporting I-TEF = International toxic equivalency factor I-TEQ = International toxic equivalence (pg/g) WHO-TEF = World Health Organistaion toxic equivalency factor WHO-TEQ = World Health Organisation toxic equivalence (pg/g) T = tetra Pe = penta Hx = hexa Hp =hepta O = octa CDD, dioxin = chlorinated dibenzo-p-dioxin CDF, furan = chlorinated dibenzofuran 1 I-TEQ(zero) and WHO-TEQ(zero) calculated treating <LOR as zero concentration (pg/g) 2 I-TEQ(0.5 LOR) and WHO-TEQ(0.5 LOR) calculated treating <LOR as 50% LoR concentration (pg/g) $_3$ I-TEQ(LOR) and WHO-TEQ(LOR) calculated treating <LOR as LoR concentration (pg/g)

4 Totals LORs are calculated by mutiplying the number of peaks by the individual LOR per compound

<u>Notes</u>

26.11.19

Kim Phan

From:Loren SchiavonSent:Thursday, 7 November 2019 10:26 AMTo:Kim PhanSubject:FW: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:Attachments:image001.png; image002.png; image003.png; image004.png

Sydney Work Order **ES1990049**

Environmental Division

Hi Kim,

Can I get you to assist with this one?

We need to add in the testing requested below to two active work orders. Please leave the current due dates and email CS to send a prelim - we then need to create the separate batches for the dioxins. Vanessa has confirmed 10 days from receipt for the TBT.

Thanks.

Kind Regards Loren Schiavon Sample Administration Coordinator, Environmental

T +61 2 8784 8555 F +61 2 8784 8500 Loren.schiavon@alsglobal.com 277-289 Woodpark Road Smithfield NSW 2164 AUSTRALIA Subscribe ES1936183 (Linear) / Convert Lat / Eptil WD and Analysis Brisbane organised By / Mater DioXin Leangement By / Duter 1-2 Chemone / Charler: (ver Son ES1980049 / 11 ph By PO / Internal Shoot:_____

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https://aus01.safelinks.protection.outlook.com/?url=www.alsglobal.com&data=02%7C01%7CKim.Phan%40alsglobal.com%7C822e6d0d1a2e415fdefc08d76310b269%7C485ca04e6f7440509764cdb4bfa89c25%7C0%7C0%7C637086795685299636&sdata=Eyqaw0cQknLkqagzwxAPSDeCzRtw1wXYtpWrHbo9C1E%3D&reserved=0

-----Original Message-----From: Grace White Sent: Thursday, 7 November 2019 8:52 AM To: Loren Schiavon <loren.schiavon@alsglobal.com> Subject: FW: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:

Hey Loren,

Can you please organise making the below amendments?

Thank you!

Grace White Client Services Officer, Environmental Sydney

T +61 2 8784 8555 D +61 2 8784 8531 F +61 2 8784 8500 grace.white@alsglobal.com 277-289 Woodpark Road Smithfield, NSW, 2164

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-----Original Message-----

From: Carmen Yi [mailto:Carmen.Yi@ghd.com] Sent: Wednesday, 6 November 2019 11:07 PM To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com> Cc: Sarah.Eccleshall@ghd.com; Brenda Hong <Brenda.Hong@alsglobal.com> Subject: [EXTERNAL] - RE: Additional analysis requerst for: ES1936029:

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi ALS team,

We have now received approval to go ahead with the TBT, dioxin and SVOC tests for ES1936183 and ES1936029. Would you please test the following samples on standard turnaround time please?

ES1936183

vc08_1.0-1.5 (j) vc12_0.0-0.5 (j)

ES1936029

VC01_0.5-1.0

VC04_0.5-1.0

VC07_0.0-0.5

Kind regards

Carmen Yi

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4





SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: ES1	990049				
Client Contact Address	GHD PTY LTD CARMEN YI LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000		Laboratory Contact Address	 Environmental Division Sydney Customer Services ES 277-289 Woodpark Road Smithfield NSW Australia 2164 		
E-mail : carmen.yi@ghd.com Telephone : +61 02 9239 7100 Facsimile : +61 02 9239 7199			E-mail Telephone Facsimile	: ALS : +61 : +61	Enviro.Sydney@alsglobal.com 2 8784 8555 2 8784 8500	
Project Order number	: 12517046 :		Page	: 1 of 2		
C-O-C number Site	:		Quote number	:		
Sampler	: Sarah	n Eccleshall	QC Level	: NEF	PM 2013 B3 & ALS QC Standard	
Dates						
Date Samples Rec	eived	: 01-NOV-2019	Issue Date		: 14-NOV-2019 18:11	
Client Requested Due Date : 28-NOV-2019		Scheduled Reportir	ng Date	28-NOV-2019		
Delivery Det	ails					
Mode of Delivery		: Carrier	Temperature		: 3.3' C - Ice present	
No. of coolers/boxe	es	: 6	No. of samples received		: 2	
Security Seal :		: N/A	No. of samples ana	lysed	: 2	

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- Dioxin analysis will be conducted by ALS Brisbane.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- Split work order from ES1936183.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (14 days), Solid (60 days) from date of completion of work order.

Address 277-289 Woodpark Road Smithfield NSW Australia 2164 | PHONE +61-2-8784 8555 | Facsimile +61-2-8784 8500

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Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: SOIL

laboratory for p bracketed without a Matrix: SOIL	rocessing purposes a time component.	s and will	be	shown	AS - Combined d Furans (SOILS)
Laboratory sample ID	Client sampling date / time	Client s	ample	ID	SOIL - HRN Dioxins and
ES1990049-001	31-OCT-2019 20:45	VC08_1.0-1.5	5		√
ES1990049-002	31-OCT-2019 20:30	VC12_0.0-0.5	5		1

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

CARMEN YI

- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	carmen.yi@ghd.com
- AU Certificate of Analysis - DIOXINS/HRMS (DIONA)	Email	carmen.yi@ghd.com
- AU QC Report - DIOXINS/HRMS (DQCNA)	Email	carmen.yi@ghd.com
- Chain of Custody (CoC) (COC)	Email	carmen.yi@ghd.com
LAB REPORTS		
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	labreports@ghd.com
- AU Certificate of Analysis - DIOXINS/HRMS (DIONA)	Email	labreports@ghd.com
- AU QC Report - DIOXINS/HRMS (DQCNA)	Email	labreports@ghd.com
- Chain of Custody (CoC) (COC)	Email	labreports@ghd.com
SARAH ECCLESHALL		
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	sarah.eccleshall@ghd.com
 AU Certificate of Analysis - DIOXINS/HRMS (DIONA) 	Email	sarah.eccleshall@ghd.com
- AU QC Report - DIOXINS/HRMS (DQCNA)	Email	sarah.eccleshall@ghd.com
- Chain of Custody (CoC) (COC)	Email	sarah.eccleshall@ghd.com
THE ACCOUNTS PAYABLE (Brisbane)		
- A4 - AU Tax Invoice (INV)	Email	ap-fss@ghd.com





		CEF	R T IF IC A	ATE OF ANALYSIS		
Client	GHD PTY LTD		Laboratory :	Environmental Division Sydney		1 of 3
Contact	CARMEN YI		Contact	CUSTOMER.SERVICES.ES	Work Order:	ES1990049
Address:	LEVEL 15, 133 CASTLEREAGH STREET SYD NSW, AUSTRALIA 2000	IEY	Address:	277-289 Woodpark Road Smithfield NSW 2164 Australia		
Project	12517046		Quote #		Received:	1 Nov 2019
Order #	- Not provided -				Issued	22 Nov 2019
C-O-C #	- Not provided -					
Site E-mail	- Not provided - carmen.yi@ghd.com		E-mail	ALSEnviro.Sydney@alsglobal.com	Number of Sa	Imples
Phone	9239 7100		Phone	+61-2-8784 8555	Received:	2
Fax	9239 7199		Fax	+61-2-8784 8500	Analysed:	4
<u>Notes</u> LOR = Limit I-TEF = Inte I-TEQ = Inte WHO-TEF = WHO-TEQ =	of reporting rnational toxic equivalency factor ernational toxic equivalence • World Health Organistaion toxic equivalency factor = World Health Organisation toxic equivalence	1 I-TEQ(zero) and V 2 I-TEQ(0.5 LOR) ar 3 I-TEQ(LOR) and V 4 Totals LORs are c 5 13C12 Rec(%) = 7	WHO-TEQ _(zero) calcul nd WHO-TEQ _(0.5 zero) WHO-TEQ _(LOR) calcul calculated by multiply The absolute recover both quantitate and	lated treating <lor as="" concentration<br="" zero="">calculated treating <lor 0.5="" as="" concentration<br="" lor="">lated treating <lor as="" concentration<br="" lor="">ing the number of peaks by the individual LOR per compound y of Isotopically labelled compound added by the Laboratory to d measure extraction efficiency.</lor></lor></lor>	T = tetra Pe = penta Hx = hexa Hp =hepta O = octa CDD, dioxin = chlo CDF, furan = chlo	prinated dibenzo-p-dioxin inated dibenzofuran

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RIGHT SOLUTIONS RIGHT PARTNER

Project : 12517046

Work Order : ES1990049

ALS Quote Reference : ----



Method Code EP300	Laboratory San	nple ID:	ES1990049001		Qc Lot	Number:	4539275		I	Date Sampled:	31-Oct-2019
	Client Sample I	D:	VC08_1.0-1.5		Sample Matrix:		SOIL		ſ	Date Extracted:	
									I	Date Analysed:	21-Nov-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ ₃	I-TEF	I-TEQ1	I-TEQ ₂	I-TEQ ₃	13 C 12
	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	<0.5	0.5	1	0.00	0.25	0.50	1	0.00	0.25	0.50	102.8
12378-PeCDD	3.0	2.5	1	3.04	3.04	3.04	0.5	1.52	1.52	1.52	127.3
123478-HxCDD	3.8	2.5	0.1	0.38	0.38	0.38	0.1	0.38	0.38	0.38	58.5
123678-HxCDD	6.0	2.5	0.1	0.60	0.60	0.60	0.1	0.60	0.60	0.60	77.5
123789-HxCDD	11.3	2.5	0.1	1.13	1.13	1.13	0.1	1.13	1.13	1.13	-
1234678-HpCDD	170.0	2.5	0.01	1.70	1.70	1.70	0.01	1.70	1.70	1.70	80.8
OCDD	19100.0	10.0	0.0003	5.73	5.73	5.73	0.001	19.10	19.10	19.10	84.5
2378-TCDF	<0.5	0.5	0.1	0.00	0.02	0.05	0.1	0.00	0.02	0.05	87.0
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.07	0.05	0.00	0.06	0.12	113.3
23478-PeCDF	<2.5	2.5	0.3	0.00	0.37	0.75	0.5	0.00	0.62	1.25	116.1
123478-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	57.5
123678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	79.4
234678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	77.5
123789-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	91.4
1234678-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	60.6
1234789-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	97.0
OCDF	<5.0	5.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.00	0.00	-
Total TEQ	-	-	-	12.58	13.79	15.01	-	24.43	25.92	27.41	-

Group Totals	Conc	LOR4	No. of Peaks
	pg/g	pg/g	
Tetra-Dioxins	474.0	1.5	3
Penta-Dioxins	129.0	15.0	6
Hexa-Dioxins	708.0	17.5	7
Hepta-Dioxins	1160.0	5.0	2
Octa-Dioxin	19100.0	10.0	1
Tetra-Furans	<0.5	0.5	1
Penta-Furans	<2.5	2.5	1
Hexa-Furans	<2.5	2.5	1
Hepta-Furans	<7.5	7.5	3
Octa-Furan	<5.0	5.0	1
S PCDD/Fs	21571.0]	

Project : 12517046

Work Order : ES1990049

ALS Quote Reference : ----



Method Code EP300	Laboratory Sar	nple ID:	ES1990049002	0049002 Qc Lot Number: 4539275		Γ	Date Sampled:	31-Oct-2019			
	Client Sample I	D:	VC12_0.0-0.5		Sample Matrix:		SOIL		[Date Extracted:	21-Nov-2019
									[Date Analysed:	21-Nov-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ ₃	I-TEF	I-TEQ1	I-TEQ ₂	I-TEQ ₃	13 C 12
	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	1.8	0.5	1	1.78	1.78	1.78	1	1.78	1.78	1.78	98.9
12378-PeCDD	3.4	2.5	1	3.42	3.42	3.42	0.5	1.71	1.71	1.71	106.7
123478-HxCDD	4.4	2.5	0.1	0.44	0.44	0.44	0.1	0.44	0.44	0.44	58.7
123678-HxCDD	13.1	2.5	0.1	1.31	1.31	1.31	0.1	1.31	1.31	1.31	73.8
123789-HxCDD	13.4	2.5	0.1	1.34	1.34	1.34	0.1	1.34	1.34	1.34	-
1234678-HpCDD	301.0	2.5	0.01	3.01	3.01	3.01	0.01	3.01	3.01	3.01	79.9
OCDD	15300.0	10.0	0.0003	4.59	4.59	4.59	0.001	15.30	15.30	15.30	78.8
2378-TCDF	1.9	0.5	0.1	0.19	0.19	0.19	0.1	0.19	0.19	0.19	85.3
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.08	0.05	0.00	0.06	0.13	94.2
23478-PeCDF	<2.5	2.5	0.3	0.00	0.38	0.75	0.5	0.00	0.63	1.25	103.6
123478-HxCDF	3.9	2.5	0.1	0.39	0.39	0.39	0.1	0.39	0.39	0.39	52.4
123678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	74.9
234678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	72.6
123789-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	83.7
1234678-HpCDF	47.5	2.5	0.01	0.48	0.48	0.48	0.01	0.48	0.48	0.48	58.6
1234789-HpCDF	2.8	2.5	0.01	0.03	0.03	0.03	0.01	0.03	0.03	0.03	86.3
OCDF	137.0	5.0	0.0003	0.04	0.04	0.04	0.001	0.14	0.14	0.14	-
Total TEQ	-	-	-	17.01	17.79	18.58	-	26.10	27.16	28.23	-

Group Totals	Conc	LOR4	No. of Peaks
	pg/g	pg/g	
Tetra-Dioxins	95.8	6.5	13
Penta-Dioxins	96.5	20.0	8
Hexa-Dioxins	459.0	17.5	7
Hepta-Dioxins	894.0	5.0	2
Octa-Dioxin	15300.0	10.0	1
Tetra-Furans	18.7	9.0	18
Penta-Furans	<25.0	25.0	10
Hexa-Furans	54.1	27.5	11
Hepta-Furans	128.0	10.0	4
Octa-Furan	137.0	5.0	1
S PCDD/Fs	17183.1		





	QUALII	Y CO	NTROL REPOR		
Client	GHD PTY LTD	Laboratory :	Environmental Division Sydney		1 of 5
Contact	SARAH ECCLESHALL	Contact	CUSTOMER.SERVICES.ES	Work Order:	FS1990049
Address:	LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address:	Smithfield NSW 2164 Australia	Work Order.	201000040
Project	12517046	Quote #		Received:	1 Nov 2019
Order #	- Not provided -			Issued	22 Nov 2019
С-О-С #	- Not provided -				
Site	- Not provided -				
E-mail	sarah.eccleshall@ghd.com	E-mail	ALSEnviro.Sydney@alsglobal.co	Number of Sa	mples
Phone	9239 7100	Phone	+61-2-8784 8555	Received:	2
Fax	9239 7199	Fax	+61-2-8784 8500	Analysed:	4

Samples analysed 'as received', results reported on 'dry weight' basis.

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	NATA Accredited Laboratory - 825	This document this report and a carried out in co	This document has been digitally signed by those names that appear on this report and are the authorised signatories. Digital signing has been carried out in compliance with procedures specified in 21 CFR Part 11.			
NAIA	accordance with NATA's	Signatory	Position	Department		
	Accredited for compliance with ISO/IED 17025	Peter Blow	HRMS Chemist	GC/HR-MS - NATA 825 (818 - Brisbane)		
Environme	tal 💭 👘 👘	www.alsg	lobal.com			

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Quality Control Report Laboratory Duplicates (DUP)

	Original Result		Duplicate Result		_
Laboratory Sample Id :	EP1990013001		5592649-026		
Client Sample Id :	Anonymous		Anonymous		
Sample Mass (g) :	10.0		10.0		
Qc Lot Number :	4539275		4539275		
Moisture Content (%) :					
Compound	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
2378-TCDD	<0.5	0.5	<0.5	0.5	-
12378-PeCDD	<2.5	2.5	<2.5	2.5	-
123478-HxCDD	<2.5	2.5	<2.5	2.5	-
123678-HxCDD	<2.5	2.5	<2.5	2.5	-
123789-HxCDD	<2.5	2.5	<2.5	2.5	-
1234678-HpCDD	20.8	2.5	20.7	2.5	0.5
OCDD	196.0	10.0	192.0	10.0	2.1
2378-TCDF	1.3	0.5	0.7	0.5	60.0
12378-PeCDF	<2.5	2.5	<2.5	2.5	-
23478-PeCDF	<2.5	2.5	<2.5	2.5	-
123478-HxCDF	<2.5	2.5	<2.5	2.5	-
123678-HxCDF	<2.5	2.5	<2.5	2.5	-
234678-HxCDF	<2.5	2.5	<2.5	2.5	-
123789-HxCDF	<2.5	2.5	<2.5	2.5	-
1234678-HpCDF	4.2	2.5	4.0	2.5	4.9
1234789-HpCDF	<2.5	2.5	<2.5	2.5	-
OCDF	9.3	5.0	8.4	5.0	10.2

Group Totals	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
Tetra-Dioxins	<0.5	0.5	<0.5	0.5	-
Penta-Dioxins	<15.0	15.0	<20.0	20.0	-
Hexa-Dioxins	<17.5	17.5	<20.0	20.0	-
Hepta-Dioxins	38.3	5.0	39.9	5.0	4.1
Octa-Dioxin	196.0	10.0	192.0	10.0	2.1
Tetra-Furans	34.5	9.0	16.5	9.0	70.6
Penta-Furans	<25.0	25.0	<29.9	29.9	-
Hexa-Furans	<30.0	30.0	<27.4	27.4	-
Hepta-Furans	10.1	10.0	10.2	10.0	1.0
Octa-Furan	9.3	5.0	8.4	5.0	10.2
S PCDD/Fs	288.2		267.0		7.6

<u>Notes</u> LOR = Limit of reporting T = tetra Pe = penta Hx = hexa Hp = hepta O = octa CDD, dioxin = chlorinated debenzo-p-dioxin CDF, furan = chlorinated debenzofuran RPD = relative per cent difference Permitted ranges for RPD are depencant upon the magnitude of the result in comparison to the LOR. Result < 10x LOR, no limit, result between 10x and 20x LOR, 50%; result > 20x LOR, 20% - = Where results are less than the LOR, no RPD is reported.



Quality Control Report Laboratory Duplicates (DUP)

	Original Result		Duplicate Result		_
Laboratory Sample Id :	ES1990048001		5592649-007		
Client Sample Id :	Anonymous		Anonymous		
Sample Mass (g) :	10.0		10.0		
Qc Lot Number :	4539275		4539275		
Moisture Content (%) :					
Compound	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
2378-TCDD	<0.5	0.5	<0.5	0.5	-
12378-PeCDD	<2.5	2.5	<2.5	2.5	-
123478-HxCDD	<2.5	2.5	<2.5	2.5	-
123678-HxCDD	<2.5	2.5	<2.5	2.5	-
123789-HxCDD	<2.5	2.5	<2.5	2.5	-
1234678-HpCDD	67.0	2.5	64.3	2.5	4.1
OCDD	23300.0	10.0	23100.0	10.0	0.9
2378-TCDF	<0.5	0.5	<0.5	0.5	-
12378-PeCDF	<2.5	2.5	<2.5	2.5	-
23478-PeCDF	<2.5	2.5	<2.5	2.5	-
123478-HxCDF	<2.5	2.5	<2.5	2.5	-
123678-HxCDF	<2.5	2.5	<2.5	2.5	-
234678-HxCDF	<2.5	2.5	<2.5	2.5	-
123789-HxCDF	<2.5	2.5	<2.5	2.5	-
1234678-HpCDF	<2.5	2.5	<2.5	2.5	-
1234789-HpCDF	<2.5	2.5	<2.5	2.5	-
OCDF	<5.0	5.0	<5.0	5.0	-

Group Totals	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
Tetra-Dioxins	<6.5	6.5	<6.5	6.5	-
Penta-Dioxins	<15.0	15.0	<20.0	20.0	-
Hexa-Dioxins	19.7	7.5	23.7	17.5	18.4
Hepta-Dioxins	144.0	5.0	133.0	5.0	7.9
Octa-Dioxin	23300.0	10.0	23100.0	10.0	0.9
Tetra-Furans	<0.5	0.5	<0.5	0.5	-
Penta-Furans	<2.5	2.5	<2.5	2.5	-
Hexa-Furans	<2.5	2.5	<2.5	2.5	-
Hepta-Furans	<2.5	2.5	<2.5	2.5	-
Octa-Furan	<5.0	5.0	<5.0	5.0	-
S PCDD/Fs	23463.7		23256.7		0.9

<u>Notes</u> LOR = Limit of reporting T = tetra Pe = penta Hx = hexa Hp = hepta O = octa CDD, dioxin = chlorinated debenzo-p-dioxin CDF, furan = chlorinated debenzofuran RPD = relative per cent difference Permitted ranges for RPD are depencant upon the magnitude of the result in comparison to the LOR. Result < 10x LOR, no limit, result between 10x and 20x LOR, 50%; result > 20x LOR, 20% - = Where results are less than the LOR, no RPD is reported.

: ES1990049

: -----



Quality Control Results Laboratory Control Samples(LCS)

Laboratory Sample Id :	5592649-010					
QC Lot Number :	4539275					
Sample Name :	BCR 529 Sandy so	il				
Compound	Conc	Lower 1	Upper 1	13 C 12	Lower 2	Upper 2
	pg/g	pg/g	pg/g	Rec(%)	(%)	(%)
2378-TCDD	4130.0	3900	5100	95.8	25	164
12378-PeCDD	470.0	390	490	96.5	25	181
123478-HxCDD	1390.0	900	1500	65.7	32	141
123678-HxCDD	5820.0	4500	6300	68.3	28	130
123789-HxCDD	3380.0	2600	3400	-	-	-
2378-TCDF	70.6	65	91	85.6	24	169
12378-PeCDF	158.0	110	170	99.3	24	185
23478-PeCDF	360.0	290	430	102.5	21	178
123478-HxCDF	3630.0	2900	3900	62.4	26	152
123678-HxCDF	1220.0	940	1240	85.0	26	123
234678-HxCDF	401.0	330	410	85.2	28	136
123789-HxCDF	566.0	12	32	102.3	29	147

<u>Notes</u>

1. Acceptable concentration limits are as quoted on the analytical certificate for the cerified reference material

2. Acceptable recovery limits are derived from EPA1613 Revision B

T = tetra

Pe = penta

Hx = hexa Hp = hepta

O = octa

Work Order : ES1990049 ALS Quote Reference : ----



Quality Control Report Method Blank (MB)

Laboratory Sample Qc Lot Number :	9 ID: 55 45	592649-001 539275						Sample Ma Date Extrac Date Analy	trix: :ted: sed:	2	SOIL 21-Nov-2019 21-Nov-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ3	I-TEF	I-TEQ1	I-TEQ ₂	I-TEQ₃	13C12
	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	<0.5	0.5	1	0.00	0.25	0.50	1	0.00	0.25	0.50	90.7
12378-PeCDD	<2.5	2.5	1	0.00	1.25	2.50	0.5	0.00	0.63	1.25	107.4
123478-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	57.1
123678-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	79.6
123789-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	-
1234678-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	66.6
OCDD	<10.0	10.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.01	0.01	38.6
2378-TCDF	<0.5	0.5	0.1	0.00	0.03	0.05	0.1	0.00	0.03	0.05	95.6
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.08	0.05	0.00	0.06	0.13	102.0
23478-PeCDF	<2.5	2.5	0.3	0.00	0.38	0.75	0.5	0.00	0.63	1.25	104.1
123478-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	50.5
123678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	81.5
234678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	73.9
123789-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	69.5
1234678-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	50.8
1234789-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	65.1
OCDF	<5.0	5.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.00	0.01	-
		Γ	S TEQ(WHO)	0.00	2.89	5.72	S TEQ(I)	0.00	2.55	5.04]

Group Totals	Conc	LOR4	No. of
	pg/g	pg/g	Peaks
Tetra-Dioxins	<0.5	0.5	1
Penta-Dioxins	<2.5	2.5	1
Hexa-Dioxins	<2.5	2.5	1
Hepta-Dioxins	<2.5	2.5	1
Octa-Dioxin	<10.0	10.0	1
Tetra-Furans	<0.5	0.5	1
Penta-Furans	<2.5	2.5	1
Hexa-Furans	<2.5	2.5	1
Hepta-Furans	<2.5	2.5	1
Octa-Furan	<5.0	5.0	1
S PCDD/Fs	0.00		

LOR = Limit of reporting I-TEF = International toxic equivalency factor I-TEQ = International toxic equivalence (pg/g) WHO-TEF = World Health Organisation toxic equivalency factor WHO-TEQ = World Health Organisation toxic equivalence (pg/g) T = tetra Pe = penta Hx = hexa Hp =hepta O = octa CDD, dioxin = chlorinated dibenzo-p-dioxin CDF, furan = chlorinated dibenzofuran 1 I-TEQ(zero) and WHO-TEQ(zero) calculated treating <LOR as zero concentration (pg/g) 2 I-TEQ(LOR) and WHO-TEQ(LOR) calculated treating <LOR as LOR concentration (pg/g) 3 I-TEQ(LOR) and WHO-TEQ(LOR) calculated treating <LOR as LOR concentration (pg/g)

4 Totals LORs are calculated by mutiplying the number of peaks by the individual LOR per compound

<u>Notes</u>

From: <u>Sarah.Eccleshall@ghd.com</u> [mailto:Sarah.Eccleshall@ghd.com] Sent: Thursday, 12 December 2019 5:56 AM To: Angus Harding <<u>angus.harding@ALSGlobal.com</u>> Subject: RE: [EXTERNAL] - Additional analyses for project 12517046

Hi Angus,

One more analysis request.

Can the following three samples which had dioxin extract as part of work order attached please be analysed for dioxins.

VC03_0.0-0.5 VC10_0.0-0.5 VC02_0.0-0.5

Thanks,

· .

Sarah Eccleshall PhD MSc BSc Hons Graduate Environmental Scientist Contamination & Environmental Management



Environmental Division

Brisbane

Work Order

EB1990410

Telephone : +61-7-3243 7222





SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Client Contact Address	GHD PTY LTD CARMEN YI LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Laboratory Contact Address	 Environmental Division Brisbane Customer Services Brisbane 2 Byth Street Stafford QLD Australia 4053
E-mail Telephone Facsimile	: carmen.yi@ghd.com : +61 02 9239 7100 : +61 02 9239 7199	E-mail Telephone Facsimile	: ALSEnviro.Brisbane@alsglobal.com : +61 7 3243 7222 : +61 7 3243 7218
Project	: 12517046	Page	: 1 of 2
Order number C-O-C number Site	: : :	Quote number	:
Sampler	Sarah Eccleshall	QC Level	ENEPM 2013 B3 & ALS QC Standard
Dates			
Date Samples Receive Client Requested Due	ed : 12-DEC-2019 Date : 27-DEC-2019	Issue Date Scheduled Reporting	: 18-DEC-2019 08:17 Date : 27-DEC-2019

Delivery Details

Delivery Details			
Mode of Delivery	Carrier	Temperature	:
No. of coolers/boxes	: Rebatch	No. of samples received	: 1
Security Seal	: Intact.	No. of samples analysed	: 1

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- This work order has been created to rebatch samples from ES1936029
- Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' etc. suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to John Pickering (Samples.Brisbane@alsglobal.com)
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958),
- Sample Disposal Aqueous (14 days), Solid (60 days) from date of completion of work order.

Address 2 Byth Street Stafford QLD Australia 4053 | PHONE +61-7-3243 7222 | Facsimile +61-7-3243 7218 Environmental Division Brisbane ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company

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Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below. EB1990410-001 : 30-OCT-2019 22:15 : VC03_0.0-0.5 - ES1936029_055

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the MS - Combined laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: SOIL

date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component. Matrix: SOIL						
Laboratory sample ID	Client sampling date / time	Client samp	ole ID	SOIL - Dioxins		
EB1990410-001	30-OCT-2019 22:15	VC03_0.0-0.5 E	S1936	1		

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

CARMEN YI

- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	carmen.yi@ghd.com
- A4 - AU Tax Invoice (INV)	Email	carmen.yi@ghd.com
- AU QC Report - DIOXINS/HRMS (DQCNA)	Email	carmen.yi@ghd.com
- Chain of Custody (CoC) (COC)	Email	carmen.yi@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	carmen.yi@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	carmen.yi@ghd.com
LAB REPORTS		, 20
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	labreports@ghd.com
- AU QC Report - DIOXINS/HRMS (DQCNA)	Email	labreports@ghd.com
- Chain of Custody (CoC) (COC)	Email	labreports@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	labreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	labreports@ghd.com
SARAH ECCLESHALL		
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	sarah.eccleshall@ghd.com
- AU QC Report - DIOXINS/HRMS (DQCNA)	Email	sarah.eccleshall@ghd.com
- Chain of Custody (CoC) (COC)	Email	sarah.eccleshall@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	sarah.eccleshall@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	sarah.eccleshall@ghd.com
THE ACCOUNTS PAYABLE (Brisbane)		
- A4 - AU Tax Invoice (INV)	Email	ap-fss@ghd.com





		CE	R T IF IC A	ATE OF ANALYSIS		
Client Contact	GHD PTY LTD LAB REPORTS		Laboratory : Contact	Environmental Division Brisbane CUSTOMER.SERVICES.EB	Work Order:	1 of 2 EB1990410
Address:	LEVEL 15, 133 CASTLEREAGH STREET SYD NSW, AUSTRALIA 2000	IEY	Address:	2 Byth Street Stafford QLD 4053 Australia		
Project Order # C-O-C #	12517046 - Not provided - - Not provided -		Quote #		Received: Issued	11 Dec 2019 20 Dec 2019
Site E-mail	- Not provided - labreports@ghd.com		E-mail	ALSEnviro.Brisbane@alsglobal.com	Number of Sa	mples
Phone Fax	9239 7100 9239 7199		Phone Fax	+61-7-3243 7222 +61-7-3243 7218	Received: Analysed:	1 2
<u>Notes</u> LOR = Limit I-TEF = Inte I-TEQ = Inte WHO-TEF = WHO-TEQ = Samples a	of reporting rnational toxic equivalency factor ernational toxic equivalence = World Health Organistaion toxic equivalency factor = World Health Organisation toxic equivalence nalysed 'as received', results reported on 'dry weig	 I -TEQ(zero) and I -TEQ(0.5 LOR) I-TEQ(LOR) and Totals LORs are 13C12 Rec(%) = 	d WHO-TEQ(zero) calcu and WHO-TEQ(0.5 zero) d WHO-TEQ(LOR) calcu e calculated by multiply = The absolute recover both quantitate and	lated treating <lor as="" concentration<br="" zero="">calculated treating <lor 0.5="" as="" concentration<br="" lor="">lated treating <lor as="" concentration<br="" lor="">ring the number of peaks by the individual LOR per compound y of Isotopically labelled compound added by the Laboratory to d measure extraction efficiency.</lor></lor></lor>	T = tetra Pe = penta Hx = hexa Hp =hepta O = octa CDD, dioxin = chlor CDF, furan = chlor	orinated dibenzo-p-dioxin inated dibenzofuran

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Project : 12517046

Work Order : EB1990410

ALS Quote Reference :



Method Code EP300	Laboratory Sar	mple ID:	EB1990410001		Qc Lot	Number:	4539552			Date Sampled:	30-Oct-2019
	Client Sample	ID:	VC03_0.0-0.5ES19	36029_055	Sample	Matrix:	SOIL			Date Extracted:	18-Dec-2019
										Date Analysed:	18-Dec-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ ₃	I-TEF	I-TEQ1	I-TEQ ₂	I-TEQ3	13 C 12
	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	0.9	0.5	1	0.94	0.94	0.94	1	0.94	0.94	0.94	87.9
12378-PeCDD	<2.5	2.5	1	0.00	1.23	2.45	0.5	0.00	0.61	1.23	103.2
123478-HxCDD	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	58.1
123678-HxCDD	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	78.8
123789-HxCDD	6.1	2.5	0.1	0.61	0.61	0.61	0.1	0.61	0.61	0.61	-
1234678-HpCDD	192.0	2.5	0.01	1.92	1.92	1.92	0.01	1.92	1.92	1.92	79.4
OCDD	63600.0	9.8	0.0003	19.08	19.08	19.08	0.001	63.60	63.60	63.60	82.7
2378-TCDF	<0.5	0.5	0.1	0.00	0.02	0.05	0.1	0.00	0.02	0.05	72.2
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.07	0.05	0.00	0.06	0.12	94.3
23478-PeCDF	<2.5	2.5	0.3	0.00	0.37	0.74	0.5	0.00	0.61	1.23	97.9
123478-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	48.7
123678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	80.6
234678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	67.5
123789-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	72.6
1234678-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	59.5
1234789-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	77.6
OCDF	<4.9	4.9	0.0003	0.00	0.00	0.00	0.001	0.00	0.00	0.00	-
Total TEQ	-	-	-	22.55	24.96	27.38	-	67.07	69.14	71.22	-

Group Totals	Conc	LOR4	No. of Peaks	
	pg/g	pg/g		
Tetra-Dioxins	71.0	2.0	4	
Penta-Dioxins	67.7	14.7	6	
Hexa-Dioxins	388.0	12.3	5	
Hepta-Dioxins	525.0	4.9	2	
Octa-Dioxin	63600.0	9.8	1	
Tetra-Furans	<0.5	0.5	1	
Penta-Furans	<2.5	2.5	1	
Hexa-Furans	<2.5	2.5	1	
Hepta-Furans	<2.5	2.5	1	
Octa-Furan	<4.9	4.9	1	
S PCDD/Fs	64651.7]		





	QUAL	$\Pi Y CO$	NIROL REPOI	K 1	
Client	GHD PTY LTD	Laboratory :	Environmental Division Brisbane		1 of 4
Contact	LAB REPORTS	Contact	CUSTOMER.SERVICES.EB	Work Order	FB1990410
Address:	LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address:	Stafford QLD 4053 Australia	Herk Order.	
Project	12517046	Quote #		Received:	11 Dec 2019
Order #	- Not provided -			Issued	20 Dec 2019
C-O-C #	- Not provided -				
Site	- Not provided -				
E-mail	labreports@ghd.com	E-mail	ALSEnviro.Brisbane@alsglobal.	Number of Sa	mples
Phone	9239 7100	Phone	+61-7-3243 7222	Received:	1
Fax	9239 7199	Fax	+61-7-3243 7218	Analysed:	2

Samples analysed 'as received', results reported on 'dry weight' basis.

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	NATA Accredited Laboratory - 825 This document is issued in	This document has been digitally signed by those names that appear on this report and are the authorised signatories. Digital signing has been carried out in compliance with procedures specified in 21 CFR Part 11.				
NAIA	accordance with NATA's	Signatory	Position	Department		
WORLD RECOGNISED	accreditation requirements. Accredited for compliance with ISO/IED 17025	Peter Blow	HRMS Chemist	GC/HR-MS - NATA 825 (818 - Brisbane)		
Environme	tal 🐊	www.alsg	lobal.com			
	RIGHT SO	LUTIONS R		1		



Quality Control Report Laboratory Duplicates (DUP)

	Original Result		Duplicate Result		_
Laboratory Sample Id :	EM1990042001		5593336-007		
Client Sample Id :	Anonymous		Anonymous		
Sample Mass (g) :	10.0		10.0		
Qc Lot Number :	4539553		4539553		
Moisture Content (%) :					
Compound	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
2378-TCDD	<0.5	0.5	<0.5	0.5	-
12378-PeCDD	<2.5	2.5	<2.5	2.5	-
123478-HxCDD	<2.5	2.5	<2.5	2.5	-
123678-HxCDD	<2.5	2.5	<2.5	2.5	-
123789-HxCDD	<2.5	2.5	<2.5	2.5	-
1234678-HpCDD	4.9	2.5	5.8	2.5	16.8
OCDD	160.0	9.9	169.0	9.9	5.5
2378-TCDF	<0.5	0.5	<0.5	0.5	-
12378-PeCDF	<2.5	2.5	<2.5	2.5	-
23478-PeCDF	<2.5	2.5	<2.5	2.5	-
123478-HxCDF	<2.5	2.5	<2.5	2.5	-
123678-HxCDF	<2.5	2.5	<2.5	2.5	-
234678-HxCDF	<2.5	2.5	<2.5	2.5	-
123789-HxCDF	<2.5	2.5	<2.5	2.5	-
1234678-HpCDF	<2.5	2.5	<2.5	2.5	-
1234789-HpCDF	<2.5	2.5	<2.5	2.5	-
OCDF	<5.0	5.0	<5.0	5.0	-

Group Totals	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
Tetra-Dioxins	4.4	1.5	4.3	1.5	2.3
Penta-Dioxins	43.6	2.5	45.5	2.5	4.3
Hexa-Dioxins	25.7	14.9	24.5	12.4	4.8
Hepta-Dioxins	14.5	5.0	17.3	5.0	17.6
Octa-Dioxin	160.0	9.9	169.0	9.9	5.5
Tetra-Furans	8.2	5.5	6.9	5.5	17.2
Penta-Furans	<2.5	2.5	<2.5	2.5	-
Hexa-Furans	<2.5	2.5	<2.5	2.5	-
Hepta-Furans	<2.5	2.5	<2.5	2.5	-
Octa-Furan	<5.0	5.0	<5.0	5.0	-
S PCDD/Fs	256.4		267.5		4.2

<u>Notes</u> LOR = Limit of reporting T = tetra Pe = penta Hx = hexa Hp = hepta O = octa CDD, dioxin = chlorinated debenzo-p-dioxin CDF, furan = chlorinated debenzofuran RPD = relative per cent difference Permitted ranges for RPD are dependant upon the magnitude of the result in comparison to the LOR. Pocult < 10x LOP no limit result between 10x and 20x LOP 50% rocult 20x10P 200/

: EB1990410

:



Quality Control Results Laboratory Control Samples(LCS)

Laboratory Sample Id :	5593336-010					
QC Lot Number :	4539553					
Sample Name :	BCR 529 Sandy so	il				
Compound	Conc	Lower 1	Upper 1	13 C 12	Lower 2	Upper 2
	pg/g	pg/g	pg/g	Rec(%)	(%)	(%)
2378-TCDD	4130.0	3900	5100	95.8	25	164
12378-PeCDD	470.0	390	490	96.5	25	181
123478-HxCDD	1390.0	900	1500	65.7	32	141
123678-HxCDD	5820.0	4500	6300	68.3	28	130
123789-HxCDD	3380.0	2600	3400	-	-	-
2378-TCDF	70.6	65	91	85.6	24	169
12378-PeCDF	158.0	110	170	99.3	24	185
23478-PeCDF	360.0	290	430	102.5	21	178
123478-HxCDF	3630.0	2900	3900	62.4	26	152
123678-HxCDF	1220.0	940	1240	85.0	26	123
234678-HxCDF	401.0	330	410	85.2	28	136
123789-HxCDF	566.0	12	32	102.3	29	147

<u>Notes</u>

1. Acceptable concentration limits are as quoted on the analytical certificate for the cerified reference material

2. Acceptable recovery limits are derived from EPA1613 Revision B

T = tetra

Pe = penta

Hx = hexa

Hp = hepta



Quality Control Report Method Blank (MB)

Laboratory Sample Qc Lot Number :	e ID: 55 45	593336-001 539553	I					Sample Ma Date Extrac Date Analy	trix: cted: sed:		SOIL 18-Dec-2019 18-Dec-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ	WHO-TEQ	WHO-TEQ	I-TEF	I-TEQ1	I-TEQ2	I-TEQ₃	13C12
•	pg/g	pg/g		1	2	3		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	<0.5	0.5	1	0.00	0.25	0.50	1	0.00	0.25	0.50	90.7
12378-PeCDD	<2.5	2.5	1	0.00	1.25	2.50	0.5	0.00	0.63	1.25	107.4
123478-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	57.1
123678-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	79.6
123789-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	-
1234678-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	66.6
OCDD	<10.0	10.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.01	0.01	38.6
2378-TCDF	<0.5	0.5	0.1	0.00	0.03	0.05	0.1	0.00	0.03	0.05	95.6
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.08	0.05	0.00	0.06	0.13	102.0
23478-PeCDF	<2.5	2.5	0.3	0.00	0.38	0.75	0.5	0.00	0.63	1.25	104.1
123478-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	50.5
123678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	81.5
234678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	73.9
123789-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	69.5
1234678-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	50.8
1234789-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	65.1
OCDF	<5.0	5.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.00	0.01	-
			S TEQ(WHO)	0.00	2.89	5.72	S TEQ(I)	0.00	2.55	5.04	

Group Totals	Conc	LOR4	No. of
	pg/g	pg/g	Peaks
Tetra-Dioxins	<0.5	0.5	1
Penta-Dioxins	<2.5	2.5	1
Hexa-Dioxins	<2.5	2.5	1
Hepta-Dioxins	<2.5	2.5	1
Octa-Dioxin	<10.0	10.0	1
Tetra-Furans	<0.5	0.5	1
Penta-Furans	<2.5	2.5	1
Hexa-Furans	<2.5	2.5	1
Hepta-Furans	<2.5	2.5	1
Octa-Furan	<5.0	5.0	1
S PCDD/Fs	0.00		

<u>Notes</u> LOR = Limit of reporting I-TEF = International toxic equivalency factor I-TEQ = International toxic equivalence (pg/g) WHO-TEF = World Health Organistaion toxic equivalency factor WHO-TEQ = World Health Organisation toxic equivalence (pg/g) T = tetra Pe = penta Hx = hexa Hp =hepta O = octa CDD, dioxin = chlorinated dibenzo-p-dioxin CDF, furan = chlorinated dibenzofuran 1 I-TEQ(zero) and WHO-TEQ(zero) calculated treating <LOR as zero concentration (pg/g) 2 I-TEQ(0.5 LOR) and WHO-TEQ(0.5 LOR) calculated treating <LOR as 50% LoR concentration (pg/g) 3 I-TEQ(LOR) and WHO-TEQ(LOR) calculated treating <LOR as LoR concentration (pg/g) 4 Totals LORs are calculated by mutiplying the number of peaks by the individual LOR per compound Report version : QC_NA 3.02 4 of 4





SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: ES19	90050				
Client Contact Address	at : GHD PTY LTD tact : SARAH ECCLESHALL : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000		Laboratory Contact Address	: Envi : Cus : 277 NSV	ironmental Division Sydney tomer Services ES -289 Woodpark Road Smithfield V Australia 2164	
E-mail : sarah.eccleshall@ghd.com Telephone : +61 02 9239 7100 Facsimile : +61 02 9239 7199		E-mail Telephone Facsimile	: ALS : +61 : +61	Enviro.Sydney@alsglobal.com 2 8784 8555 2 8784 8500		
Project Order number	: 19517046 ·		Page	: 1 of 2		
C-O-C number Site	:		Quote number	:		
Sampler	:		QC Level	: NEF	PM 2013 B3 & ALS QC Standard	
Dates						
Date Samples Rec	eived	: 12-NOV-2019	Issue Date		: 21-NOV-2019 12:25	
Client Requested [Due Date	: 29-NOV-2019	Scheduled Reporti	ng Date	29-NOV-2019	
Delivery Det	ails					
Mode of Delivery		Carrier	Temperature		:	
No. of coolers/boxe	es	:	No. of samples rec	eived	: 3	
Security Seal		: Intact.	No. of samples and	alysed	: 3	

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
- Dioxin analysis to be conducted at ALS Brisbane
- This work order is a split from ES1937554 & ES1937483.
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal Aqueous (14 days), Solid (60 days) from date of completion of work order.

Address 277-289 Woodpark Road Smithfield NSW Australia 2164 | PHONE +61-2-8784 8555 | Facsimile +61-2-8784 8500

Environmental Division Sydney ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: SOIL

Matrix: SOIL	a time component.	s and will be snow	U RMS - Combined and Furans (SOILS)
Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - H Dioxins a
ES1990050-001	30-OCT-2019 15:00	VC12_0.0-0.5	✓
ES1990050-002	31-OCT-2019 15:00	VC10_0.0-0.5	✓
ES1990050-003	30-OCT-2019 15:00	VC02_0.5-1.0	 ✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

SARAH ECCLESHALL - A4 - AU Sample Receipt Notification - Environmental HT (SRN Email sarah.eccleshall@ghd.com - AU Certificate of Analysis - DIOXINS/HRMS (DIONA) Email sarah.eccleshall@ghd.com - AU QC Report - DIOXINS/HRMS (DQCNA) Email sarah.eccleshall@ghd.com - Chain of Custody (CoC) (COC) Email sarah.eccleshall@ghd.com THE ACCOUNTS PAYABLE (Brisbane) - A4 - AU Tax Invoice (INV) Email ap-fss@ghd.com





		CER	TIFICA	ATE OF ANALYSIS		
Client	GHD PTY LTD		Laboratory :	Environmental Division Sydney		1 of 4
Contact	SARAH ECCLESHALL		Contact	CUSTOMER.SERVICES.ES	Work Order:	ES1990050
Address:	LEVEL 15, 133 CASTLEREAGH STREET SYDI NSW, AUSTRALIA 2000	IEY	Address:	277-289 Woodpark Road Smithfield NSW 2164 Australia		
Project	19517046		Quote #		Received:	12 Nov 2019
Order #	- Not provided -				Issued	27 Nov 2019
С-О-С #	- Not provided -					
Site E-mail	- Not provided - sarah.eccleshall@ghd.com		E-mail	ALSEnviro.Sydney@alsglobal.com	Number of Sa	mples
Phone	9239 7100		Phone	+61-2-8784 8555	Received:	3
Fax	9239 7199		Fax	+61-2-8784 8500	Analysed:	3
<u>Notes</u> LOR = Limit I-TEF = Inte I-TEQ = Inte WHO-TEF = WHO-TEQ =	of reporting rnational toxic equivalency factor ernational toxic equivalence • World Health Organistaion toxic equivalency factor = World Health Organisation toxic equivalence	1 I-TEQ(zero) and W 2 I-TEQ(0.5 LOR) and 3 I-TEQ(LOR) and W 4 Totals LORs are ca 5 13C12 Rec(%) = T	VHO-TEQ(zero) calcul d WHO-TEQ(0.5 zero) /HO-TEQ(LOR) calcul alculated by multiply he absolute recover both quantitate and	lated treating <lor as="" concentration<br="" zero="">calculated treating <lor 0.5="" as="" concentration<br="" lor="">lated treating <lor as="" concentration<br="" lor="">ing the number of peaks by the individual LOR per compound y of Isotopically labelled compound added by the Laboratory to d measure extraction efficiency.</lor></lor></lor>	T = tetra Pe = penta Hx = hexa Hp =hepta O = octa CDD, dioxin = chlo CDF, furan = chlo	rinated dibenzo-p-dioxin inated dibenzofuran

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RIGHT SOLUTIONS RIGHT PARTNER

Project : 19517046

Work Order : ES1990050

ALS Quote Reference : ----



Method Code EP300	Laboratory Sar	mple ID:	ES1990050001		Qc Lot	Number:	4539274 SOIL		[Date Sampled:	30-Oct-2019
	Client Sample	ID:	VC12_0.0-0.5		Sample	watrix:	SOIL		ı I	Date Extracted: Date Analysed:	21-Nov-2019 21-Nov-2019
Compound	Conc pg/g	LOR pg/g	WHO-TEF	WHO-TEQ1 (zero)	WHO-TEQ ₂ (0.5 LOR)	WHO-TEQ₃ (LOR)	I-TEF	I-TEQ1 (zero)	I-TEQ2 (0.5 LOR)	I-TEQ₃ (LOR)	13C12 Rec(%)
2378-TCDD	1.4	0.5	1	1.36	1.36	1.36	1	1.36	1.36	1.36	100.9
12378-PeCDD	2.9	2.5	1	2.93	2.93	2.93	0.5	1.47	1.47	1.47	100.3
123478-HxCDD	2.7	2.5	0.1	0.27	0.27	0.27	0.1	0.27	0.27	0.27	61.0
123678-HxCDD	11.3	2.5	0.1	1.13	1.13	1.13	0.1	1.13	1.13	1.13	79.2
123789-HxCDD	10.4	2.5	0.1	1.04	1.04	1.04	0.1	1.04	1.04	1.04	-
1234678-HpCDD	269.0	2.5	0.01	2.69	2.69	2.69	0.01	2.69	2.69	2.69	79.6
OCDD	14700.0	10.0	0.0003	4.41	4.41	4.41	0.001	14.70	14.70	14.70	67.1
2378-TCDF	1.7	0.5	0.1	0.17	0.17	0.17	0.1	0.17	0.17	0.17	81.7
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.07	0.05	0.00	0.06	0.12	95.4
23478-PeCDF	<2.5	2.5	0.3	0.00	0.37	0.75	0.5	0.00	0.62	1.25	101.9
123478-HxCDF	3.3	2.5	0.1	0.33	0.33	0.33	0.1	0.33	0.33	0.33	52.8
123678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	77.1
234678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	73.2
123789-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	85.0
1234678-HpCDF	40.2	2.5	0.01	0.40	0.40	0.40	0.01	0.40	0.40	0.40	55.2
1234789-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	88.3
OCDF	111.0	5.0	0.0003	0.03	0.03	0.03	0.001	0.11	0.11	0.11	-
Total TEQ	-	-	-	14.76	15.56	16.36	-	23.66	24.74	25.81	-

Group Totals	Conc	LOR4	No. of Peaks
	pg/g	pg/g	
Tetra-Dioxins	58.1	6.0	12
Penta-Dioxins	85.8	17.5	7
Hexa-Dioxins	403.0	20.0	8
Hepta-Dioxins	811.0	5.0	2
Octa-Dioxin	14700.0	10.0	1
Tetra-Furans	18.7	9.0	18
Penta-Furans	<29.9	29.9	12
Hexa-Furans	45.4	29.9	12
Hepta-Furans	113.0	10.0	4
Octa-Furan	111.0	5.0	1
S PCDD/Fs	16346.0		

Project : 19517046

Work Order : ES1990050

ALS Quote Reference : ----



Method Code EP300	Laboratory Sar Client Sample	nple ID: ID:	ES1990050002 VC10_0.0-0.5		Qc Lot Sample	Number: Matrix:	4539274 SOIL		1	Date Sampled: Date Extracted:	31-Oct-2019 21-Nov-2019
									I	Date Analysed:	21-Nov-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ ₃	I-TEF	I-TEQ1	I-TEQ2	I-TEQ ₃	13 C 12
	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	<0.5	0.5	1	0.00	0.25	0.50	1	0.00	0.25	0.50	93.3
12378-PeCDD	<2.5	2.5	1	0.00	1.25	2.49	0.5	0.00	0.62	1.25	93.3
123478-HxCDD	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	56.3
123678-HxCDD	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	82.4
123789-HxCDD	5.8	2.5	0.1	0.58	0.58	0.58	0.1	0.58	0.58	0.58	-
1234678-HpCDD	283.0	2.5	0.01	2.83	2.83	2.83	0.01	2.83	2.83	2.83	72.8
OCDD	73500.0	10.0	0.0003	22.05	22.05	22.05	0.001	73.50	73.50	73.50	72.6
2378-TCDF	<0.5	0.5	0.1	0.00	0.02	0.05	0.1	0.00	0.02	0.05	77.5
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.07	0.05	0.00	0.06	0.12	99.6
23478-PeCDF	<2.5	2.5	0.3	0.00	0.37	0.75	0.5	0.00	0.62	1.25	99.9
123478-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	56.1
123678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	94.2
234678-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	82.6
123789-HxCDF	<2.5	2.5	0.1	0.00	0.12	0.25	0.1	0.00	0.12	0.25	96.0
1234678-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	62.8
1234789-HpCDF	<2.5	2.5	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	101.7
OCDF	<5.0	5.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.00	0.00	-
Total TEQ	-	-	-	25.46	28.16	30.87	-	76.91	79.27	81.62	-

Group Totals	Conc	LOR4	No. of Peaks	
	pg/g	pg/g		
Tetra-Dioxins	269.0	1.5	3	
Penta-Dioxins	85.1	12.5	5	
Hexa-Dioxins	518.0	17.4	7	
Hepta-Dioxins	1090.0	5.0	2	
Octa-Dioxin	73500.0	10.0	1	
Tetra-Furans	<0.5	0.5	1	
Penta-Furans	<2.5	2.5	1	
Hexa-Furans	<2.5	2.5	1	
Hepta-Furans	<2.5	2.5	1	
Octa-Furan	<5.0	5.0	1	
S PCDD/Fs	75462.1			

Project : 19517046

Work Order : ES1990050

ALS Quote Reference : ----



Method Code EP300	Laboratory San	nple ID:	ES1990050003		Qc Lot	Number:	4539274		I	Date Sampled:	30-Oct-2019
	Client Sample I	D:	VC02_0.5-1.0		Sample	Matrix:	SOIL		I	Date Extracted:	21-Nov-2019
									I	Date Analysed:	21-Nov-2019
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ ₃	I-TEF	I-TEQ1	I-TEQ ₂	I-TEQ ₃	13 C 12
	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	18.4	0.5	1	18.40	18.40	18.40	1	18.40	18.40	18.40	110.7
12378-PeCDD	33.1	2.5	1	33.10	33.10	33.10	0.5	16.55	16.55	16.55	109.3
123478-HxCDD	35.1	2.5	0.1	3.51	3.51	3.51	0.1	3.51	3.51	3.51	77.8
123678-HxCDD	128.0	2.5	0.1	12.80	12.80	12.80	0.1	12.80	12.80	12.80	69.1
123789-HxCDD	93.0	2.5	0.1	9.30	9.30	9.30	0.1	9.30	9.30	9.30	-
1234678-HpCDD	2400.0	2.5	0.01	24.00	24.00	24.00	0.01	24.00	24.00	24.00	82.5
OCDD	48000.0	10.0	0.0003	14.40	14.40	14.40	0.001	48.00	48.00	48.00	73.5
2378-TCDF	16.7	0.5	0.1	1.67	1.67	1.67	0.1	1.67	1.67	1.67	95.0
12378-PeCDF	13.4	2.5	0.03	0.40	0.40	0.40	0.05	0.67	0.67	0.67	94.2
23478-PeCDF	20.5	2.5	0.3	6.15	6.15	6.15	0.5	10.25	10.25	10.25	109.2
123478-HxCDF	36.8	2.5	0.1	3.68	3.68	3.68	0.1	3.68	3.68	3.68	59.7
123678-HxCDF	17.9	2.5	0.1	1.79	1.79	1.79	0.1	1.79	1.79	1.79	72.1
234678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	76.6
123789-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	79.4
1234678-HpCDF	440.0	2.5	0.01	4.40	4.40	4.40	0.01	4.40	4.40	4.40	57.7
1234789-HpCDF	37.0	2.5	0.01	0.37	0.37	0.37	0.01	0.37	0.37	0.37	86.6
OCDF	1300.0	5.0	0.0003	0.39	0.39	0.39	0.001	1.30	1.30	1.30	-
Total TEQ	-	-	-	134.36	134.61	134.86	-	156.69	156.94	157.19	-

Group Totals	Conc	LOR4	No. of Peaks	
	pg/g	pg/g		
Tetra-Dioxins	343.0	5.5	11	
Penta-Dioxins	627.0	25.0	10	
Hexa-Dioxins	3030.0	17.5	7	
Hepta-Dioxins	7140.0	5.0	2	
Octa-Dioxin	48000.0	10.0	1	
Tetra-Furans	234.0	9.0	18	
Penta-Furans	258.0	30.0	12	
Hexa-Furans	509.0	25.0	10	
Hepta-Furans	1350.0	10.0	4	
Octa-Furan	1300.0	5.0	1	
S PCDD/Fs	62791.0]		





	QUAL	TTY CO	NTROL REPOR	ст_		
Client	GHD PTY LTD	Laboratory :	Environmental Division Sydney		1 of 5	
Contact	SARAH ECCLESHALL	Contact	CUSTOMER.SERVICES.ES	Work Order:	ES1990050	
Address: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000		Address:	Smithfield NSW 2164 Australia	Work Order.		
Project	19517046	Quote #		Received:	12 Nov 2019	
Order #	- Not provided -			Issued	27 Nov 2019	
C-O-C #	- Not provided -					
Site	- Not provided -					
E-mail	sarah.eccleshall@ghd.com	E-mail	ALSEnviro.Sydney@alsglobal.co	Number of Sa	mples	
Phone	9239 7100	Phone	+61-2-8784 8555	Received:	3	
Fax	9239 7199	Fax	+61-2-8784 8500	Analysed:	5	

Samples analysed 'as received', results reported on 'dry weight' basis.

ALSE - Excellence in Analytical Testing

	NATA Accredited Laboratory - 825	This document has been digitally signed by those names that appear on this report and are the authorised signatories. Digital signing has been carried out in compliance with procedures specified in 21 CFR Part 11.					
NAIA	accordance with NATA's	Signatory	Position	Department			
	Accredited for compliance with ISO/IED 17025	Peter Blow	HRMS Chemist	GC/HR-MS - NATA 825 (818 - Brisbane)			
Environme	tal 💭 👘 👘	www.alsg	lobal.com				

RIGHT SOLUTIONS RIGHT PARTNER


Quality Control Report Laboratory Duplicates (DUP)

	Original Result		Duplicate Result		_
Laboratory Sample Id :	EP1990013001		5592649-026		
Client Sample Id :	Anonymous		Anonymous		
Sample Mass (g) :	10.0		10.0		
Qc Lot Number :	4539275		4539275		
Moisture Content (%) :					
Compound	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
2378-TCDD	<0.5	0.5	<0.5	0.5	-
12378-PeCDD	<2.5	2.5	<2.5	2.5	-
123478-HxCDD	<2.5	2.5	<2.5	2.5	-
123678-HxCDD	<2.5	2.5	<2.5	2.5	-
123789-HxCDD	<2.5	2.5	<2.5	2.5	-
1234678-HpCDD	20.8	2.5	20.7	2.5	0.5
OCDD	196.0	10.0	192.0	10.0	2.1
2378-TCDF	1.3	0.5	0.7	0.5	60.0
12378-PeCDF	<2.5	2.5	<2.5	2.5	-
23478-PeCDF	<2.5	2.5	<2.5	2.5	-
123478-HxCDF	<2.5	2.5	<2.5	2.5	-
123678-HxCDF	<2.5	2.5	<2.5	2.5	-
234678-HxCDF	<2.5	2.5	<2.5	2.5	-
123789-HxCDF	<2.5	2.5	<2.5	2.5	-
1234678-HpCDF	4.2	2.5	4.0	2.5	4.9
1234789-HpCDF	<2.5	2.5	<2.5	2.5	-
OCDF	9.3	5.0	8.4	5.0	10.2

Group Totals	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
Tetra-Dioxins	<0.5	0.5	<0.5	0.5	-
Penta-Dioxins	<15.0	15.0	<20.0	20.0	-
Hexa-Dioxins	<17.5	17.5	<20.0	20.0	-
Hepta-Dioxins	38.3	5.0	39.9	5.0	4.1
Octa-Dioxin	196.0	10.0	192.0	10.0	2.1
Tetra-Furans	34.5	9.0	16.5	9.0	70.6
Penta-Furans	<25.0	25.0	<29.9	29.9	-
Hexa-Furans	<30.0	30.0	<27.4	27.4	-
Hepta-Furans	10.1	10.0	10.2	10.0	1.0
Octa-Furan	9.3	5.0	8.4	5.0	10.2
S PCDD/Fs	288.2		267.0		7.6

 Notes

 LOR = Limit of reporting

 T = tetra

 Pe = penta

 Hx = hexa

 Hp = hepta

 O = octa

 CDD, dioxin = chlorinated debenzo-p-dioxin

 CDF, furan = chlorinated debenzo-p-dioxin

 RPD = relative per cent difference

 Permitted ranges for RPD are depencant upon the magnitude of the result in comparison to the LOR.

 Result < 10x LOR, no limit, result between 10x and 20x LOR, 50%; result > 20x LOR, 20%

 - = Where results are less than the LOR, no RPD is reported.



Quality Control Report Laboratory Duplicates (DUP)

	Original Result		Duplicate Result		_
Laboratory Sample Id :	ES1990048001		5592649-007		
Client Sample Id :	Anonymous		Anonymous		
Sample Mass (g) :	10.0		10.0		
Qc Lot Number :	4539275		4539275		
Moisture Content (%) :					
Compound	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
2378-TCDD	<0.5	0.5	<0.5	0.5	-
12378-PeCDD	<2.5	2.5	<2.5	2.5	-
123478-HxCDD	<2.5	2.5	<2.5	2.5	-
123678-HxCDD	<2.5	2.5	<2.5	2.5	-
123789-HxCDD	<2.5	2.5	<2.5	2.5	-
1234678-HpCDD	67.0	2.5	64.3	2.5	4.1
OCDD	23300.0	10.0	23100.0	10.0	0.9
2378-TCDF	<0.5	0.5	<0.5	0.5	-
12378-PeCDF	<2.5	2.5	<2.5	2.5	-
23478-PeCDF	<2.5	2.5	<2.5	2.5	-
123478-HxCDF	<2.5	2.5	<2.5	2.5	-
123678-HxCDF	<2.5	2.5	<2.5	2.5	-
234678-HxCDF	<2.5	2.5	<2.5	2.5	-
123789-HxCDF	<2.5	2.5	<2.5	2.5	-
1234678-HpCDF	<2.5	2.5	<2.5	2.5	-
1234789-HpCDF	<2.5	2.5	<2.5	2.5	-
OCDF	<5.0	5.0	<5.0	5.0	-

Group Totals	Conc	LOR	Conc	LOR	RPD
	pg/g	pg/g	pg/g	pg/g	(%)
Tetra-Dioxins	<6.5	6.5	<6.5	6.5	-
Penta-Dioxins	<15.0	15.0	<20.0	20.0	-
Hexa-Dioxins	19.7	7.5	23.7	17.5	18.4
Hepta-Dioxins	144.0	5.0	133.0	5.0	7.9
Octa-Dioxin	23300.0	10.0	23100.0	10.0	0.9
Tetra-Furans	<0.5	0.5	<0.5	0.5	-
Penta-Furans	<2.5	2.5	<2.5	2.5	-
Hexa-Furans	<2.5	2.5	<2.5	2.5	-
Hepta-Furans	<2.5	2.5	<2.5	2.5	-
Octa-Furan	<5.0	5.0	<5.0	5.0	-
S PCDD/Fs	23463.7		23256.7		0.9

Notes LOR = Limit of reporting T = tetra Pe = penta Hx = hexa Hp = hepta O = octa CDD, dioxin = chlorinated debenzo-p-dioxin CDF, furan = chlorinated debenzofuran RPD = relative per cent difference Permitted ranges for RPD are depencant upon the magnitude of the result in comparison to the LOR. Result < 10x LOR, no limit, result between 10x and 20x LOR, 50%; result > 20x LOR, 20% - = Where results are less than the LOR, no RPD is reported.

: ES1990050

: ----



Quality Control Results Laboratory Control Samples(LCS)

Laboratory Sample Id : QC Lot Number :	5592649-010 4539275					
Sample Name :	BCR 529 Sandy so	il				
Compound	Conc pg/g	Lower 1 pg/g	Upper 1 pg/g	13C12 Rec(%)	Lower 2 (%)	Upper 2 (%)
2378-TCDD	4130.0	3900	5100	95.8	25	164
12378-PeCDD	470.0	390	490	96.5	25	181
123478-HxCDD	1390.0	900	1500	65.7	32	141
123678-HxCDD	5820.0	4500	6300	68.3	28	130
123789-HxCDD	3380.0	2600	3400	-	-	-
2378-TCDF	70.6	65	91	85.6	24	169
12378-PeCDF	158.0	110	170	99.3	24	185
23478-PeCDF	360.0	290	430	102.5	21	178
123478-HxCDF	3630.0	2900	3900	62.4	26	152
123678-HxCDF	1220.0	940	1240	85.0	26	123
234678-HxCDF	401.0	330	410	85.2	28	136
123789-HxCDF	566.0	12	32	102.3	29	147

<u>Notes</u>

1. Acceptable concentration limits are as quoted on the analytical certificate for the cerified reference material

2. Acceptable recovery limits are derived from EPA1613 Revision B

T = tetra

Pe = penta

Hx = hexa Hp = hepta

O = octa

: ES1990050 Work Order ALS Quote Reference :

Quality Control Report Method Blank (MB)

Laboratory Sample Qc Lot Number :						Sample Ma Date Extrac Date Analy		SOIL 21-Nov-2019 21-Nov-2019			
Compound	Conc	LOR	WHO-TEF	WHO-TEQ1	WHO-TEQ ₂	WHO-TEQ3	I-TEF	I-TEQ1	I-TEQ ₂	I-TEQ₃	13 C 12
	pg/g	pg/g		(zero)	(0.5 LOR)	(LOR)		(zero)	(0.5 LOR)	(LOR)	Rec(%)
2378-TCDD	<0.5	0.5	1	0.00	0.25	0.50	1	0.00	0.25	0.50	90.7
12378-PeCDD	<2.5	2.5	1	0.00	1.25	2.50	0.5	0.00	0.63	1.25	107.4
123478-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	57.1
123678-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	79.6
123789-HxCDD	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	-
1234678-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	66.6
OCDD	<10.0	10.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.01	0.01	38.6
2378-TCDF	<0.5	0.5	0.1	0.00	0.03	0.05	0.1	0.00	0.03	0.05	95.6
12378-PeCDF	<2.5	2.5	0.03	0.00	0.04	0.08	0.05	0.00	0.06	0.13	102.0
23478-PeCDF	<2.5	2.5	0.3	0.00	0.38	0.75	0.5	0.00	0.63	1.25	104.1
123478-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	50.5
123678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	81.5
234678-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	73.9
123789-HxCDF	<2.5	2.5	0.1	0.00	0.13	0.25	0.1	0.00	0.13	0.25	69.5
1234678-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	50.8
1234789-HpCD	<2.5	2.5	0.01	0.00	0.01	0.03	0.01	0.00	0.01	0.03	65.1
OCDF	<5.0	5.0	0.0003	0.00	0.00	0.00	0.001	0.00	0.00	0.01	
			S TEQ(WHO)	0.00	2.89	5.72	S TEQ(I)	0.00	2.55	5.04]

Group Totals	Conc	LOR4	No. of
	pg/g	pg/g	Peaks
Tetra-Dioxins	<0.5	0.5	1
Penta-Dioxins	<2.5	2.5	1
Hexa-Dioxins	<2.5	2.5	1
Hepta-Dioxins	<2.5	2.5	1
Octa-Dioxin	<10.0	10.0	1
Tetra-Furans	<0.5	0.5	1
Penta-Furans	<2.5	2.5	1
Hexa-Furans	<2.5	2.5	1
Hepta-Furans	<2.5	2.5	1
Octa-Furan	<5.0	5.0	1
S PCDD/Fs	0.00		

LOR = Limit of reporting I-TEF = International toxic equivalency factor I-TEQ = International toxic equivalence (pg/g) WHO-TEF = World Health Organistaion toxic equivalency factor WHO-TEQ = World Health Organisation toxic equivalence (pg/g) T = tetra Pe = penta Hx = hexa Hp =hepta O = octa CDD, dioxin = chlorinated dibenzo-p-dioxin CDF, furan = chlorinated dibenzofuran 1 I-TEQ(zero) and WHO-TEQ(zero) calculated treating <LOR as zero concentration (pg/g) 2 I-TEQ(0.5 LOR) and WHO-TEQ(0.5 LOR) calculated treating <LOR as 50% LoR concentration (pg/g) $_3$ I-TEQ(LOR) and WHO-TEQ(LOR) calculated treating <LOR as LoR concentration (pg/g)

4 Totals LORs are calculated by mutiplying the number of peaks by the individual LOR per compound

<u>Notes</u>

,					-							A	F68	5	84	5				B
- Contraction	CHAIN C CUSTO ALS Labora please t	roraka SA 6095 elsglebat.com Istefford QED 4053 Istikane@alsglobat.com h. Drive Clinten OLD 4690 gealsglobai.com	EIMELBOURNE 2-4 Weshall Road Springrals VIC 3171 EIMELBOURNE 2-4 Weshall Road Springrals VIC 3171 EIMELBOURNE 2-4 Weshall Road Springrals VIC 3171 rsm EIMELBOURNE 2-4 Weshall Road Springrals VIC 3171 EIMEVCA8511E 6 Roads Common Road Wataprovo NSW 233 rsm EIMELBOURNE 2-4 Weshall Road Springrals VIC 3171 EIMOWER 4/1/3 Geary Place North Howa NSW 2541 rsm Phr 03 6590 5600 € rsmptles.metbourne@alegiobal.com Phr 02 482 2083 E: anorte@alegiobal.com y 4680 CIMUDGEE 27 Syday Road Multidges NSW 2850 EIMERTH 10 Hod Way Malaga WA 6090 Phr 02 6972 6735 E: multiges.metli@alegiobal.com Phr 06 9209 7655 E: samples.parh@alegiobal.com					k NSW 2304 JobaLeom NSW 2541 J90 JlsglobaLeom	Stoff LISYDNEY 277-288 Woodpark Road Smithald NW 276 m Pik 02 8794 E655 Examples widnay@lasylobil.com 41 LIYOWLSVILE 14-145 Deama Cont Bolds OLD 4818 Pik 07 4766 0600 E: townswiks-environmental@lasylobil.com Loom Pik 02 4225 3125 E: portkambla@lasylobil.com					84 om 500						
LIENT:	GHD Pty Ltd		TURNAROU	ND REQUIREMENT	Standa	ard TAT (Lis	t due date):			and the second		FOR	LABORAT	ORY US		Y (Ci	rcle)		and all	-Section
FFICE:	level 15, 133 Castlereagh St, Sydney		(Standard TAT some tests e.g.	may be longer for . Ultra Trace	Non St	andard or u	rgent TAT (Li	st due date):		15 1 10	Custo	dy Seal Intac	1?			1	/es	No	Ð
ROJECT	: 12517046		ALS QUOTE	NO.:	SY-552-19)			COC SEQU	JENCE NUMB	ER (Circle)	Free k	cev frozen ic	e bricks (oresent	upon re	ceipt?	res	No	N/
RDER N	UMBER:							coc	* 1) 2	3 4	5 6	7 Rando	om Sample T	emperati	ure on R	eceipt:		3-9	°C	
ROJECT	MANAGER: Carmen Yi	CONTACT P	H: 0451 962 9	88			1	OF	1 2	3 4	5 6	7 Other	comment:	11.6			1. 50	- 1		
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OC ema	iled to ALS? (YES / NO)	EDD FORM	AT (or default)	:	S. Ecclesha	all		X	p-ALS ((mous 1	VIST							- as ~1.	A-3	
mail Rep	orts to: sarah.eccleshall@ghd.com; ca	armen.yi@ghd.com; labreprots@	Dghd.com		DATE/TIME	1 - 11	n < .	IC DAT	E/TIME:	171-	-	DATE/TIME	:			2.4	DATE/	TIME:	a 101	-
mail Invo	pice to (will default to PM if no other add	dresses are listed):			101	(0/1	9 3	ipa s	1/10/10	ins	<u></u>	1.110			01	1	31	lor.	1 184	23
OMMEN	TS/SPECIAL HANDLING/STORAGE O	R DISPOSAL:					r		100	hore	1 11	11/19	2:	52	pp	2				
ALS USE	SAMPLE DETAILS	X: SOLID (S) WATER (W)	an an an an an an an an an an an an an a	CONTAINE	R INFORMA	TION			ANALY Where Metals	SIS REQUIRE are required, s	D including S pecify Total (SUITES (NB. Su unfiltered bottle	uite Codes mi required) or	ust be lis Dissolve	ted to at ad (field	tract su filtered	ite price bottle re) iquired).		
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESER (refer below)	VATIVE to codes	TOTAL CONTAINERS	ASS Field Screen (pH field ad pHfox)	Phenols	ТКН	BTEXN	TOC	TCN	OC/OP/PCB	OC/OP/PCB PAH Total Fluoride VOCs		VOCs Particle Size		ICMPS Metals (15 metals + low level Hg)		Hold
1	VC09_0.0-0.2	30/10/2019 20:45	s	Jar		1		x	x	x	x	x	x	×			×	r		
2	VC09_0.4-0.6	30/10/2019 20:45	S	Jar		1	Cui	00120	WHERE IS	/Split T	WO	Environm Sydney	ental Divis	sion						x
3	VC09_0.7-0.8	30/10/2019 20:45	S	Jar		1	Ú.	anist i	in l'hote	FLUCERDE	& PSD	ES1	9360	29						x
4	VC09_0.8-1.0	30/10/2019 20:45	s	Jar		1	Cor	nnote / 4	Leaders.	a car of any an and the	and the transformed and the second		2.0%2° (%)4							x
5	VC09_0.0-0.5	30/10/2019 20:45	s	Jar		2	Wi Att) (Mor Lett 12 y 1	Pair / Encer	ai Sheet					-					x
6	VC09_0.5-1.0	30/10/2019 20:45	S	Jar		2	1.1					elephone : +	61-2-8784 8555							x
7	VC07_0.0-0.2	30/10/2019 21:00	s	Jar		1		x	x	x	x	×	×	×	x	x	×	1		
3	VC07_0.5-0.6	30/10/2019 21:00	S	Jar		1	(Cub	Cost 2's	rvari Los BRIS	Split V	NO.		Lanco	D/Co Analy	rwaz sis:_	ti La	6/SI SCRO	plit W(ja l	х
9	VC07_0.7-0.8	30/10/2019 21:00	S	Jar		1	Urg	anisati i	VERCER	ASS FO	ECO		Organ	ised f	NY/I	ate: 7 Do	F	002		x
10	VC07_1.0-1.2	30/10/2019 21:00	S	Jar		1	Con	105 - 1	A This same	 and the state of the state of the state and the state of	and and the set of		Conno	te/C	ourie	RS		and the two and the		x
11	VC07_0.0-0.5	30/10/2019 21:00	S	jar and	В	4	Atte	cn 3× r	C. tisk at	heet:	X	x	Atten	sy P	0/1	atera	tal SP	Cettan	to all a second	
- 12	VC07_0.5-1.0	30/10/2019 21:00	S	Jar		3							1.1							x
					TOTAL															
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	fainer Codes: P = Uppreserved Plastic: N		1 2 C	and the second second				1 States in	A CAR SALE				ALL STORE							

CLIENT:	GHD Pty Ltd		TURNAROU	ND REQUIREMENT	Stand	ard TAT (Lis	t due date):					FOR	LABORAT	ORY U	SE ON	ILY (C	ircle)		Cost 14 August		
OFFICE:	level 15, 133 Castlereagh St, Sydney		(Standard TAT some tests e.g.	may be longer for . Ultra Trace	Non S	Standard or u	rgent TAT (Li	st due date)	:			Custo	dy Seal Inta	ct?				Yes		No	G
PROJECT: 12517046 ALS QUOTE NO.: SY-552-19									COC SEQU	UENCE NUME	ER (Circle)	Free	ice / frozen i	ce bricks	present	t upon r	receipt	Yes		No	N
ORDER N	IUMBER:		4	coc	: 1 2	3 4	5 6	Rand	om Sample ⁻	remperat	lure on I	Receipt	t	6		.С					
PROJECT	MANAGER: Carmen Yi	CONTACT P	H: 0451 962 9	88				OF:	1 2	3 4	5 6	Boher	comment:				2	5-7		See.	
SAMPLE	R: Sarah Eccleshall	SAMPLER	OBILE: 0459	546 332	RELINQUI	SHED BY:		REC	EIVED BY:			RELINQUIS	SHED BY:				RECE	EIVED	BY: L	0	
COC ema	iled to ALS? (YES / NO)	EDD FORM	AT (or default)		S. Ecclesh	nall		Sec	p M.								120	42	N'N	Jus .	
Email Rep	ports to: sarah.eccleshall@ghd.com; car	men.yi@ghd.com; labreprots@	@ghd.com		DATE/TIM	E:		DAT	E/TIME:			DATE/TIME					DATE	TIME	1101	19	171.5
Email Inv	oice to (will default to PM if no other addre	esses are listed):					-	1	INAM	.0	tube	,	120	11.0				21	1 10 1	11	10%)
COMMEN	ITS/SPECIAL HANDLING/STORAGE OR	DISPOSAL:						-	for for	g	111/19	2	34	M							
ALS USE	SAMPLE DETAILS	SOLID (S) WATER (W)		CONTAINE	R INFORMA	ATION			ANALY Where Metals	SIS REQUIRE	D including SU specify Total (un	TES (NB. Su filtered bottle	uite Codes n required) or	nust be lis Dissolv	sted to a red (field	attract s d filtered	uite pric d bottle	e) require	d).		
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESER (rafer below)	XVATIVE to codes	TOTAL CONTAINERS	AS3 Field Screen (pH field ad pHfox)	Phenols	ТКН	BTEXN	TOC	TCN	OC/OP/PCB	РАН	Total Fluoride	vocs	Particle Size distribution	ICMPS Metals (15 metals + Iow level Hg)	8 metals	TRH C6-C10	BTEX
81	FD01	30/10/2019	s	JAR		1		x	x	x	x	x	x	x				x			
	FD02	30/10/2019	s	JAR	Sec. 2	1		x	x	x	x	x	x	x	1980			x	Plea	ise foi	rward to
2.2	FD03	30/10/2019	S	JAR							1.180									euro	x
9.3	FD05	31/10/2019	s	Jar		1		x	x	x	x	x	x	x			198	x			
24	RIN_01	30/10/2019 0:00	W			4			x	x				x					x		
.85	TS1	30/10/2019 0:00	S	jar					Sec. 4	x			Filles								
26	TB1	30/10/2019 0:00	S	jar		11.1		1000											7	к 3	x
87	TSC		1.158.86	B. S. RES		1		1.1			4.500										
				1.000																	
													1								
19.2			1.23						11216						19.5			1			
							1		-	1				-							

Version Container Container Contest: P = Unpreserved Plastic; N = Nutric Preserved Plastic; NC = Nutric Preserved Plastic; N



Environment Testing Melbourne 6 Monterey Road Unit F3, Building F Unit F3, Building F Dandenong South Vis 3175 16 Mars Road Place Murarrie QLD 4172 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271 NATA # 1261 Site # 16217

Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736

e.mail : EnviroSales@eurofins.com ABN - 50 005 085 521 web : www.eurofins.com.au

Sample Receipt Advice

Company name:	GHD Pty Ltd NSW
Contact name:	Carmen Yi
Project name:	12517046
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Nov 1, 2019 2:52 PM
Eurofins reference:	685895

Sample information

- A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- \checkmark Sample Temperature of a random sample selected from the batch as recorded by Eurofins Sample Receipt : 17.8 degrees Celsius.
- All samples have been received as described on the above COC.
- COC has been completed correctly.
- Attempt to chill was evident.
- Appropriately preserved sample containers have been used.
- All samples were received in good condition.
- Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- \mathbf{V} Appropriate sample containers have been used.
- \times Split sample sent to requested external lab.
- \boxtimes Some samples have been subcontracted.
- Custody Seals intact (if used). N/A

Contact notes

If you have any questions with respect to these samples please contact:

Alena Bounkeua on Phone : or by e.mail: AlenaBounkeua@eurofins.com

Results will be delivered electronically via e.mail to Carmen Yi - carmen.yi@ghd.com.



ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au Melbourne 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271 Sydney Unit F3, Building F 16 Mars Road Lane Cove West NSW 2066 Phone : +61 2 9900 8400 NATA # 1261 Site # 18217

Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794 Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736

Company Name: GHD Pty Ltd NSW Address: Level 15, 133 Castlereagh Street Sydney NSW 2000 Project Name: 12517046								rder N eport none: ix:	lo.: #:	6 0 0	885895 12 9239 7100 12 9239 7199	Reco Due: Prio Con Eurofins A	eived: : ity: tact Name: Analytical Servi	Nov 1, 2019 2:52 PM Nov 8, 2019 5 Day Carmen Yi ices Manager : Alena Bounkeua
	Sample Detail Melbourne Laboratory - NATA Site # 1254 & 14271							Eurofins mgt Suite B15	Moisture Set	Eurofins mgt Suite B4A				
Melb	ourne Laborato	ory - NATA Site	# 1254 & 142	.71		Х	х	х	х	х				
Sydn	ney Laboratory	- NATA Site # 1	8217								4			
Brisk	bane Laborator	/ - NATA Site #	20794								4			
Perth	rth Laboratory - NATA Site # 23736							-			-			
No	Sample ID	Sample Date	Sampling	Matrix	LAB ID						-			
1	ED02	Oct 20, 2010	Time	Soil	S10 No01404	v	v		v	v	-			
Tost	Test Counts							1	1	1	-			
rest	t Counts							1		1				



Certificate of Analysis

Environment Testing

GHD Pty Ltd NSW Level 15, 133 Castlereagh Street Sydney NSW 2000





NATA Accredited Accreditation Number 1261 Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention:	
Report	
Project name	

Received Date

685895-S 12517046 Nov 01, 2019

Carmen Yi

	1	1	1
Client Sample ID			FD02
Sample Matrix			Soil
Eurofins Sample No.			S19-No01404
Date Sampled			Oct 30, 2019
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fract	ions		
TRH C6-C9	20	mg/kg	< 20
TRH C10-C14	20	mg/kg	< 20
TRH C15-C28	50	mg/kg	< 50
TRH C29-C36	50	mg/kg	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50
втех			
Benzene	0.1	mg/kg	< 0.1
Toluene	0.1	mg/kg	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2
o-Xylene	0.1	mg/kg	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3
4-Bromofluorobenzene (surr.)	1	%	86
Total Recoverable Hydrocarbons - 2013 NEPM Fract	ions		
Naphthalene ^{N02}	0.5	mg/kg	< 0.5
TRH C6-C10	20	mg/kg	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20
TRH >C10-C16	50	mg/kg	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50
TRH >C16-C34	100	mg/kg	< 100
TRH >C34-C40	100	mg/kg	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5



Client Sample ID			FD02
Sample Matrix			Soil
Eurofins Sample No.			S19-No01404
Date Sampled			Oct 30, 2019
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons		0	
Fluoranthene	0.5	ma/ka	< 0.5
Fluorene	0.5	ma/ka	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	ma/ka	< 0.5
Naphthalene	0.5	ma/ka	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	66
p-Terphenyl-d14 (surr.)	1	%	60
Organochlorine Pesticides			
Chlordanes - Total	0.1	mg/kg	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05
a-BHC	0.05	mg/kg	< 0.05
Aldrin	0.05	mg/kg	< 0.05
b-BHC	0.05	mg/kg	< 0.05
d-BHC	0.05	mg/kg	< 0.05
Dieldrin	0.05	mg/kg	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05
Endrin	0.05	mg/kg	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05
Heptachlor	0.05	mg/kg	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05
Toxaphene	1	mg/kg	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1
Dibutylchlorendate (surr.)	1	%	83
Tetrachloro-m-xylene (surr.)	1	%	64
Organophosphorus Pesticides			
Azinphos-methyl	0.2	mg/kg	< 0.2
Bolstar	0.2	mg/kg	< 0.2
Chlorevinphos	0.2	mg/kg	< 0.2
Chlorowites method	0.2	mg/kg	< 0.2
	0.2	mg/kg	< 0.2
Demotor S	2	mg/kg	< 2
Demeton O	0.2	mg/kg	< 0.2
	0.2	mg/kg	< 0.2
	0.2	mg/kg	< 0.2
Dimethoate	0.2	mg/kg	~ 0.2
Difformatio	0.2	i ing/kg	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \



Client Sample ID			FD02
Sample Matrix			Soil
Eurofins Sample No.			S19-No01404
Date Sampled			Oct 30, 2019
Test/Poforonco		Linit	00000, 2010
Organonhosphorus Pesticides	LOK	Unit	
Disulfoton	0.2	ma/ka	< 0.2
EPN	0.2	mg/kg	< 0.2
Ethion	0.2	ma/ka	< 0.2
Ethoprop	0.2	ma/ka	< 0.2
Ethyl parathion	0.2	ma/ka	< 0.2
Fenitrothion	0.2	ma/ka	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2
Fenthion	0.2	mg/kg	< 0.2
Malathion	0.2	mg/kg	< 0.2
Merphos	0.2	mg/kg	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2
Mevinphos	0.2	mg/kg	< 0.2
Monocrotophos	2	mg/kg	< 2
Naled	0.2	mg/kg	< 0.2
Omethoate	2	mg/kg	< 2
Phorate	0.2	mg/kg	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2
Ronnel	0.2	mg/kg	< 0.2
Terbufos	0.2	mg/kg	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2
Tokuthion	0.2	mg/kg	< 0.2
Trichloronate	0.2	mg/kg	< 0.2
Triphenylphosphate (surr.)	1	%	66
Polychlorinated Biphenyls			
Aroclor-1016	0.1	mg/kg	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1
Total PCB*	0.1	mg/kg	< 0.1
Dibutylchlorendate (surr.)	1	%	83
Tetrachloro-m-xylene (surr.)	1	%	64
Phenois (Halogenated)	a =		
2-Chlorophenol	0.5	mg/kg	< 0.5
2.4-Dichlorophenol	0.5	mg/kg	< 0.5
2.4.5-1 richlorophenol	1	mg/kg	< 1
2.4.0-1 richlorophenol	1	mg/kg	< 1
	0.5	mg/kg	< 0.5
4-Onioro-3-metnyipnenoi	1	mg/kg	< 1
	10	mg/kg	< 1
	10	mg/kg	< 10
i olar halogenaleu Phenor		ппд/кд	< 1



Client Sample ID Sample Matrix			FD02 Soil
Eurofins Sample No.			S19-No01404
Date Sampled			Oct 30, 2019
Test/Reference	LOR	Unit	
Phenols (non-Halogenated)			
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2
2-Nitrophenol	1.0	mg/kg	< 1
2.4-Dimethylphenol	0.5	mg/kg	< 0.5
2.4-Dinitrophenol	5	mg/kg	< 5
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4
4-Nitrophenol	5	mg/kg	< 5
Dinoseb	20	mg/kg	< 20
Phenol	0.5	mg/kg	< 0.5
Total Non-Halogenated Phenol*	20	mg/kg	< 20
Phenol-d6 (surr.)	1	%	60
	-		
Cyanide (total)	5	mg/kg	< 5
Total Organic Carbon	0.1	%	< 0.1
% Moisture	1	%	15



Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported. A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins mgt Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Nov 07, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Nov 07, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Nov 07, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Nov 07, 2019	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Nov 07, 2019	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Nov 07, 2019	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Nov 07, 2019	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Eurofins mgt Suite B15			
Organochlorine Pesticides	Melbourne	Nov 07, 2019	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Organophosphorus Pesticides	Melbourne	Nov 07, 2019	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS (USEPA 8081)			
Polychlorinated Biphenyls	Melbourne	Nov 07, 2019	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Cyanide (total)	Melbourne	Nov 11, 2019	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Organic Carbon	Melbourne	Nov 08, 2019	28 Days
- Method: LTM-INO-4060 Total Organic Carbon in water and soil			
% Moisture	Melbourne	Nov 01, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			



ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au Melbourne 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271

Sydney Unit F3, Building F 16 Mars Road Lane Cove West NSW 2066 Phone : +61 2 9900 8400 NATA # 1261 Site # 18217 Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794 Perth 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736

Company Name:GHD Pty Ltd NSWAddress:Level 15, 133 Castlereagh Street Sydney NSW 2000Project Name:12517046			Order No.:Report #:685895Phone:02 9239 7100Fax:02 9239 7199			6 0 0	85895 2 9239 7100 2 9239 7199 Eur	Received: Due: Priority: Contact Name: ofins Analytical Serv	Nov 1, 2019 2:52 PM Nov 8, 2019 5 Day Carmen Yi ices Manager : Alena Bounkeua				
		Sa	mple Detail			Cyanide (total)	Total Organic Carbon	Eurofins mgt Suite B15	Moisture Set	Eurofins mgt Suite B4A			
Melbo	ourne Laborato	ory - NATA Site	# 1254 & 142	71		х	х	х	х	Х			
Sydn	ey Laboratory	NATA Site # 1	8217								-		
Brisb	ane Laboratory	/ - NATA Site #	20794										
Perth	Laboratory - N	IATA Site # 237	36								-		
No	Sample ID	Sample Date	Sampling	Matrix									
	Cample ID		Time	INIGU IA									
1	FD02	Oct 30, 2019		Soil	S19-No01404	Х	х	Х	Х	Х			
Test	Counts					1	1	1	1	1			



Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site 1. Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- 2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- 3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- 5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds
- 6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- 7. Samples were analysed on an 'as received' basis.
- 8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
- This report replaces any interim results previously issued. 9.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days. **NOTE: pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ug/L: micrograms per litre
ppm: Parts per million	ppb: Parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms	
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
сос	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
СР	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

- 1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- 2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- 3. Organochlorine Pesticide analysis where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
- 4. Organochlorine Pesticide analysis where reporting Spike data, Toxaphene is not added to the Spike.
- Total Recoverable Hydrocarbons where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported 5. in the C10-C14 cell of the Report.
- 6. pH and Free Chlorine analysed in the laboratory Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- 7. Recovery Data (Spikes & Surrogates) where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
- 8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
- 9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
- 10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.



Quality Control Results

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank				1		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	mg/kg	< 20		20	Pass	
TRH C10-C14	mg/kg	< 20		20	Pass	
TRH C15-C28	mg/kg	< 50		50	Pass	
TRH C29-C36	mg/kg	< 50		50	Pass	
Method Blank			r	1		
ВТЕХ						
Benzene	mg/kg	< 0.1		0.1	Pass	
Toluene	mg/kg	< 0.1		0.1	Pass	
Ethylbenzene	mg/kg	< 0.1		0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2		0.2	Pass	
o-Xylene	mg/kg	< 0.1		0.1	Pass	
Xylenes - Total	mg/kg	< 0.3		0.3	Pass	
Method Blank				1		
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene	mg/kg	< 0.5		0.5	Pass	
TRH C6-C10	mg/kg	< 20		20	Pass	
TRH >C10-C16	mg/kg	< 50		50	Pass	
TRH >C16-C34	mg/kg	< 100		100	Pass	
TRH >C34-C40	mg/kg	< 100		100	Pass	
Method Blank				-		
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	mg/kg	< 0.5		0.5	Pass	
Acenaphthylene	mg/kg	< 0.5		0.5	Pass	
Anthracene	mg/kg	< 0.5		0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5		0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5		0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5		0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5		0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5		0.5	Pass	
Chrysene	mg/kg	< 0.5		0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5		0.5	Pass	
Fluoranthene	mg/kg	< 0.5		0.5	Pass	
	mg/kg	< 0.5		0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5		0.5	Pass	
Naphthalene	mg/kg	< 0.5		0.5	Pass	
Prienantriene	mg/kg	< 0.5		0.5	Pass	
Pytene Method Plank	mg/kg	< 0.5		0.5	Fass	
Organachlaring Basticidas						
Chlordanes - Total	ma/ka	< 0.1		0.1	Pass	
	mg/kg	< 0.05		0.05	Pass	
4.4-DDE	mg/kg	< 0.05		0.05	Pass	
	mg/kg	< 0.05		0.05	Pass	
a-BHC	mg/kg	< 0.05		0.05	Pase	
Aldrin	mg/kg	< 0.05		0.05	Pase	
h-BHC	ma/ka	< 0.05		0.05	Pase	
d-BHC	mg/kg	< 0.05		0.05	Pase	
Dieldrin	ma/ka	< 0.05		0.05	Pase	
Endosulfan I	ma/ka	< 0.05		0.05	Pass	
Endosulfan II	ma/ka	< 0.05		0.05	Pass	



Test	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan sulphate	mg/kg	< 0.05	0.05	Pass	
Endrin	mg/kg	< 0.05	0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05	0.05	Pass	
Endrin ketone	mg/kg	< 0.05	0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05	0.05	Pass	
Heptachlor	mg/kg	< 0.05	0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05	0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05	0.05	Pass	
Methoxychlor	mg/kg	< 0.05	0.05	Pass	
Toxaphene	mg/kg	< 1	1	Pass	
Method Blank					
Organophosphorus Pesticides					
Azinphos-methyl	mg/kg	< 0.2	0.2	Pass	
Bolstar	mg/kg	< 0.2	0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2	0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2	0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2	0.2	Pass	
Coumaphos	mg/kg	< 2	2	Pass	
Demeton-S	mg/kg	< 0.2	0.2	Pass	
Demeton-O	mg/kg	< 0.2	0.2	Pass	
Diazinon	mg/kg	< 0.2	0.2	Pass	
Dichlorvos	mg/kg	< 0.2	0.2	Pass	
Dimethoate	mg/kg	< 0.2	0.2	Pass	
Disulfoton	mg/kg	< 0.2	0.2	Pass	
EPN	mg/kg	< 0.2	0.2	Pass	
Ethion	mg/kg	< 0.2	0.2	Pass	
Ethoprop	mg/kg	< 0.2	0.2	Pass	
Ethyl parathion	mg/kg	< 0.2	0.2	Pass	
Fenitrothion	mg/kg	< 0.2	0.2	Pass	
Fensulfothion	mg/kg	< 0.2	0.2	Pass	
Fenthion	mg/kg	< 0.2	0.2	Pass	
Malathion	mg/kg	< 0.2	0.2	Pass	
Merphos	mg/kg	< 0.2	0.2	Pass	
Methyl parathion	mg/kg	< 0.2	0.2	Pass	
Mevinphos	mg/kg	< 0.2	0.2	Pass	
Monocrotophos	mg/kg	< 2	2	Pass	
Naled	mg/kg	< 0.2	0.2	Pass	
Omethoate	mg/kg	< 2	2	Pass	ļ
Phorate	mg/kg	< 0.2	0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2	0.2	Pass	
Pyrazophos	mg/kg	< 0.2	0.2	Pass	
Ronnel	mg/kg	< 0.2	0.2	Pass	
Terbufos	mg/kg	< 0.2	0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2	0.2	Pass	
Tokuthion	mg/kg	< 0.2	0.2	Pass	
Trichloronate	mg/kg	< 0.2	0.2	Pass	
Method Blank		i		1	
Polychlorinated Biphenyls					
Arocior-1016	mg/kg "	< 0.1	0.1	Pass	
Arocior-1221	mg/kg	< 0.1	0.1	Pass	
Arocior-1232	mg/kg	< 0.1	0.1	Pass	
Arocior-1242	mg/kg	< 0.1	0.1	Pass	
Arocior-1248	mg/kg	< 0.1	0.1	Pass	
Aroclor-1254	mg/kg	< 0.1	0.1	Pass	1



Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Aroclor-1260	mg/kg	< 0.1		0.1	Pass	
Total PCB*	mg/kg	< 0.1		0.1	Pass	
Method Blank						
Phenols (Halogenated)						
2-Chlorophenol	mg/kg	< 0.5		0.5	Pass	
2.4-Dichlorophenol	mg/kg	< 0.5		0.5	Pass	
2.4.5-Trichlorophenol	mg/kg	< 1		1	Pass	
2.4.6-Trichlorophenol	mg/kg	< 1		1	Pass	
2.6-Dichlorophenol	mg/kg	< 0.5		0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1		1	Pass	
Pentachlorophenol	mg/kg	< 1		1	Pass	
Tetrachlorophenols - Total	mg/kg	< 10		10	Pass	
Method Blank	00					
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	mg/kg	< 20		20	Pass	
2-Methyl-4.6-dinitrophenol	mg/kg	< 5		5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2		0.2	Pass	
2-Nitrophenol	mg/kg	< 1		1.0	Pass	
2.4-Dimethylphenol	mg/kg	< 0.5		0.5	Pass	
2.4-Dinitrophenol	mg/kg	< 5		5	Pass	
3&4-Methylphenol (m&p-Cresol)	ma/ka	< 0.4		0.4	Pass	
4-Nitrophenol	ma/ka	< 5		5	Pass	
Dinoseb	ma/ka	< 20		20	Pass	
Phenol	ma/ka	< 0.5		0.5	Pass	
Method Blank			1 1			
Total Organic Carbon	%	< 0.1		0.1	Pass	
LCS - % Recovery		-				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	%	124		70-130	Pass	
TRH C10-C14	%	83		70-130	Pass	
LCS - % Recovery						
BTEX						
Benzene	%	106		70-130	Pass	
Toluene	%	104		70-130	Pass	
Ethylbenzene	%	101		70-130	Pass	
m&p-Xylenes	%	103		70-130	Pass	
Xylenes - Total	%	104		70-130	Pass	
LCS - % Recovery						
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene	%	95		70-130	Pass	
TRH C6-C10	%	124		70-130	Pass	
TRH >C10-C16	%	78		70-130	Pass	
LCS - % Recovery						
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	%	116		70-130	Pass	
Acenaphthylene	%	120		70-130	Pass	
Anthracene	%	109		70-130	Pass	
Benz(a)anthracene	%	105		70-130	Pass	
Benzo(a)pyrene	%	119		70-130	Pass	
Benzo(b&j)fluoranthene	%	115		70-130	Pass	
Benzo(g.h.i)perylene	%	80		70-130	Pass	
Benzo(k)fluoranthene	%	92		70-130	Pass	
Chrysene	%	121		70-130	Pass	
Dibenz(a.h)anthracene	%	129		70-130	Pass	



Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Fluoranthene	%	108		70-130	Pass	
Fluorene	%	92		70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	78		70-130	Pass	
Naphthalene	%	102		70-130	Pass	
Phenanthrene	%	109		70-130	Pass	
Pyrene	%	112		70-130	Pass	
LCS - % Recovery						
Organochlorine Pesticides						
Chlordanes - Total	%	87		70-130	Pass	
4.4'-DDD	%	93		70-130	Pass	
4.4'-DDE	%	96		70-130	Pass	
4.4'-DDT	%	92		70-130	Pass	
a-BHC	%	94		70-130	Pass	
Aldrin	%	96		70-130	Pass	
b-BHC	%	92		70-130	Pass	
d-BHC	%	106		70-130	Pass	
Dieldrin	%	102		70-130	Pass	
Endosulfan I	%	97		70-130	Pass	
Endosulfan II	%	91		70-130	Pass	
Endosulfan sulphate	%	77		70-130	Pass	
Endrin	%	83		70-130	Pass	
Endrin aldehyde	%	92		70-130	Pass	
Endrin ketone	%	102		70-130	Pass	
g-BHC (Lindane)	%	101		70-130	Pass	
Heptachlor	%	95		70-130	Pass	
Heptachlor epoxide	%	102		70-130	Pass	
Hexachlorobenzene	%	106		70-130	Pass	
Methoxychlor	%	80		70-130	Pass	
LCS - % Recovery	70	00		10 100	1 400	
Organophosphorus Pesticides						
Diazinon	%	82		70-130	Pass	
Dimethoate	%	78		70-130	Pass	
Ethion	%	72		70-130	Pass	
Fenitrothion	%	100		70-130	Pass	
Methyl parathion	%	103		70-130	Pass	
Mexinghos	%	73		70-130	Pass	
LCS - % Recovery	/0	10		10 100	1 455	
Polychlorinated Binhenvis						
Aroclor-1260	%	96		70-130	Pass	
LCS - % Recovery	/0			10 100	1 455	
Phenols (Halogenated)						
2-Chlorophenol	%	109		30-130	Pass	
2.4-Dichlorophenol	/0 0/_	103		30-130	Dass	
2.4 5-Trichlorophenol	70 0/_	102		30-130	Dass	
2.4.6 Trichlorophonol	70 0/	104		30 130	Pass	
	/0 0/	110		30-130	Pass	
4 Chloro 2 methylphonol	/0	114		30-130	Pass	
A-Chiolo-3-methyphenol	0/	64		30-130	Pass	
	-70 07	104		20 120	Page	
	70		<u> </u>	30-130	F d 55	
Dhanala (nen Halageneted)						
Prienois (non-Halogenated)	0/	50		20.400	Der	
2-Oycionexyi-4.6-dinitrophenoi	<u>%</u>	59		30-130	Pass	
	<u>%</u>	60		30-130	Pass	
2-wetnylphenol (o-Cresol)	%	111		30-130	Pass	



Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
2-Nitrophenol			%	115		30-130	Pass	
2.4-Dimethylphenol			%	85		30-130	Pass	
2.4-Dinitrophenol			%	34		30-130	Pass	
3&4-Methylphenol (m&p-Cresol)			%	117		30-130	Pass	
4-Nitrophenol			%	84		30-130	Pass	
Dinoseb			%	83		30-130	Pass	
Phenol			%	110		30-130	Pass	
LCS - % Recovery								
Total Organic Carbon			%	104		70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance	Pass Limits	Qualifying
Spike - % Recovery		ocuroo					2	
Total Recoverable Hydrocarbons -	1999 NEPM Fract	ions		Result 1				
TRH C6-C9	M19-No01888	NCP	%	104		70-130	Pass	
TRH C10-C14	M19-No00059	NCP	%	109		70-130	Pass	
Spike - % Recovery								
BTEX				Result 1				
Benzene	M19-No01888	NCP	%	105		70-130	Pass	
Toluene	M19-No01888	NCP	%	110		70-130	Pass	
Ethylbenzene	M19-No01888	NCP	%	110		70-130	Pass	
m&p-Xylenes	M19-No01888	NCP	%	115		70-130	Pass	
o-Xylene	M19-No01888	NCP	%	114		70-130	Pass	
Xylenes - Total	M19-No01888	NCP	%	115		70-130	Pass	
Spike - % Recovery								
Total Recoverable Hydrocarbons -	2013 NEPM Fract	ions		Result 1				
Naphthalene	M19-No01888	NCP	%	94		70-130	Pass	
TRH C6-C10	M19-No01888	NCP	%	117		70-130	Pass	
TRH >C10-C16	M19-No00059	NCP	%	103		70-130	Pass	
Spike - % Recovery								
Polycyclic Aromatic Hydrocarbons				Result 1				
Acenaphthene	M19-No00942	NCP	%	98		70-130	Pass	
Acenaphthylene	M19-No00942	NCP	%	102		70-130	Pass	
Anthracene	M19-No00942	NCP	%	98		70-130	Pass	
Benz(a)anthracene	M19-No00942	NCP	%	86		70-130	Pass	
Benzo(a)pyrene	M19-No00942	NCP	%	99		70-130	Pass	
Benzo(b&j)fluoranthene	M19-No00942	NCP	%	118		70-130	Pass	
Benzo(g.h.i)perylene	M19-No00942	NCP	%	92		70-130	Pass	
Benzo(k)fluoranthene	M19-No00942	NCP	%	126		70-130	Pass	
Chrysene	M19-No00942	NCP	%	93		70-130	Pass	
Dibenz(a.h)anthracene	M19-No00942	NCP	%	83		70-130	Pass	
Fluoranthene	M19-No00942	NCP	%	80		70-130	Pass	
Fluorene	M19-No00942	NCP	%	109		70-130	Pass	
Indeno(1.2.3-cd)pyrene	M19-No00942	NCP	%	86		70-130	Pass	
Naphthalene	M19-No00942	NCP	%	111		70-130	Pass	
Phenanthrene	M19-No00942	NCP	%	89		70-130	Pass	
Pyrene	M19-No00942	NCP	%	75		70-130	Pass	
Spike - % Recovery								
Organochlorine Pesticides				Result 1				
Chlordanes - Total	S19-No00985	NCP	%	81		70-130	Pass	
4.4'-DDD	S19-No00985	NCP	%	80		70-130	Pass	
4.4'-DDE	S19-No00985	NCP	%	76		70-130	Pass	
4.4'-DDT	S19-No00985	NCP	%	80		70-130	Pass	
a-BHC	S19-No00985	NCP	%	95		70-130	Pass	
Aldrin	S19-No00985	NCP	%	104		70-130	Pass	
b-BHC	S19-No00985	NCP	%	82		70-130	Pass	



Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
d-BHC	S19-No00985	NCP	%	93			70-130	Pass	
Dieldrin	S19-No00985	NCP	%	73			70-130	Pass	
Endosulfan I	S19-No00985	NCP	%	107			70-130	Pass	
Endosulfan II	S19-No00985	NCP	%	101			70-130	Pass	
Endosulfan sulphate	S19-No00985	NCP	%	87			70-130	Pass	
Endrin	S19-No00985	NCP	%	93			70-130	Pass	
Endrin aldehyde	S19-No00985	NCP	%	102			70-130	Pass	
Endrin ketone	S19-No00985	NCP	%	100			70-130	Pass	
g-BHC (Lindane)	S19-No00985	NCP	%	110			70-130	Pass	
Heptachlor	S19-No00985	NCP	%	91			70-130	Pass	
Heptachlor epoxide	S19-No00985	NCP	%	79			70-130	Pass	
Hexachlorobenzene	S19-No00985	NCP	%	76			70-130	Pass	
Methoxychlor	S19-No00985	NCP	%	71			70-130	Pass	
Spike - % Recovery	•						•		
Organophosphorus Pesticides				Result 1					
Diazinon	Z19-Oc47469	NCP	%	106			70-130	Pass	
Dimethoate	W19-Oc31011	NCP	%	79			70-130	Pass	
Ethion	Z19-Oc47469	NCP	%	81			70-130	Pass	
Fenitrothion	Z19-Oc47469	NCP	%	97			70-130	Pass	
Methyl parathion	Z19-Oc47469	NCP	%	109			70-130	Pass	
Mevinphos	Z19-Oc47469	NCP	%	78			70-130	Pass	
Spike - % Recovery	•						•		
Polychlorinated Biphenyls				Result 1					
Aroclor-1016	M19-Oc49034	NCP	%	110			70-130	Pass	
Aroclor-1260	S19-Oc36566	NCP	%	90			70-130	Pass	
Spike - % Recovery	•						•		
Phenols (Halogenated)				Result 1					
2-Chlorophenol	M19-No00942	NCP	%	91			30-130	Pass	
2.4-Dichlorophenol	M19-No00942	NCP	%	89			30-130	Pass	
2.4.5-Trichlorophenol	M19-No00942	NCP	%	93			30-130	Pass	
2.4.6-Trichlorophenol	M19-No00942	NCP	%	84			30-130	Pass	
2.6-Dichlorophenol	M19-No00942	NCP	%	89			30-130	Pass	
4-Chloro-3-methylphenol	M19-No00942	NCP	%	100			30-130	Pass	
Pentachlorophenol	M19-No00942	NCP	%	61			30-130	Pass	
Tetrachlorophenols - Total	M19-No00942	NCP	%	84			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4.6-dinitrophenol	M19-No00942	NCP	%	46			30-130	Pass	
2-Methyl-4.6-dinitrophenol	M19-No00942	NCP	%	55			30-130	Pass	
2-Methylphenol (o-Cresol)	M19-No00942	NCP	%	92			30-130	Pass	
2-Nitrophenol	M19-No00942	NCP	%	85			30-130	Pass	
2.4-Dimethylphenol	M19-No00942	NCP	%	77			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	M19-No00942	NCP	%	99			30-130	Pass	
4-Nitrophenol	M19-No00942	NCP	%	112			30-130	Pass	
Dinoseb	M19-No00942	NCP	%	86			30-130	Pass	
Phenol	M19-No00942	NCP	%	91			30-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate				_	_				
Total Recoverable Hydrocarbons -	1999 NEPM Fract	ions		Result 1	Result 2	RPD			
1RH C6-C9	M19-No01887	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
IRH C10-C14	M19-No00058	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
IRH C15-C28	M19-No00058	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
IRH C29-C36	M19-No00058	NCP	mg/kg	< 50	< 50	<1	30%	Pass	



Duplicate						-	-		
BTEX				Result 1	Result 2	RPD			
Benzene	M19-No01887	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M19-No01887	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M19-No01887	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M19-No01887	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M19-No01887	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	M19-No01887	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate							-		
Total Recoverable Hydrocarbons -	2013 NEPM Fract	ions	-	Result 1	Result 2	RPD			
Naphthalene	M19-No01887	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	M19-No01887	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M19-No00058	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate				1					
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M19-No02371	NCP	mg/kg	1.3	0.6	70	30%	Fail	Q15
Acenaphthylene	M19-No02371	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M19-No02371	NCP	mg/kg	1.3	< 0.5	110	30%	Fail	Q15
Benz(a)anthracene	M19-No02371	NCP	mg/kg	1.5	< 0.5	120	30%	Fail	Q15
Benzo(a)pyrene	M19-No02371	NCP	mg/kg	1.1	< 0.5	100	30%	Fail	Q15
Benzo(b&j)fluoranthene	M19-No02371	NCP	mg/kg	1.1	< 0.5	110	30%	Fail	Q15
Benzo(g.h.i)perylene	M19-No02371	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M19-No02371	NCP	mg/kg	1.5	< 0.5	110	30%	Fail	Q15
Chrysene	M19-No02371	NCP	mg/kg	1.4	< 0.5	110	30%	Fail	Q15
Dibenz(a.h)anthracene	M19-No02371	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M19-No02371	NCP	mg/kg	4.2	1.3	110	30%	Fail	Q15
Fluorene	M19-No02371	NCP	mg/kg	0.9	< 0.5	82	30%	Fail	Q15
Indeno(1.2.3-cd)pyrene	M19-No02371	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M19-No02371	NCP	mg/kg	2.5	1.8	35	30%	Fail	Q15
Phenanthrene	M19-No02371	NCP	mg/kg	3.1	1.1	98	30%	Fail	Q15
Pyrene	M19-No02371	NCP	mg/kg	3.6	1.1	110	30%	Fail	Q15
Duplicate				1	-				
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M19-No02371	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
а-ВНС	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M19-No02371	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M19-Oc30269	NCP	mg/kg	<1	< 1	<1	30%	Pass	



Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M19-No02371	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M19-No02371	NCP	ma/ka	< 2	< 2	<1	30%	Pass	
Naled	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M19-No02371	NCP	ma/ka	< 2	< 2	<1	30%	Pass	
Phorate	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M19-No02371	NCP	ma/ka	< 0.2	< 0.2	<1	30%	Pass	
Duplicate				-					
Polychlorinated Biphenvis				Result 1	Result 2	RPD			
Aroclor-1016	M19-No02371	NCP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1221	M19-No02371	NCP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1232	M19-No02371	NCP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1242	M19-No02371	NCP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1248	M19-No02371	NCP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1254	M19-No02371	NCP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1260	M19-No02371	NCP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Total PCB*	M19-No02371	NCP	ma/ka	< 0.1	< 0.1	<1	30%	Pass	
Duplicate	111011002011	1101	mg/ng	4 0.1	V 0.1		0070	1 400	
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M19-No02371	NCP	ma/ka	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dichlorophenol	M19-No02371	NCP	ma/ka	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	M19-No02371	NCP	ma/ka	< 1	< 1	<1	30%	Pass	
2.4.6-Trichlorophenol	M19-No02371	NCP	ma/ka	< 1	< 1	<1	30%	Pass	
2.6-Dichlorophenol	M19-No02371	NCP	ma/ka	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	M19-No02371	NCP	ma/ka	< 1	< 1	<1	30%	Pass	
Pentachlorophenol	M19-No02371	NCP	ma/ka	~ 1	< 1	~1	30%	Pass	
Tetrachlorophenols - Total	M19-No02371	NCP	ma/ka	< 10	< 10	<1	30%	Pass	
							0070		i



Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	M19-No02371	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	M19-No02371	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	M19-No02371	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
2-Nitrophenol	M19-No02371	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4-Dimethylphenol	M19-No02371	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dinitrophenol	M19-No02371	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	M19-No02371	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
4-Nitrophenol	M19-No02371	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Dinoseb	M19-No02371	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Phenol	M19-No02371	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Organic Carbon	S19-No01404	CP	%	< 0.1	< 0.1	<1	30%	Pass	
% Moisture	M19-No01150	NCP	%	12	11	9.0	30%	Pass	



Comments

Sample Integrity	
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code Description

N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Alena Bounkeua	
Harry Bacalis	
Joseph Edouard	
Julie Kay	

Analytical Services Manager Senior Analyst-Volatile (VIC) Senior Analyst-Organic (VIC) Senior Analyst-Inorganic (VIC)

Glenn Jackson General Manager Final report - this Report replaces any previously issued Report

- Indicates Not Requested

 * Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please $\underline{\text{click here.}}$

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Appendix F - Calibration certificates

PhoCheck Tiger Instrument Serial No. T-111087



Air-Met Scientific Pty Ltd 1300 137 067

Item	Test	Pass			Comments	S	
Battery	Charge Condition	\checkmark					
	Fuses	✓					
	Capacity	1					
	Recharge OK?	✓					
Switch/keypad	Operation	1					
Display	Intensity	1					
	Operation (segments)	1					
Grill Filter	Condition	√					1 2
	Seal	✓					
Pump	Operation	1					
	Filter	1					
	Flow	\checkmark					
	Valves, Diaphragm	1					
PCB	Condition	1					
Connectors	Condition	1					
Sensor	PID	✓	10.6 ev				
Alarms	Beeper	✓	Low	High	TWA	STEL	
	Settings	1	50ppm	100ppm			
Software	Version	1					
Data logger	Operation	1					
Download	Operation	✓					
Other tests:							

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Diffusion mode Aspirated mode

Sensor	Serial no	Calibration gas and	Certified	Gas bottle	Instrument Reading
		concentration		No	
PID Lamp		92ppm Isobutylene	NATA	SY245	91.3ppm
	0				

-

Sarabba Calibrated by: Sarah Lian

Calibration date: 30/10/2019 Next calibration due:

27/04/2020

Multi Parameter Water Meter

YSI Quatro Pro Plus Instrument Serial No. 12D100012



30/10/2019

Item	Test	Pass	Comments
Battery	Charge Condition	\checkmark	
	Fuses	1	
	Capacity	✓	
Switch/keypad	Operation	\checkmark	
Display	Intensity	1	
	Operation (segments)	✓	
Grill Filter	Condition	1	
	Seal	✓	
PCB	Condition	1	
Connectors	Condition	×	
Sensor	1. pH	✓	
	2. mV	1	
	3. EC	1	
	4. D.O	1	
	5. Temp	1	
Alarms	Beeper		
T-Spectra	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle	Instrument Reading
				Number	
1. pH 10.00		pH 10.00		324189	pH 9.48
2. pH 7.00	Sec. 1 also	pH 7.00		320613	pH 6.98
3. pH 4.00		pH 4.00	and the second second	330734	pH 4.25
4. mV	12	229.6mV		338782/337308	229.9mV
5. EC	122	2.76mS		333787	2.75mS
6. D.O	made & Call	0.00ppm	1	329994	0.00ppm
7. Temp	5 4 S. N.	21.6°C		MultiTherm	21.2°C

Sarah Lian

Calibration date:

30/10/2019

Next calibration due:

30/11/2019

GHD

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52284/https://projectsportal.ghd.com/sites/pp15_04/circularquayinvestig/ProjectDocs/12517046-REP-0 Sediment assessment_Rev0.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	S.Eccleshall	J. Hallchurch	Abellehinh	J Hallchurch	Abellehinh	03/08/2020

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