



**PRELIMINARY SITE (CONTAMINATION) ASSESSMENT**  
**792 SEAHAM ROAD, SEAHAM**

**Prepared for Mr B Statham**

**Prepared by RCA Australia**

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## RCA AUSTRALIA

ABN 53 063 515 711

92 Hill Street, CARRINGTON NSW 2294


Telephone: +61 2 4902 9200

Facsimile: +61 2 4902 9299

Email: [administrator@rca.com.au](mailto:administrator@rca.com.au)

Internet: [www.rca.com.au](http://www.rca.com.au)

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13 November 2020

Mr B Statham  
C/- Le Mottee Group  
PO Box 363  
Raymond Terrace NSW 2324

Attention: Kate Wheeler (Le Mottee Group)

Geotechnical Engineering

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Construction Materials Testing

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## **PRELIMINARY SITE (CONTAMINATION) ASSESSMENT**

### **792 SEAHAM ROAD, SEAHAM**

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#### **EXECUTIVE SUMMARY**

This report presents the findings of a preliminary site (contamination) assessment undertaken at 792 Seaham Road, Seaham.

It is understood that the owner of the site is seeking to rezone the land for a nineteen (19) Lot subdivision for residential use and as part of gateway approval for this is required to undertake a preliminary site (contamination) assessment by the Department of Planning, Industry and Environment (DPIE).

The purpose of the investigation is to provide a report to address the DPIE requirement and facilitate the continued assessment of the proposed rezoning and associated development. The objective of this investigation is to identify whether there is potential for contamination at the site which may pose a constraint to the proposed development of the site.

The assessment comprising a desktop assessment of site historical use and consideration of potential contamination, as well as soil sampling at four (4) locations at the site and two (2) surface water samples.

No potential contamination activities were identified at the site or surrounding areas by the desktop assessment which comprised review of aerial photography as well as Council and NSW EPA records. It was considered that contamination was limited to the agricultural use of the site and potential localised fill placement in low lying areas. The potential for some areas of the site to comprise acid sulfate soil is noted however was not further investigated as part of this assessment.

Contamination was identified at one (1) location (S1), with benzene in excess of the human health guidelines (Ref [2]). This location was in an identified burn pit, which appeared to have been used to burn timber located within the site, with this the likely causing the presence of the benzene. Given the site is to be developed into nineteen (19) individual Lots with some earthworks involved it is expected that this small area would be scraped out and removed and in combination with the site history assessment, RCA considers that there has been sufficient assessment to consider that there is a negligible potential for contamination within the in-situ soils.

Concentrations of hydrocarbons and metals were in excess of the ecological (Ref [4]) and the drinking water (Ref [5]) guidelines. These are not considered to pose a current risk to the environment or to human health and, on the understanding that these dams will be filled as part of the proposed development, RCA does not consider that any further work is required. RCA recommend that the water be removed during the filling of the dams by irrigation over the site at a rate that it infiltrates and surface water does not enter any waterway.

RCA considers based on the current assessment that the conditions at the site are suitable for the proposed residential use subject to:

- Removal of the burnt residue. Visual verification of the removal of burnt residue and an over-excavation of 0.1m is considered sufficient for the purpose of confirming the removal of the identified contamination.
- Removal of isolated refuse identified at the site.
- Disposal of water from the dams during filling by irrigation, and infiltration, over the site. No water is to be permitted to enter a waterway.
- Implementation of an industry standard unexpected finds protocol, dust and surface water management.

# Contents

1	INTRODUCTION .....	1
2	SITE IDENTIFICATION AND DESCRIPTION .....	1
3	SITE HISTORY AND BACKGROUND INFORMATION .....	2
3.1	SITE NOTIFICATIONS .....	2
3.2	HISTORICAL MAPS AND PHOTOGRAPHS .....	3
3.3	CONTAMINATED LAND PUBLIC RECORD .....	4
3.4	GEOLOGY AND HYDROGEOLOGY .....	4
3.5	INTEGRITY ASSESSMENT .....	5
4	PRELIMINARY CONCEPTUAL SITE MODEL .....	6
5	SAMPLING AND ANALYTICAL QUALITY PLAN .....	7
5.1	STEP 1 – STATE THE PROBLEM .....	7
5.2	STEP 2 – IDENTIFY THE GOALS AND DECISIONS .....	7
5.3	STEP 3 – IDENTIFY INPUTS TO THE DECISIONS .....	7
5.4	STEP 4 – DEFINE THE BOUNDARIES OF THE INVESTIGATION .....	8
5.5	STEP 5 – DEVELOP THE DECISION RULES .....	8
5.6	STEP 6 – ACCEPTABLE LIMITS ON DECISION ERRORS .....	9
5.7	STEP 7 – OPTIMISATION OF THE DESIGN OF THE COLLECTION OF DATA .....	10
6	FIELDWORK .....	12
7	QUALITY ASSURANCE/QUALITY CONTROL .....	13
8	RESULTS .....	13
8.1	SOIL .....	14
8.2	SURFACE WATER .....	14
9	SITE CONTAMINATION CHARACTERISATION .....	15
10	CONCLUSIONS .....	16
11	LIMITATIONS .....	17
	REFERENCES .....	18
	GLOSSARY .....	18

## APPENDIX A

### *DRAWING*

## APPENDIX B

### *HISTORICAL PHOTOGRAPHS*

## APPENDIX C

### *REGISTERED GROUNDWATER WELL INFORMATION*

## APPENDIX D

### *SITE PHOTOGRAPHS*

## APPENDIX E

***SCREENING LEVELS AND GUIDELINES***

**APPENDIX F**

***QUALITY ASSURANCE REVIEW AND LABORATORY REPORT SHEETS***

**APPENDIX G**

***SUMMARY OF RESULTS***

## 1 INTRODUCTION

This report presents the findings of a preliminary site (contamination) assessment undertaken at 792 Seaham Road, Seaham.

It is understood that the owner of the site is seeking to rezone the land for a nineteen (19) Lot subdivision for residential use and as part of gateway approval for this is required to undertake a preliminary site (contamination) assessment by the Department of Planning, Industry and Environment (DPIE).

The purpose of the investigation is to provide a report to address the DPIE requirement and facilitate the continued assessment of the proposed rezoning and associated development. The objective of this investigation is to identify whether there is potential for contamination at the site which may pose a constraint to the proposed development of the site.

The assessment was undertaken at the request of the owner of the site, Mr Statham and is provided to Le Mottee Group on his behalf.

## 2 SITE IDENTIFICATION AND DESCRIPTION

The site is described as 792 Seaham Road, Seaham, NSW, Lot 100 and DP1064980.

Additional site details are shown in **Table 1**.

**Table 1**      *Site Details*

<b>Current zoning (Ref [1])</b>	RU1 – Primary Production
<b>Current use(s) Proposed use</b>	The northern portion of site comprises the residence with the remainder of the site used for agricultural (grazing) usage and/or unused.  The site is proposed to be divided into nineteen (19) residential lots.
<b>Size of site</b>	38ha
<b>Land use to the:</b>	
<b>North</b>	Rural property
<b>South</b>	Rural property then residential
<b>East</b>	Rural properties
<b>West</b>	Seaham Road then residential properties
<b>Nearest sensitive receptor (human health)</b>	Residential housing to the north, south and west.
<b>Nearest sensitive receptor (environmental)</b>	Unnamed creek within the site, which flows south to north from across Seaham Road into the neighbouring property and eventually the Williams River approximately 3kms to the east.

**Drawing 1, Appendix A** shows the locality and the layout of the site.

### 3 SITE HISTORY AND BACKGROUND INFORMATION

#### 3.1 SITE NOTIFICATIONS

The Section 10.7 Planning Certificate as specified under the Environmental Planning and Assessment Regulation 2000 (Schedule 4) includes information associated with any restrictions for the use of the land.

Information relevant to this obtained from the 10.7 certificate and relevant to the site is contained in **Table 2**.

**Table 2** *Planning Advice Contained in the 10.7 Certificate*

<p><b>Part 2 relevant Information</b></p>	<ul style="list-style-type: none"> <li>• Multiple SEPP that apply to the site.</li> <li>• Port Stephens Local Environmental Plan 2013.</li> <li>• The land <b>does not</b> include or comprise critical habitat.</li> <li>• The land <b>is not</b> in a conservation area.</li> <li>• There are <b>no</b> heritage items within the site.</li> <li>• The land <b>is not</b> within a proclaimed Mine Subsidence District under the <i>Coal Mine Subsidence Compensation Act 2017</i>.</li> <li>• The land <b>is not</b> affected by any road widening or realignment.</li> <li>• The land <b>is not</b> affected by RAAF Base Williamstown and Salt Ash Air Weapons Range 2025 Australian Noise Exposure Forecast (10<sup>th</sup> August 2011) or the Aircraft Noise Planning Area under the Port Stephens Council Aircraft Noise Policy.</li> <li>• The site <b>is in</b> Flood Planning Area.</li> <li>• The land <b>is not</b> biodiversity certified land under Part 8 of the <i>Biodiversity Conservation Act 2016</i>.</li> <li>• The land <b>does not</b> contain a set aside area for native vegetation clearing under section 60ZC of the <i>Local Land Services Act 2013</i>.</li> <li>• Part of the land <b>is</b> bushfire prone land.</li> <li>• The land <b>is not</b> subject to an order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.</li> <li>• There are <b>no</b> directions under Part 3A which apply to the land.</li> <li>• Council have <b>not</b> received a notification that the site contains premises containing loose fill asbestos ceiling insulation.</li> <li>• There are <b>no</b> matters arising under the Contaminated Land Management Act 1997 which apply to the site.</li> </ul>
<p><b>Part 5 relevant Information</b></p>	<ul style="list-style-type: none"> <li>• The land <b>is</b> identified as containing a wetland in Port Stephens Local Environmental Plan 2013.</li> <li>• Port Stephens Council takes into account – Heritage, Aboriginal Archaeology, Aircraft Noise, Koala Habitat and Invasive Species.</li> </ul>

RCA undertook a search of the NSW Department of Planning, Industry and Environment register for Seaham and identified that there are no Aboriginal Places or items on the State Heritage Register within vicinity of the site.

### 3.2 HISTORICAL MAPS AND PHOTOGRAPHS

RCA undertook a search through the collections of the Newcastle Library (<http://www.newcastle.nsw.gov.au/Library/Heritage-History/Search-the-Collection/Hunter-PhotoBank>) and did not identify any records relevant to the site.

RCA undertook a search through the State Library of NSW (<http://archival.sl.nsw.gov.au/home>) and did not identify any photographs relevant to the site.

RCA reviewed historical aerial photographs and **Table 3** summarises the observations at the site and the surrounding environment.

**Table 3** *Aerial Photograph Review*

<b>1966 – B&amp;W</b>	<p>The site appears to be predominately undeveloped with trees through the central portion of the site with the remaining portions of the site vegetated with grass. A gully, presumably the current water course and dam, runs through the site on the north west corner of the site. A building, likely the current existing residential, is located on the north east corner of the site.</p> <p>Several buildings are visible north east of the site, presumably residential and sheds. The adjacent land to the north, east, south and west appear to be either undeveloped bushland or agricultural land, presumably for grazing.</p>
<b>1976 – B&amp;W</b>	<p>The site appears to have changed little with the exception of what appears to be a dam wall within the water course.</p> <p>The surrounding area appears to have changed little with the exception of a dam located on the southern side of the southern boundary of the site and a large rectangle building located approximately 600m to the south-south west of the site consistent with the current location of poultry shed.</p>
<b>1984- B&amp;W</b>	<p>The site appears to be unchanged since the 1976 aerial photograph.</p> <p>The surrounding area appears to have changed little with the exception of additional two (2) large rectangle buildings located adjacent the existing poultry shed approximately 600m to the south-south west of the site, along with a further two (2) large rectangle buildings, also considered likely to be poultry sheds, approximately 180m to the west of the other large buildings.</p>
<b>1993 – B&amp;W</b>	<p>The site appears to be unchanged since the 1984 aerial photograph.</p> <p>The surrounding area appears to have changed little since the previous aerial photograph.</p>
<b>2001 - Colour</b>	<p>The site appears to have changed little since the 1993 aerial photograph.</p> <p>The area to the east and south have been developed significantly with residential housing, while north and east have changed little. Additional large rectangle sheds have been constructed in the vicinity of the previously identified sheds.</p>
<b>2004 - Colour</b>	<p>The site appears to have changed little since the 2001 aerial photograph.</p> <p>The surrounding area has changed little since the previous photograph.</p>
<b>2010 - Colour</b>	<p>The site appears to have changed little since the 2004 aerial photograph.</p> <p>The surrounding area has changed little since the previous photograph</p>
<b>2015 - Colour</b>	<p>The site appears to have changed little since the 2010 aerial photograph.</p> <p>The surrounding area has changed little since the previous photograph</p>
<b>2020 - Colour</b>	<p>The site appears to have changed little since the 2015 aerial photograph.</p> <p>The surrounding area has changed little since the previous photograph</p>

Reviewed documentation is included in **Appendix B**.

### 3.3 CONTAMINATED LAND PUBLIC RECORD

RCA undertook a search of the NSW EPA public lands register (<http://www.epa.nsw.gov.au/publicregister/>) and did not find any record of Environment Protection licences, applications, notices, audits or pollution studies and reduction programmes applicable to the site. Hanson Construction Material, off Seaham Road, Seaham currently has an Environmental Protection Licence, originally issued July 2000, with several variations to the licence. Rachael Rapson of 1004 Newline Road, East Seaham was issued a Clean-Up Notice 25 July 2018 for stockpiles of concrete, brick, tile, timber, plastic, reo steel and suspected asbestos fragments within the for mentioned site. Variation of Issue Clean-Up Notice were additionally issued on five (5) separate occasions till May 2019.

RCA undertook a search of sites notified to the NSW EPA as potentially requiring regulation (<http://www.epa.nsw.gov.au/clm/publiclist.htm> as updated 11 September 2020<sup>1</sup> and confirmed that the site is not notified, nor is there any site within Seaham, Nelson Plains or Brandy Hill.

RCA undertook a search of the NSW EPA gasworks database (<http://www.epa.nsw.gov.au/clm/gasworkslocation.htm>) and determined that there are no known gasworks within vicinity of the site.

RCA undertook a search of the NSW Office of Fair Trading asbestos insulation register ([http://www.fairtrading.nsw.gov.au/ftw/Tenants\\_and\\_home\\_owners/Loose\\_fill\\_asbestos\\_insulation/Public\\_Search/LFAI\\_Public\\_Register.page](http://www.fairtrading.nsw.gov.au/ftw/Tenants_and_home_owners/Loose_fill_asbestos_insulation/Public_Search/LFAI_Public_Register.page)) and determined the absence of known loose-fill asbestos insulation in the buildings at the site.

RCA undertook a search of the NSW Department of Primary Industries (NSW DPI) register for cattle dip sites (<http://www.dpi.nsw.gov.au/animals-and-livestock/beef-cattle/health-and-disease/parasitic-and-protozoal-diseases/ticks/cattle-dip-site-locator>) and determined that there are no known cattle dip sites on site or within vicinity of the site.

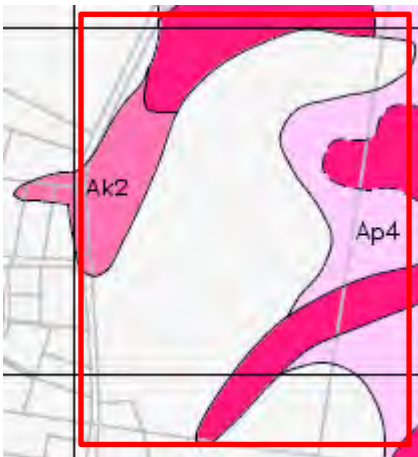
RCA undertook a search of Department of Industry naturally occurring asbestos mapping (<https://trade.maps.arcgis.com/apps/PublicInformation/index.html?appid=87434b6ec7dd4aba8cb664d8e646fb06> ) and determined that there are no known point occurrences or geological units with medium to high asbestos potential.

### 3.4 GEOLOGY AND HYDROGEOLOGY

RCA reviewed published geological and hydrogeological maps and summarised the findings in **Table 4**.

<sup>1</sup> It is noted that since the desktop work was undertaken that this list was refreshed on 22 October 2020. No sites of relevance were identified.

**Table 4**      *Geology and Hydrogeology*

<b>Soil type</b>	Branxton formation consisting of sandstone, siltstone, conglomerate and erratics.
<b>Acid sulfate soil</b>	<p>The north western portion of the site is within alluvium backswamp, with high probability of acid sulfate soils between 1 and 3 metres below the ground surface. The eastern portion of the site is alluvium plain with high probability of with acid sulfate soils greater than 3 metres below the ground surface. The southern portion of the site is alluvium backswamp, with high probability of acid sulfate soils at or near the ground surface.</p> 
<b>Groundwater use</b>	No groundwater use is currently known to be undertaken at the site.
<b>Number of monitoring wells on site</b>	Nil known
<b>Depth to groundwater</b>	Unknown
<b>Estimated Groundwater flow direction</b>	Unknown, thought to be to the east towards the lower lying land and Williams River
<b>Background water quality</b>	Unknown

The groundwater information is attached in **Appendix C**.

### 3.5 INTEGRITY ASSESSMENT

Information obtained from the 10.7 Certificate is presumed to be accurate however is limited to information Council has obtained and documented.

Information obtained from aerial photography is limited in that it only provides a snapshot of the site in time. RCA considers that adequate coverage was achieved for this investigation with aeriels available for every decade from the 1960s onwards.

Overall RCA considers that the site history review is adequate to provide a general understanding of the past nature of land use at the site.

#### 4 PRELIMINARY CONCEPTUAL SITE MODEL

Based on RCA's understanding of the site it has been rural, agricultural land with only limited use associated with the existing dwelling on site. As such potential contamination is considered limited to:

- Historical filling of the site:
  - Some of the site is low lying, and subject to flooding, and as such there may have been localised fill placed at the site or for the construction of a dam at the western portion of the property. If this has occurred, depending on the source of the fill, there may be contaminated soil to the depth of filling and contaminated groundwater due to leaching through the contaminated fill. Contaminants of concern are considered to be hydrocarbons and metals. Asbestos may be present if anthropogenic material is present within the fill.
  - Risks associated with this material are considered to be limited to direct exposure by ingestion or dermal contact. The presence of asbestos would give rise to an inhalation risk.
  - Off site impacts are considered to be related only to the potential for groundwater contamination.
- Site activities associated with agricultural use:
  - This may have resulted in surface contamination by pesticides and herbicides. This potential would be higher if there has been cultivation of the site than for use of the property for grazing. There may be additional contamination potential if there has been a fuel or chemical storage at the site.
  - Risks associated with this material are considered to be associated with ingestion or dermal contact.
  - Off site impacts are considered minimal, although there may have been some transportation/migration of dust and fines in stormwater.
- Use of asbestos containing building materials at the site:
  - If asbestos containing materials were used in construction, and depending on the condition and location within the (current and potentially former) buildings at the site this may have resulted in surface soil contamination. Subsurface contamination may be present if excess building materials were inappropriately disposed of at site at time of construction.
  - The risks associated with this contamination are considered to be due to inhalation directly or secondarily from adhered fibres on equipment and clothing.
  - Off site impacts are possible, depending on the extent of the degradation of building materials.
- Presence of acid sulfate soils. The Maitland Acid Sulfate Soil Risk Map indicates that the majority of the site is situated within an area of no known acid sulfate soil potential.
  - The presence of actual or potential acid sulfate soils pose a risk of acid generation which may impact on buried infrastructure, environmental receptors

and impact on removal of soil from site. It is noted that there is a transmission easement which crosses the area of shallow soil risk.

- The risks associated with acid generation is the corrosion of buried infrastructure, acidification of the groundwater and surface water receptors and associated mobility of some contaminants, particularly metals. Actual, or potential, acid sulfate soil cannot be classified under the resource recovery orders and exemptions and cannot be removed to a licensed waste facility unless neutralised.

## 5 SAMPLING AND ANALYTICAL QUALITY PLAN

Based on the preliminary conceptual site model, there is potential for hydrocarbon, metals and asbestos contamination arising from filling, along with potential for pesticide and herbicide contamination from agricultural activities. No formal sampling and analytical quality plan (SAQP) was developed for the project, however the following sections provides detail and rationale regarding the scope of works undertaken.

### 5.1 STEP 1 – STATE THE PROBLEM

Based on the preliminary conceptual site model, there is potential for hydrocarbon, metals and asbestos contamination arising from filling, along with potential for pesticide and herbicide contamination from agricultural activities. There was potential for acid sulfate soil in some areas of the site however it was determined that assessment of the constraints would be left until following consent and undertaken on a per subdivided Lot.

### 5.2 STEP 2 – IDENTIFY THE GOALS AND DECISIONS

The key uncertainty that the investigation has attempted to address was:

- Are there concentrations of contaminants which exceed acceptable levels to preclude the site from being used for the proposed residential use?

In order to resolve this uncertainty, decisions were to be made as to the presence and significance of potential contamination such that management measures can be designed to reduce risk. The specific decisions to be made were to:

- Investigate past and present potential contamination sources.
- Determine the nature of contamination.
- Determine the geology and hydrogeology.
- Determine the potential and actual contaminant migration routes.
- Determine whether contaminants exceed acceptable levels.
- Determine whether further investigation or management is required.

### 5.3 STEP 3 – IDENTIFY INPUTS TO THE DECISIONS

The specific types of information needed to resolve the decision statements in Step 2 were noted as follows:

- Adequate conceptual site model.
- Soil material type.

- Analytical data for the collected samples.
- Appropriate assessment criteria for the media being investigated and the approved use of the land.
- Appropriate field methods.
- Appropriate laboratory analysis methods.

The ASC NEPM (Ref [2]) document has been approved by the NSW EPA for use on potentially contaminated sites and supersedes most of the preceding reference documents. The criteria from the ASC NEPM (Ref [2]) was to be used to determine the significance of any contamination found.

Best practice in alignment with Council's requirements under SEPP 55 (Ref [3]) prescribes assessment on the basis of the most sensitive allowable site use. The current land zone is RU1 – Primary Production and the proposed use is for residential land, RCA therefore considers the criteria (Ref [2]) as defined for residential with soil access use to be appropriate for assessment of human health risk from the soil at the site. The ecological risk was to be also assessed under the criteria defined for residential and recreational land use.

Full details of the relevant guidelines are included in **Appendix E**.

#### **5.4 STEP 4 – DEFINE THE BOUNDARIES OF THE INVESTIGATION**

The horizontal extent of the assessment has been defined by the cadastral lot as shown in the site plan (**Drawing 1, Appendix A**) and was interpreted in the field based on fencing and vegetation (trees).

The vertical extent has been determined by consideration of the conceptual site model and the objectives of the assessment and was to comprise:

- Surface samples for the purposes of soil assessment.

Practical constraints that could have interfered with sampling include:

- Fences.
- Property access.

#### **5.5 STEP 5 – DEVELOP THE DECISION RULES**

The Data Quality Indicators (DQI) that were implemented for the project are detailed in **Table 5**.

**Table 5** *Data Quality Indicators Implemented for the Assessment*

DQI	Determined by	Criteria
Accuracy	Internal – surrogates, laboratory control samples, matrix spikes, method blanks.	Surrogate, LCS, spike - recovery data to be 70-130%. Blanks – results to be < PQL.
Precision	Internal – laboratory duplicates	RPD of duplicates: <ul style="list-style-type: none"> <li>• 50% RPD at concentration levels greater than ten times the PQL.</li> <li>• 75% RPD at concentrations between five to ten times the PQL.</li> <li>• 100% RPD at concentration levels between two and five times the PQL.</li> </ul> Where concentration levels are less than two times the PQL, the Absolute Difference (AD) shall be calculated. Data will be considered acceptable if the AD < 2.5 times the PQL.
Completeness	The percentage of completed data points, taking in account consideration of other DQI.	95%
Representativeness	Whether there has been sufficient sampling by appropriate methodology with relevant analysis to determine that the assessment is representative of the site conditions.	
Comparability	<ul style="list-style-type: none"> <li>• All samples collected during this sampling programme were to be obtained by adequately trained RCA personnel using consistent sampling methodologies throughout the project.</li> <li>• All samples must be received by the laboratory cool and appropriately preserved for the requested analysis with sufficient time within the specified holding time.</li> <li>• All laboratory analyses were to be conducted by NATA accredited methodologies that comply with the international standard methods referred to in the ASC NEPM (Ref [2]) guidelines.</li> <li>• Comparable analytes such as Total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH) and metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc, mercury) should show some concurrence between analytical results and to identified field observations.</li> </ul>	

## 5.6 STEP 6 – ACCEPTABLE LIMITS ON DECISION ERRORS

If the data received was not in accordance with the defined acceptable limits outlined in Step 5, it may have been considered to be an estimate or be rejected. Determination of whether this data may be used or, if re-sampling was required, would have been based on the following considerations:

- Closeness of the result to the guideline concentrations.
- Data analysis and the acceptance of 95% UCL as the true mean value of the data set and understanding that a conclusive statement made on these grounds has a 5% chance of being inaccurate.

- Specific contaminant of concern (eg, response to carcinogens may be more conservative).
- The area of site in question and the potential lateral and vertical extent of questionable information.
- Whether the uncertainty can be effectively managed by site management controls.

If any of the data validation procedures or criteria identified were not followed or met, this will have constituted a non-conformance. The significance of the non-conformance will have determined if rectification was required, is presented in **Appendix F**.

## **5.7 STEP 7 – OPTIMISATION OF THE DESIGN OF THE COLLECTION OF DATA**

The scope of work comprised collection of soil samples from ten (10) soil sampling locations up to 0.1m based on a judgemental sampling pattern to provide characterisation of potential contamination within soils throughout the site. Collection from one (1) surface water sampling location located within the site.

Disturbed soil samples were to have been collected directly from hand tools at all locations. This method was chosen due to the minimal disturbance to the ground or other potential underground infrastructure.

Water samples were to have been collected directly from the identified water body.

Decontamination of soil sampling equipment was to have been undertaken by brushing of excess soil from the auger between locations. New, disposable nitrile gloves were to be employed at each sampling location.

Samples were to have been laboratory analysed from a suite comprising BTEX, TRH (C<sub>6</sub>-C<sub>40</sub>), PAH and metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), pesticides (OCP, OPP) and herbicides depending on the location of the sample and field observations of potential contamination.

Samples were to have been stored in the field in an insulated container on ice and sent to the laboratory under Chain of Custody (COC) documentation.

ALS was to have been used as the primary analysing laboratory for all analyses as well as quality assurance samples due to its NATA accreditation and experience with potentially contaminated soil.

The scope is summarised in **Table 6**.

**Table 6**      *Sampling Strategy*

<b>Contaminating activity</b>	<b>Potential Contaminants of Concern</b>	<b>Sampling Strategy</b>	<b>Rationale for Sampling Strategy and Sampling Locations</b>
Historical filling of the site, use of ACM and pesticides and herbicides	TRH, BTEX, PAH, metals, pesticides and herbicides.	Collection of soil samples at 0.1 below the surface. Additional samples will be collected based on field observations of contamination or to characterise strata. Hand tools will be utilised to obtain disturbed samples.	Up to ten (10) locations were chosen to provide characterisation of potential contamination within the fill at the site and from on-site and off-site sources. A judgmental sampling pattern was employed based on available site history information regarding potential contaminants of concern and site walkover.
<b>Surface Water</b>			
Pesticides and herbicide usage.	TRH, BTEX, PAH, metals, pesticides and herbicides	RCA have allowed for the analysis of one (1) sample from the site. Additional samples will be collected based on field observations.	The one (1) surface water location was chosen from available aerial imagery.

## 6 FIELDWORK

RCA undertook a site inspection on 16 October 2020 and recorded the following observations in **Table 7**.

**Table 7** *General Site Conditions and Observations*

<b>Topography</b>	The sit slopes gently from the western boundary downgradient to the east and north and then slopes moderately up gradient to centre of the site and then slopes moderately from the centre of the site to the east, west and south with the northern portion of the site sloping then rising to the northern boundary. then slopes more moderately
<b>Site condition</b>	The majority of the site appears to be have been unused with vegetation, i.e. grass and weeds, covering the entire site. The central portion of the site was covered with large eucalyptus trees. There was a dam in the north eastern portion of the site, with trees surrounding the western bank. A creek flowed from the middle portion of the western boundary towards the northern boundary on the western portion of the site. The creek was dammed with soil.
<b>Condition of Building and roads</b>	The site had a residential dwelling and shed in the north eastern corner of the site which were in good condition. There were no visible roads on the site.
<b>Visual Signs of contamination</b>	There were no signs of contamination.
<b>Signs of erosion</b>	There were no signs of erosion.
<b>Presence of drums or waste</b>	There were several locations that had superficial waste, i.e. cabinet pieces. There were no other signs of waste or drums. Of note: there was some PVC pipe, metal and timber within the dam/creek that appeared to be previously used for recreation (wake boarding).
<b>Identification of potential asbestos bearing materials</b>	There were no signs of asbestos containing material.
<b>Visible signs of plant stress</b>	There were no signs of plant stress. Of note: there were several dead trees, either standing or fallen, though they appear to have died naturally i.e. age related, along with several burn pits that appear to have been used to burn the timber.
<b>Odours noticeable on site</b>	There were no noticeable odours on the site.
<b>Evidence of current or former petroleum facilities</b>	There was no evidence of current or former petroleum facilities.
<b>Chemicals stored on site</b>	There appeared to be no chemicals stored on the site.
<b>Evidence of waste burial: (anecdotal or otherwise)</b>	There was no evidence of buried waste.

The location of photographs taken during the site inspection are shown on **Drawing 1, Appendix A** and attached in **Appendix D**.

An environmental scientist experienced in the handling of potentially contaminated soil/surface water undertook the fieldwork on 16 October 2020. The scope of work included:

- A site inspection.
- The collection of four (4) soil samples from four (4) locations on the site:
  - Samples were collected from the surface utilising hand tools. Sampling depths were determined due to the preliminary nature of the investigation and signs of surface contamination.
  - S1 was collected from an observed fire pit.
  - S2 was collected from an observed fire pit.
  - S3 was collected from within a fill mound utilised as a dam/weir for creek flowing through the western portion of the site.
  - S4 was collected to aid in determining the usage of pesticides and /or herbicides within the site.

Sample locations are shown on **Drawing 1, Appendix A**.

- All selected soil samples were laboratory analysed for BTEX, TRH (C<sub>6</sub>-C<sub>40</sub>), PAH and metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), pesticides (OCP, OPP) and herbicides.
- The collection of two (2) surface water samples from two (2) dams within the site.
- All selected surface water samples were laboratory analysed for BTEX, TRH (C<sub>6</sub>-C<sub>40</sub>), PAH and metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), pesticides (OCP, OPP) and herbicides

No visual or olfactory indications of contamination were observed at the site during fieldwork.

Fill was observed being utilised damming the creek within the western portion of the site. There did not appear to be any other fill within the site.

Direction of surface water flow is considered to be either the east or west from the central portion of the site, and from the western boundary to the east and north.

## 7 QUALITY ASSURANCE/QUALITY CONTROL

RCA has assessed the quality assurance and control in **Appendix F** and found it to be acceptable for the purpose of site assessment.

## 8 RESULTS

All soil and surface water results are compared to the relevant criteria in **Appendix G**. The following sections present a summary.

## 8.1 SOIL

- BTEX concentrations were not detected or were detected at low concentrations below the relevant criteria with the exception of benzene at S1 which exceeded the human health criterion (Ref [2]).
- TRH concentrations were not detected and are considered below the relevant criteria (Ref [2]).
- PAH concentrations were not detected and are considered below the relevant criteria (Ref [2]).
- Metal concentrations were not detected or were detected at low concentrations below the relevant criteria (Ref [2]).
- Pesticide concentrations were not detected and are considered below the relevant criteria (Ref [2]).
- Herbicide concentrations were not detected and are considered below the relevant criteria (Ref [2]).

Soil results in excess of the relevant ecological and human health criteria are presented in **Table 8**.

**Table 8** *Soil Results above Relevant Criteria*

Sample Identification (depth)	Analyte	Criteria	Concentration
S1 (0.01m)	Benzene	0.5 <sup>a</sup> 50 <sup>b</sup> 100 <sup>c</sup>	<b>3.7</b>

All concentrations in mg/kg.

<sup>a</sup> Human Health Criteria for Residential land use (Ref [2]).

<sup>b</sup> Ecological Criteria for Urban Residential and Public Open Space (Ref [2]).

<sup>c</sup> Direct Contact Criteria for Residential land use (Ref [2]).

Results shown in **bold** are in excess of the human health criteria.

## 8.2 SURFACE WATER

- BTEX concentrations were not detected or were detected at low concentrations below the relevant criteria (Ref [5]).
- TRH concentrations were not detected or were detected at low concentrations below the relevant criteria with the exception of TRH C<sub>6</sub> – C<sub>40</sub> at D2 which exceeded the relevant ecological criterion (Ref [4]).
- PAH concentrations were not detected and are considered below the relevant criteria (Ref [4] and [5]).
- Metal concentrations were detected in excess of the relevant ecological criteria (Ref [4]) at both locations: concentrations of some metals were in excess of the drinking water criteria (Ref [5]) at D2.
- Pesticide concentrations were not detected and are considered below the relevant criteria (Ref [4] and [5]).

- Herbicide concentrations were not detected with the exception of one herbicide at D2. There are no criteria for the herbicides.

**Table 9**      *Groundwater Results above Relevant Criteria*

Sample Identification	Analyte	Criteria	Concentration
D1	Chromium	0.01 <sup>a</sup>	0.002
	Copper	0.0014 <sup>a</sup>	<b>0.004</b>
	Zinc	0.008 <sup>a</sup>	0.019
D2	TRH C <sup>6</sup> -C <sub>40</sub>	0.007 <sup>a</sup>	0.99
	Arsenic	0.013 <sup>a</sup> 0.01 <sup>b</sup>	<b>0.035</b>
	Cadmium	0.0002 <sup>a</sup> 0.002 <sup>b</sup>	<b>0.0021</b>
	Copper	0.0014 <sup>a</sup>	<b>0.051</b>
	Lead	0.0034 <sup>a</sup> 0.01 <sup>b</sup>	<b>0.095</b>
	Nickel	0.011 <sup>a</sup>	0.031
	Zinc	0.008 <sup>a</sup>	0.654

All concentrations in mg/L.

<sup>a</sup> Ecological Protection Level for Receiving Water Type (Ref [4]).

<sup>b</sup> Human Health (Ingestion) Criteria (Ref [5]).

Results shown in **bold** are in excess of the human health criteria.

## 9 SITE CONTAMINATION CHARACTERISATION

The collection of soil samples from four (4) locations is not in accordance with the frequency recommended by NSW EPA guidelines (Ref [6]) for a site of more than 38ha. RCA reduced the number due to the assessment being preliminary in nature, the absence of significant contamination sources based on the desktop review and the field observations of potential contamination. Samples were collected from the surface utilising hand tools. Two (2) surface water samples were collected from two (2) dams located within the site.

Contamination was identified at one (1) location (S1), with benzene in excess of the human health guidelines (Ref [2]). This location was in an identified burn pit, which appeared to have been used to burn timber located within the site, with this the likely causing the presence of the benzene. Given the site is to be developed into nineteen (19) individual Lots with some earthworks involved it is expected that this small area would be scraped out and removed and in combination with the site history assessment, RCA considers that there has been sufficient assessment to consider that there is a negligible potential for contamination within the in-situ soils. Visual verification of the removal of burnt residue and an over-excavation of 0.1m is considered sufficient to remove the contamination.

The concentrations of metals in the surface water body located near the eastern boundary is considered likely to be associated with the suspended solids in the water, whilst the surface water body located near Seaham Road is likely associated with the suspended solids in the water and /or from the adjacent Seaham Road from which the water is sourced. Similarly the hydrocarbon concentrations within the D2 sample are considered to have been sourced from runoff from Seaham Road. It is not considered that the concentrations of metals or hydrocarbons pose a risk to the environment due to the small volume associated with the site and the distance to the Williams River, noting that if the low lying area to the north of the site is flooded that there would be a substantial dilution factor which would be considered to mitigate the potential impact of the concentrations. It is understood that the watercourse and dams will be filled as part of the proposed development: it is considered that the water can be pumped onto the ground surface of the site as part of that process and will not pose a risk to human health or the environment as long as none of the water enters a waterway.

Surface rubbish was observed in several locations within the site: this will require removal from site during the site development works to a licensed waste facility. No specific classification works are considered necessary based on RCA's observations.

## 10 CONCLUSIONS

This report has presented the findings of a preliminary site assessment undertaken at 792 Seaham Road, Seaham.

The assessment was undertaken at the request of the owner of the site and comprised a desktop assessment of site historical use and consideration of potential contamination as well as soil sampling and surface water sampling.

No potential contamination activities were identified at the site or surrounding areas by the desktop assessment which comprised review of aerial photography as well as Council and NSW EPA records. It was considered that contamination was limited to the agricultural use of the site and potential localised fill placement in low lying areas. The potential for some areas of the site to comprise acid sulfate soil is noted however was not further investigated as part of this assessment.

No visual olfactory indications of contamination were identified at the site during the inspection with the exception of an area which appeared to have been used for burning material (predominantly timber). Fill placement was considered to be limited to the area of the dam across the creek in the western portion of the site. Soil samples were collected from these areas and at two (2) other locations to assess for potential pesticide and herbicide use.

Concentration of benzene was found in excess of the residential human health criterion (Ref [2]) at one (1) location within a burn pit, however due to the proposed development the area can be removed during earthworks and verified by visual observation of removal of burnt residue RCA does not consider that any further work is required.

Concentrations of hydrocarbons and metals were in excess of the ecological (Ref [4]) and some metals were also in excess of the drinking water (Ref [5]) guidelines. These are not considered to pose a current risk to the environment or to human health and, on the understanding that these dams will be filled as part of the proposed development, RCA does not consider that any further work is required. RCA recommend that the water be removed during the filling of the dams by irrigation over the site at a rate that it infiltrates and surface water does not enter any waterway.

RCA considers that the site is suitable for the proposed residential use subject to the removal of the burnt residue and refuse identified at the site. RCA recommend implementation of standard industry practice unexpected finds protocol which stops work for further assessment in the event of visual or olfactory indications of contamination, dust and surface water control.

RCA recommend that acid sulfate assessment of Lots which fall within the mapped area is undertaken prior to soil disturbance by way of excavation at these Lots.

## 11 LIMITATIONS

This report has been prepared for Mr Brett Statham in accordance with an agreement with RCA Australia (RCA) dated 24 September 2020. The services performed by RCA have been conducted in a manner consistent with that generally exercised by members of its profession and consulting practice.

This report has been prepared for the sole use of Mr Brett Statham . The report may not contain sufficient information for purposes of other uses or for parties other than Mr Brett Statham. This report shall only be presented in full and may not be used to support objectives other than those stated in the report without written permission from RCA Australia.

The information in this report is considered accurate at the date of issue with regard to the current conditions of the site. Conditions can vary across any site that cannot be explicitly defined by investigation.

Environmental conditions including contaminant concentrations can change in a limited period of time. This should be considered if the report is used following a significant period of time after the date of issue.

Yours faithfully

**RCA AUSTRALIA**



Richie Lamont  
Environmental Scientist



Fiona Brooker  
Environmental Services Manager

## REFERENCES

- [1] Port Stephens Local Environment Plan 2013 under the Environmental Planning and Assessment Act 1979, published August 2020.
- [2] NEPC, *National Environment Protection (Assessment of Site Contamination) Measure*, 1999 as amended 2013.
- [3] Department of Urban Affairs and Planning, *State Environmental Planning Policy (SEPP): Remediation of Land*, August 1998.
- [4] ANZG, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality Australian and New Zealand Governments and Australian state and territory governments*, Canberra ACT, Australia., August 2018. Available at [www.waterquality.gov.au/anz-guidelines](http://www.waterquality.gov.au/anz-guidelines).
- [5] ADWG, *Australian Drinking Water Guidelines, National Water Quality Management Strategy*, January 2011 and updated October 2017.
- [6] NSW EPA, *Sampling Design Guidelines*, September 1995.
- [7] CRC Care, *Technical Report 10, Health screening levels for petroleum in soil and groundwater*, September 2011.

## GLOSSARY

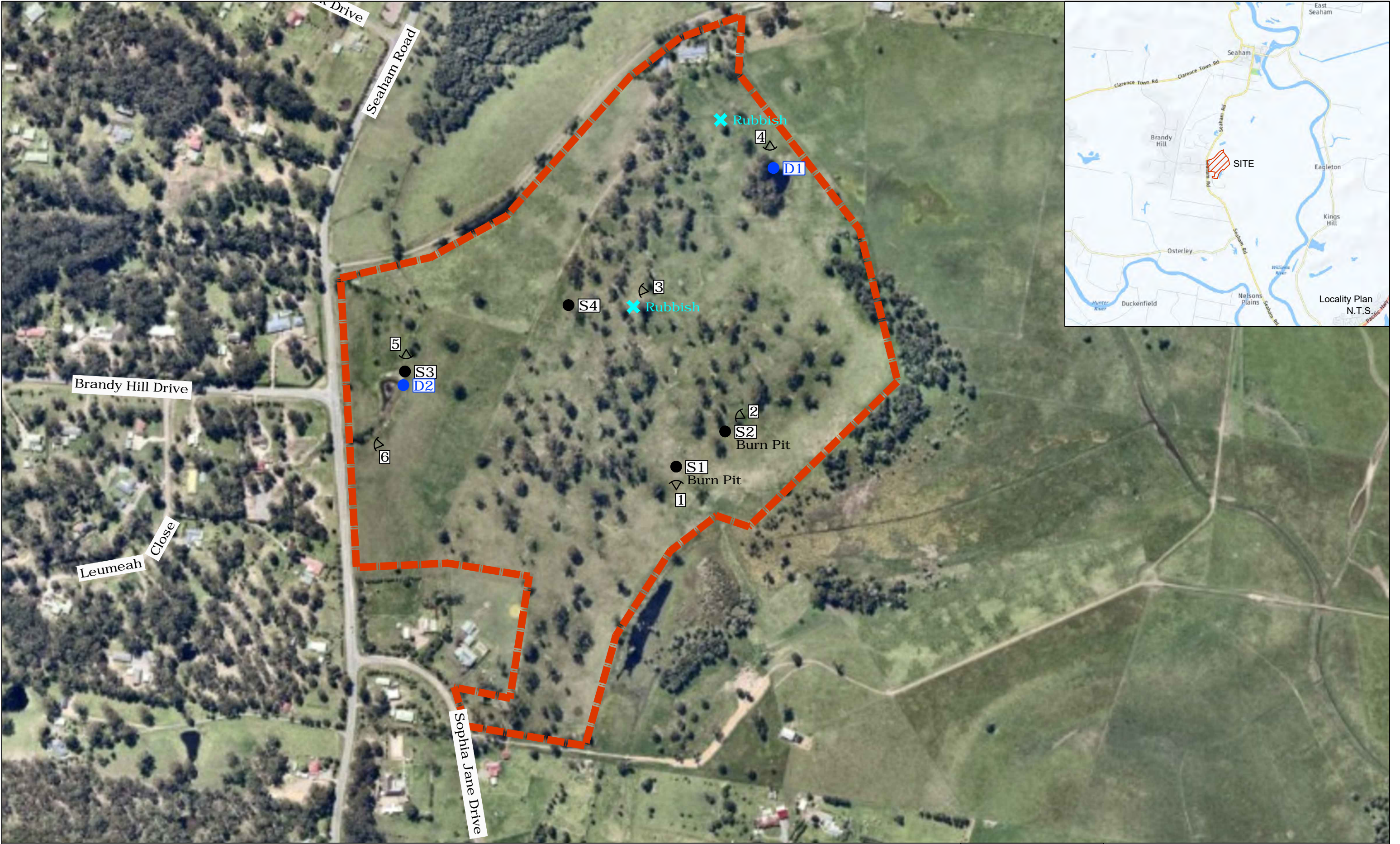
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure.
EIL	Ecological investigation level. Relates to soil concentrations which may pose a risk to ecological health.
ESL	Ecological screening level. Relates to vapour risk from petroleum
HIL	Health investigation level. Relates to soil concentrations which may pose a risk to human health in soil.

HSL	Health screening level. Relates to the vapour risk from petroleum hydrocarbons which may pose a risk to human health in soil.
In-Situ	In place, without excavation.
LEP	Local environment plan. A planning tool for the Local Government.
µg	microgram, 1/1000 milligram.
mg	milligram, 1/1000 gram.
NEPC	National Environment Protection Council.
NSW EPA	NSW Environment Protection Authority – formerly a component of DECC, DECCW, OEH but made a separate entity in 2011 to regulates the contaminated land industry.
PQL	Practical Quantitation Limit.
QA	Quality Assurance.
QC	Quality Control.
RPD	Relative Percentage Difference.
BOD	Biochemical oxygen demand, the requirement for molecular oxygen by microbes during oxidation of biological substances in sewage. The BOD test measures the oxygen consumed (in mg/L) over five days at 20°C.
OCP	Organochlorin pesticides.
PAH	Polycyclic aromatic hydrocarbons. Multi-ring compounds found in fuels, oils and creosote. These are also common combustion products.
TPH	Total petroleum hydrocarbons.
TRH	Total recoverable hydrocarbons

# Appendix A

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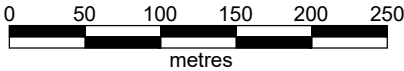
Drawing



LEGEND

- Approximate site boundary
- Soil sample
- Surface water sample
- Approximate photograph location and direction

NOTE: Aerial image taken from Nearmap, 23 September 2020 (used in accordance with commercial licence)



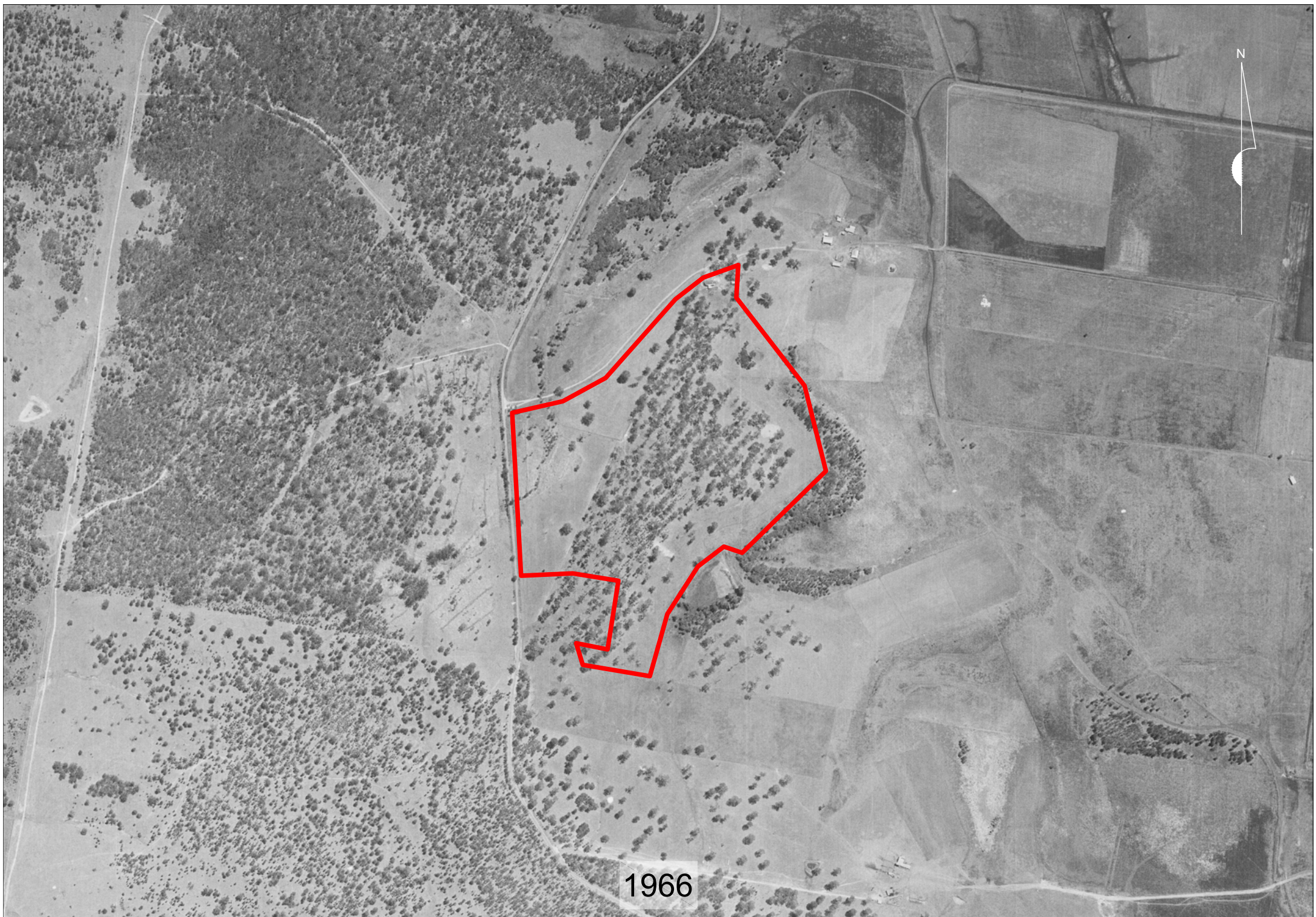
PRELIMINARY SITE (CONTAMINATION) ASSESSMENT  
792 SEAHAM ROAD  
SEAHAM

CLIENT	Mr B Statham C/- Le Mottee Group	RCA Ref	15111-401/0
DRAWN BY	RJL	SCALE	1:5000 (A3)
APPROVED BY	FJB	DATE	13/11/2020
		DRAWING No	1
		REV	0
		OFFICE	NEWCASTLE

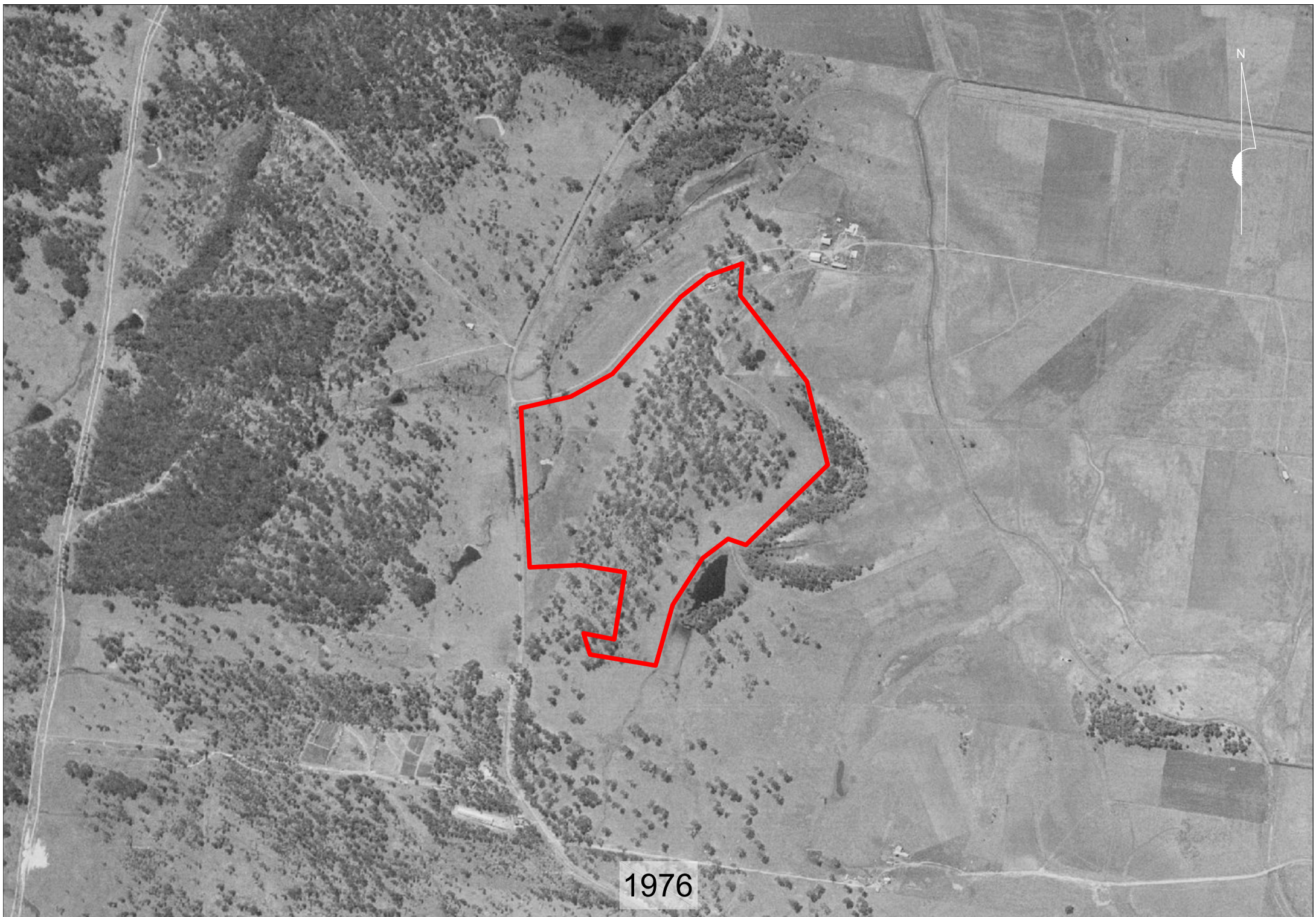
# Appendix B

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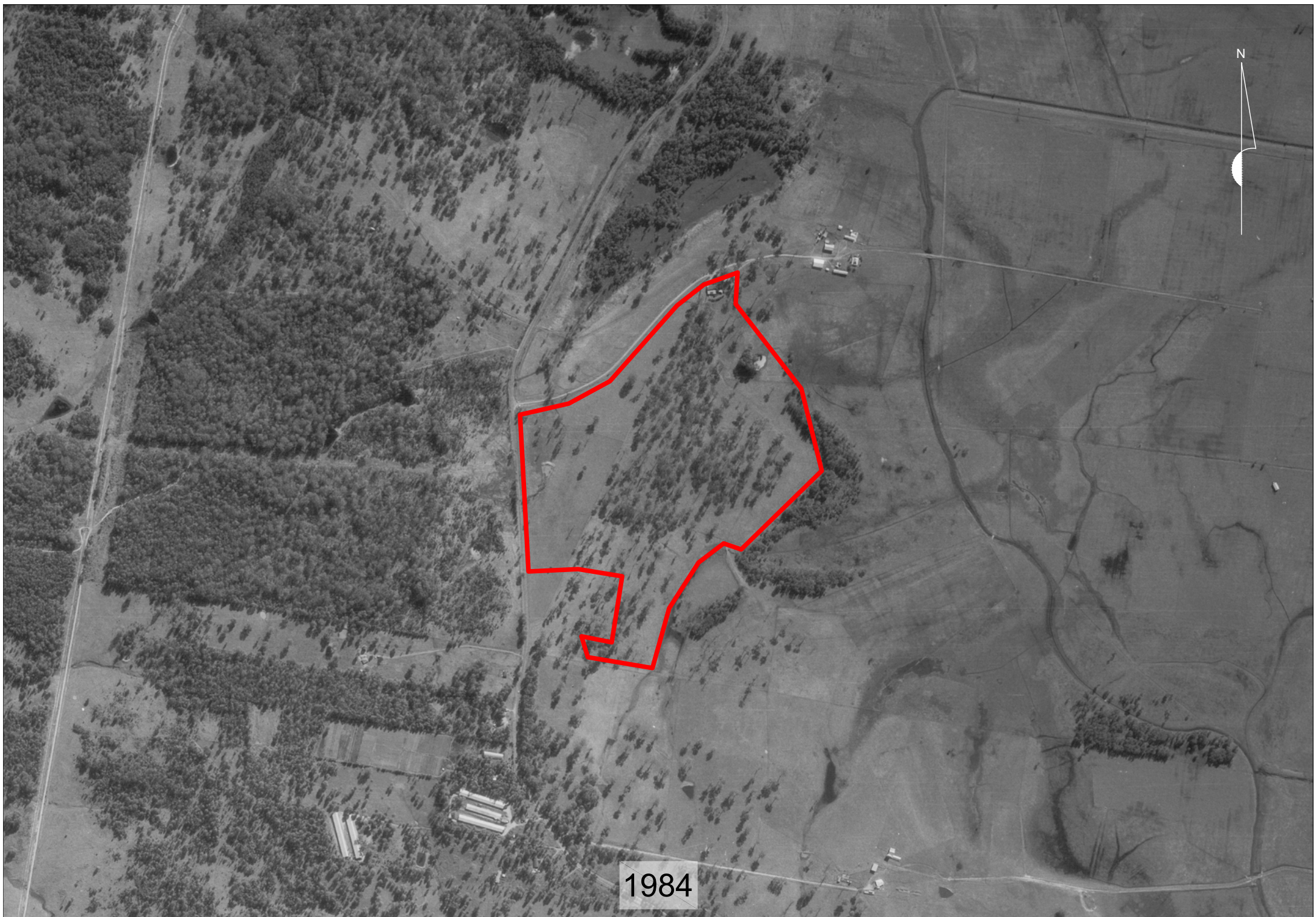
Historical Photographs



1966



1976



1984



1993



N

2001



2004



2010



2015

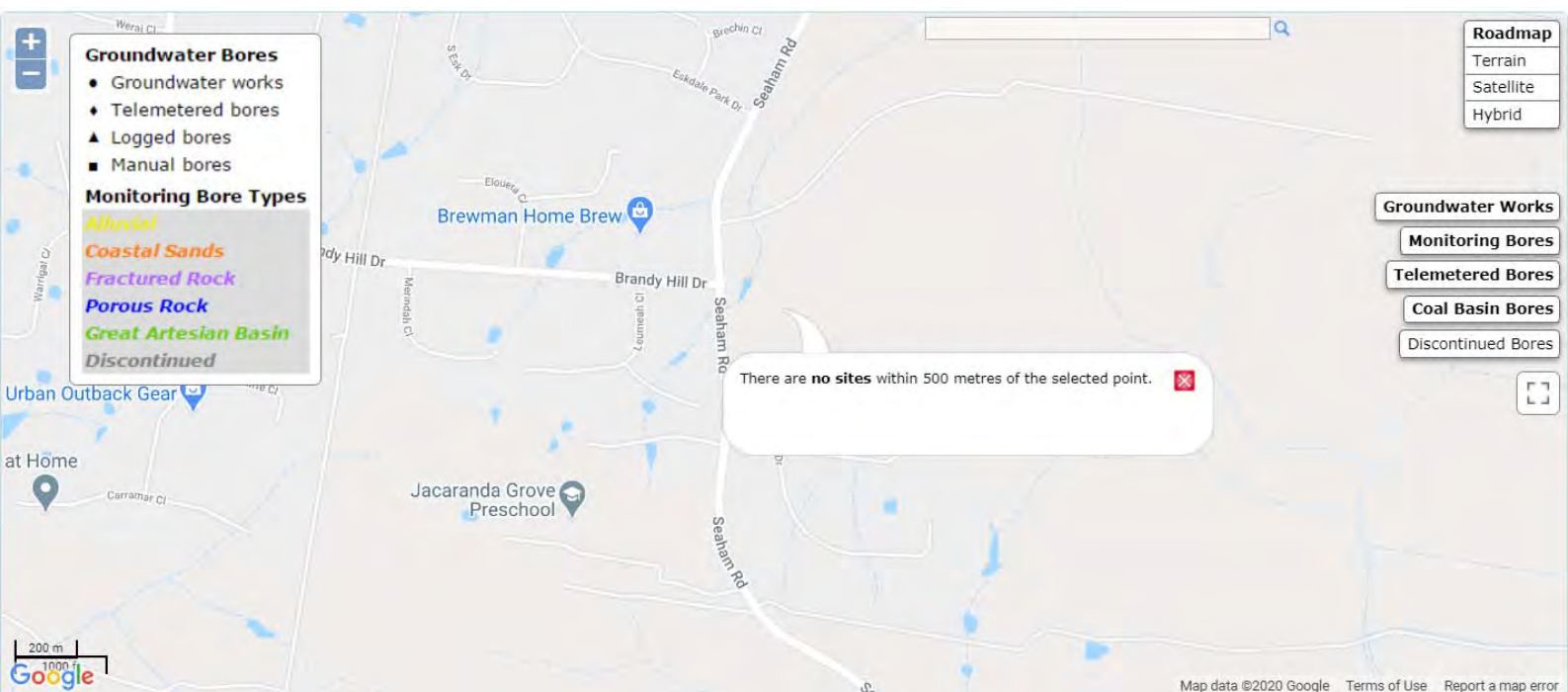


2020

# Appendix C

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## Registered Groundwater Well Information



# Appendix D

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Site Photographs



**PHOTOGRAPH 1** *S1 burn pit, view north.*



**PHOTOGRAPH 2** *S2 burn pit, view north west.*

**Client:** B Statham C/-Le Motte Group

**RCA Australia**

**Project:** Preliminary Site (Contamination) Assessment

**Location:** 792 Seaham Road, Seaham

**RCA ref:** 15111-401/0



**PHOTOGRAPH 3** *Rubbish, north central portion of site.*



**PHOTOGRAPH 4** *D1 Sample location, view south.*

**Client:** B Statham C/-Le Motte Group

**RCA Australia**

**Project:** Preliminary Site (Contamination) Assessment

**Location:** 792 Seaham Road, Seaham

**RCA ref:** 15111-401/0



**PHOTOGRAPH 5**    *Dam, with D2 sample location southern point of dam.*



**PHOTOGRAPH 6**    *Creek flowing under Seaham Road, view west.*

**Client:**        B Statham C/-Le Motte Group

**RCA Australia**

**Project:**       Preliminary Site (Contamination) Assessment

**Location:**    792 Seaham Road, Seaham

**RCA ref:** 15111-401/0

# Appendix E

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## Screening Levels and Guidelines

## NATIONAL ENVIRONMENT PROTECTION (ASSESSMENT OF SITE CONTAMINATION) MEASURE 1999 AS AMENDED 2013

### Soil

The investigation and screening levels (ISL) utilised for the assessment of the soil on site were sourced from the National Environment Protection Measure for the Assessment of Site Contamination (ASC NEPM, Ref [2]). These ISL are not derived as acceptance criteria for contamination at a site, but as levels above which specific consideration of risk, based on the site use and potential exposure, is required. If a risk is determined as present, then remediation and/or management must be undertaken.

Assessment ISL are based on:

- Human Health.

Intentionally conservative health investigation levels (HIL) have been derived for four (4) generic land use settings.

- HIL 'A' - Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry). This category includes children's day care centres, preschools and primary schools.
- HIL 'B' - Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high rise buildings and flats.
- HIL 'C' - Public open space such as parks, playgrounds, playing fields (e.g. ovals) secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves).
- HIL 'D' - Commercial/industrial such as shops, offices, factories and industrial sites.

The exposure scenario(s) for the derivation of the relevant land use setting is set out in the table(s) below.

Health screening levels (HSL) have been determined for risks associated from vapour intrusion from petroleum<sup>2</sup> compound contamination for the same land use settings. These HSL are additionally based on the fraction of compound, the soil texture and the depth of the encountered soil.

Direct hydrocarbon contact criteria are not provided in the ASC NEPM (Ref [2]), however these are provided in CRC Care Technical Report 10 (Ref [7]) which is the source document for the HSL.

- Ecological Health

These levels are considered to apply to soil within two (2) metres of the surface, the root zone and habitation zone of many species.

<sup>2</sup> Laboratory analysis of hydrocarbons is being reported as total recoverable hydrocarbons (TRH). This testing method includes all forms of hydrocarbons, not just petroleum hydrocarbons and therefore can be considered a conservative measure against the chosen TPH criteria. Further laboratory analysis using a silica gel clean up (TRH<sub>sg</sub>) is considered to enable a better identification of the extent of petroleum based contamination.

Ecological investigation levels (EIL) have been determined for arsenic, copper, chromium III, DDT, naphthalene, nickel, lead and zinc in soil based on species sensitivity model and for three (3) generic land use settings:

- Areas of ecological significance – for areas where the primary intention is for the conservation and protection of the natural environment. Protection level of 99%.
- Urban residential areas and public open space – broadly equivalent to the HIL A, HIL B and HIL C land use settings. Protection level of 80%.
- Commercial and industrial land uses – considered to be broadly equivalent to HIL D land use setting. Protection level of 60%.

Methodology for the derivation of EIL for other contaminants is available in the ASC NEPM (Ref [2]) and requires additional soil character data.

Ecological screening levels (ESL) have been determined for petroleum compound contamination. Due to limitations in the data only moderate reliability ESL have been determined for fractions  $<C_{16}$ , applied generically in fine and coarse grained soils. ESL for petroleum fractions  $> C_{16}$ , BTEX and naphthalene are consider low reliability.

- Aesthetics

Aesthetic considerations operate separately to the HIL/HSL and EIL/ESL assessment. Issues to be considered include:

- Highly malodorous soils or extracted groundwater (e.g. strong residual petroleum hydrocarbon odours, hydrogen sulphide in soil or extracted groundwater, organosulfur compounds).
- Hydrocarbon sheen on surface water.
- Discoloured chemical deposits or soil staining with chemical waste other than of a very minor nature.
- Large monolithic deposits of otherwise low-risk material, e.g. gypsum as powder or plasterboard, cement kiln dust.
- Presence of putrescible refuse including material that may generate hazardous levels of methane such as a deep-fill profile of green waste or large quantities of timber waste.
- Soils containing residue from animal burial (e.g. former abattoir sites).

Site assessment requires consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity. For example, higher expectations for soil quality would apply to residential properties with gardens compared with industrial settings.

Tier 1 assessment comprises the comparison of the soil data with the HIL/HSL and EIL/ESL. In the event that some concentrations are in excess of the relevant criteria, the summary statistics of the data set may be utilised for assessment purpose. Consideration of a range of statistics is recommended; at a minimum the 95%UCL<sub>ave</sub> should be compared to the relevant criteria as long as:

- No single value exceeds 250% of the relevant criterion.

- The standard deviation of the results for each analyte is less than 50% of the relevant criterion.

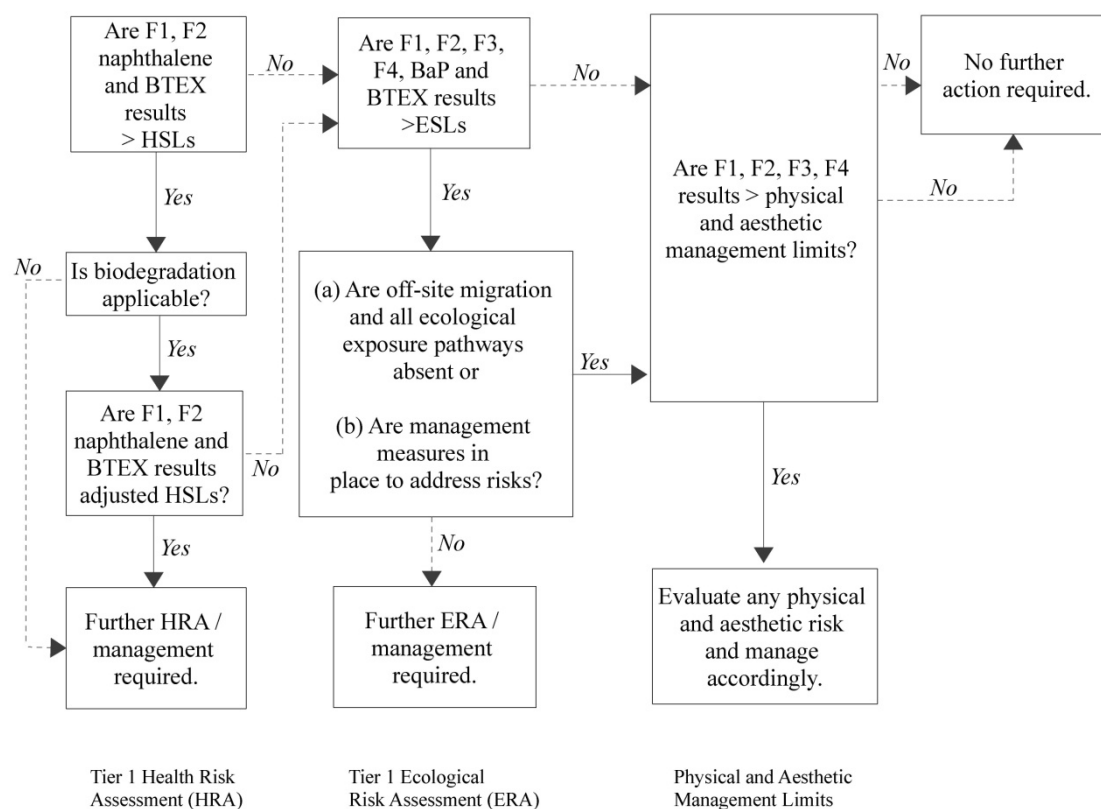
In addition to appropriate consideration and application of the HSL and ESL, there are a number of policy considerations which reflect the nature and properties of petroleum hydrocarbons:

- Formation of observable light non-aqueous phase liquids (LNAPL).
- Fire and explosive hazards.
- Effects on buried infrastructure e.g., penetration of, or damage to, in-ground services by hydrocarbons.

The ASC NEPM (Ref [2]) has therefore provided management limits, the application of which will require consideration of site-specific factors such as the depth of building basements and services and depth to groundwater, to determine the maximum depth to which the limits should apply. The management limits may have less relevance at operating industrial sites (including mine sites) which have no or limited sensitive receptors in the area of potential impact. When the management limits are exceeded, further site-specific assessment and management may enable any identified risk to be addressed.

The presence of site hydrocarbon contamination at the levels of the management limits does not imply that there is no need for administrative notification or controls in accordance with jurisdiction requirements.

The following figure has been taken from the ASC NEPM (Ref [2]) to illustrate the assessment methodology in regards to petroleum contamination.



**Figure 1** *Flowchart for the Tier 1 human and ecological risk assessment of petroleum hydrocarbon contamination – application of HSL and ESL and consideration of management limits*

### Residential with Garden/Accessible soil

Summary of Exposure Pathways	Abbreviations	Units	Parameters	
			Adult	Child
Body weight	BW <sub>A</sub> or BW <sub>C</sub>	kg	70	15
Exposure duration	ED <sub>A</sub> or ED <sub>C</sub>	years	29	6
Exposure frequency	EF	days	365	365
Soil/dust ingestion rate <sup>1</sup>	IR <sub>SA</sub> or IR <sub>SC</sub>	mg/day	50 <sup>2</sup>	100 <sup>2</sup>
Soil/dust to skin adherence factor	AF	mg/cm <sup>2</sup> /day	0.5	0.5
Skin surface area	SA <sub>A</sub> or SA <sub>C</sub>	cm <sup>2</sup>	20 000	6100
Fraction of skin exposed	F <sub>s</sub>	%	31.5	44.3
Dermal absorption factor	DAF	%	Chemical specific values applied	
Time spent indoors on site each day	ET <sub>i</sub>	hours	20	20
Time spent outdoors on site each day	ET <sub>o</sub>	hours	4	4
Home-grown fraction of vegetables consumed	F <sub>HG</sub>	%	10	10
Vegetable & fruit consumption rate	C <sub>y</sub> (veg and fruit)	g/day	400	280
Averaging time for carcinogens ('lifetime')	AT <sub>NT</sub>	years	70	70
Dust lung retention factor	RF	%	37.5	37.5

Soil ingestion rates for children are based on a child aged 2-3 years where normal hand-to-mouth activity is assumed and does not account for pica behaviour

Soil ingestion rates for the HIL A scenario include the ingestion of both outdoor soil, including soil adhering to home-grown produce, and indoor dust (derived from outdoor soil tracked indoors)

## AUSTRALIAN AND NEW ZEALAND GUIDELINES FOR FRESH AND MARINE WATER QUALITY

The ANZG (Ref [4]) are complex guidelines that consider not only the level of protection (e.g. 99% or 95%) but also the state of the receiving water (e.g. moderately disturbed). For the protection of aquatic ecosystems the use of 95% protection for all analytes is recommended with the exception of carcinogenic analytes for which the 99% protection value should be used. The following comments are additionally made:

- Where the existing generic GIL is below the naturally occurring background concentration of a particular contaminant, the background concentration becomes the default GIL.
- Where PQL are greater than the recommended GIL the PQL is adopted as the GIL. Where background concentrations are proven to be greater than the GIL, the background concentration is adopted as the GIL.
- Where there is insufficient data for the derivation of marine water criteria it is allowable to use fresh water criteria as low reliability criteria (pg 33 Ref [36 in template]).

## AUSTRALIAN DRINKING WATER GUIDELINES

The ADWG (Ref [5]) document provides a framework for drinking water quality management and assessment. The framework provided in this document has been adopted for the evaluation of contaminants in groundwater where groundwater can be, or is being, extracted and used for drinking water purpose.

# Appendix F

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Quality Assurance Review and  
Laboratory Report Sheets

The collection of all soil and groundwater samples was undertaken by personnel experienced in the handling of potentially contaminated soil. The trowel was wiped clean of soil between samples and in the absence of any indications of gross contamination it is considered that this was sufficient to prevent potential cross contamination.

Due to the limited scope of works and the presumed absence of significant contamination, based on the desktop assessment, RCA did not collect any quality assurance samples.

ALS was chosen as the primary laboratory.

This laboratory used for analysis is NATA accredited and are experienced in the analytical requirements for potentially contaminated soil and water.

ALS undertook internal quality assurance testing. Results are contained within the laboratory report sheets, included in this **Appendix. Table 10** presents a summary of their review.

**Table 10** *Internal Quality Assurance Review*

	Number Samples (including QA)	Laboratory Duplicates	Spikes	Laboratory Control Samples	Laboratory Blanks
Requirement		10%	5%	One every batch	One every batch
<b>Soil</b>					
Metals (As, Cd, Cr, Cu, Ni, Hg, Pb, Zn)	4	0 (2)	1	1	1
TRH C <sub>6</sub> -C <sub>10</sub>	4	0 (2)	1	1	1
TRH >C <sub>10</sub> -C <sub>40</sub>	4	0 (3)	2	2	2
BTEX	4	0 (2)	1	1	1
PAH	4	0 (3)	2	2	2
OCP/OPP	4	0 (3)	2	2	2
Herbicides	4	0 (4)	2	2	2
<b>Water</b>					
Metals (As, Cd, Cr, Cu, Ni, Pb, Zn)	2	0 (2)	1	1	1
TRH C <sub>6</sub> -C <sub>10</sub>	2	0 (2)	1	1	1
TRH >C <sub>10</sub> -C <sub>40</sub>	2	0	0	1	1
BTEX	2	0 (2)	1	1	1
PAH	2	0	0	1	1
OCP/OPP	2	0	0	1	1
Herbicides	2	0 (2)	1	1	1

Numbers in brackets refer the tests undertaken on samples not from this project but within the same laboratory batch.

Examination of the above table reveals that ALS have undertaken laboratory quality assurance testing in accordance with the ASC NEPM (Ref [2]) with the exception of TRH >C<sub>10</sub>-C<sub>40</sub>, PAH and pesticides. This slight shortfall is not considered significant due to small number of samples.

Further assessment indicated:

- Recoveries of Surrogates were within acceptance criteria of 70-130%
- Holding Times were within laboratory specified time frames.
- Recoveries of laboratory control samples were within the acceptance criteria of 70-130%.
- Recoveries of Spikes were within acceptance criteria of 70-130%.
- Relative Percentage Differences for duplicates were within acceptance criteria<sup>3</sup>.
- No Laboratory Blank result was detected above the practical quantification limit (PQL).

It is therefore considered that the data obtained from this testing is accurate and reliable in as far as it can be ascertained

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<sup>3</sup> Relative Percentage Difference for duplicate acceptance criteria is defined as:

- 50% RPD at concentration levels greater than ten times the PQL.
- 75% RPD at concentrations between five to ten times the PQL.
- 100% RPD at concentration levels between two and five times the PQL.

Where concentration levels are less than two times the PQL, the Absolute Difference (AD) shall be calculated. Data will be considered acceptable if the AD <2.5 times the PQL

## CERTIFICATE OF ANALYSIS

**Work Order** : **ES2036358**  
**Client** : **ROBERT CARR & ASSOCIATES P/L**  
**Contact** : MS FIONA BROOKER  
**Address** : PO BOX 175  
                   CARRINGTON NSW, AUSTRALIA 2294  
**Telephone** : +61 02 4902 9200  
**Project** : 15111  
**Order number** : ----  
**C-O-C number** : ----  
**Sampler** : R Lamont  
**Site** : ----  
**Quote number** : SYBQ/400/18  
**No. of samples received** : 6  
**No. of samples analysed** : 6

**Page** : 1 of 12  
**Laboratory** : Environmental Division Sydney  
**Contact** : Grace White  
**Address** : 277-289 Woodpark Road Smithfield NSW Australia 2164  
**Telephone** : +61 2 8784 8555  
**Date Samples Received** : 16-Oct-2020 11:06  
**Date Analysis Commenced** : 19-Oct-2020  
**Issue Date** : 23-Oct-2020 15:42



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW



## General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- EP202: Particular samples required dilution due to matrix interferences. LOR values have been adjusted accordingly.
- EP075 (SIM): Where reported, 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.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EP080: Sample id D2 is confirmed by re-analysis.
- EP080: Surrogate recovery bias low due to sample matrix interferences, confirmed by re-extraction and re-analysis.



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S1	S2	S3	S4	----
Client sampling date / time					16-Oct-2020 00:00	16-Oct-2020 00:00	16-Oct-2020 00:00	16-Oct-2020 00:00	----
Compound	CAS Number	LOR	Unit		ES2036358-001	ES2036358-002	ES2036358-003	ES2036358-004	-----
					Result	Result	Result	Result	----
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	1.0	%		4.7	2.0	3.8	4.2	----
<b>EG005(ED093)T: Total Metals by ICP-AES</b>									
Arsenic	7440-38-2	5	mg/kg		10	7	<5	<5	----
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg		20	17	10	9	----
Copper	7440-50-8	5	mg/kg		7	5	<5	<5	----
Lead	7439-92-1	5	mg/kg		14	7	9	11	----
Nickel	7440-02-0	2	mg/kg		5	3	<2	<2	----
Zinc	7440-66-6	5	mg/kg		82	23	12	29	----
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
<b>EP068A: Organochlorine Pesticides (OC)</b>									
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	----
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	----
^ Endosulfan (sum)	115-29-7	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	----
Endrin ketone	53494-70-5	0.05	mg/kg		----	----	<0.05	<0.05	----



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S1	S2	S3	S4	----
Client sampling date / time					16-Oct-2020 00:00	16-Oct-2020 00:00	16-Oct-2020 00:00	16-Oct-2020 00:00	----
Compound	CAS Number	LOR	Unit		ES2036358-001	ES2036358-002	ES2036358-003	ES2036358-004	-----
					Result	Result	Result	Result	----
<b>EP068A: Organochlorine Pesticides (OC) - Continued</b>									
Methoxychlor	72-43-5	0.2	mg/kg		----	----	<0.2	<0.2	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		----	----	<0.05	<0.05	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg		----	----	<0.05	<0.05	----
<b>EP068B: Organophosphorus Pesticides (OP)</b>									
Dichlorvos	62-73-7	0.05	mg/kg		----	----	<0.05	<0.05	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		----	----	<0.05	<0.05	----
Monocrotophos	6923-22-4	0.2	mg/kg		----	----	<0.2	<0.2	----
Dimethoate	60-51-5	0.05	mg/kg		----	----	<0.05	<0.05	----
Diazinon	333-41-5	0.05	mg/kg		----	----	<0.05	<0.05	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		----	----	<0.05	<0.05	----
Parathion-methyl	298-00-0	0.2	mg/kg		----	----	<0.2	<0.2	----
Malathion	121-75-5	0.05	mg/kg		----	----	<0.05	<0.05	----
Fenthion	55-38-9	0.05	mg/kg		----	----	<0.05	<0.05	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		----	----	<0.05	<0.05	----
Parathion	56-38-2	0.2	mg/kg		----	----	<0.2	<0.2	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		----	----	<0.05	<0.05	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		----	----	<0.05	<0.05	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		----	----	<0.05	<0.05	----
Fenamiphos	22224-92-6	0.05	mg/kg		----	----	<0.05	<0.05	----
Prothiofos	34643-46-4	0.05	mg/kg		----	----	<0.05	<0.05	----
Ethion	563-12-2	0.05	mg/kg		----	----	<0.05	<0.05	----
Carbophenothion	786-19-6	0.05	mg/kg		----	----	<0.05	<0.05	----
Azinphos Methyl	86-50-0	0.05	mg/kg		----	----	<0.05	<0.05	----
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
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	----	----



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S1	S2	S3	S4	----
Client sampling date / time					16-Oct-2020 00:00	16-Oct-2020 00:00	16-Oct-2020 00:00	16-Oct-2020 00:00	----
Compound	CAS Number	LOR	Unit		ES2036358-001	ES2036358-002	ES2036358-003	ES2036358-004	-----
					Result	Result	Result	Result	----
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
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 hydrocarbons	----	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		<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		<b>1.2</b>	<b>1.2</b>	<b>1.2</b>	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	----	----
<b>EP080: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg		<b>3.7</b>	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		<b>0.6</b>	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	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	----	----
^ Sum of BTEX	----	0.2	mg/kg		<b>4.3</b>	<0.2	<0.2	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	----



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S1	S2	S3	S4	----
Client sampling date / time					16-Oct-2020 00:00	16-Oct-2020 00:00	16-Oct-2020 00:00	16-Oct-2020 00:00	----
Compound	CAS Number	LOR	Unit		ES2036358-001	ES2036358-002	ES2036358-003	ES2036358-004	-----
					Result	Result	Result	Result	----
<b>EP080: BTEXN - Continued</b>									
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	----
<b>EP202A: Phenoxyacetic Acid Herbicides by LCMS</b>									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		----	----	<0.04	<0.04	----
2,4-DB	94-82-6	0.02	mg/kg		----	----	<0.04	<0.04	----
Dicamba	1918-00-9	0.02	mg/kg		----	----	<0.04	<0.04	----
Mecoprop	93-65-2	0.02	mg/kg		----	----	<0.04	<0.04	----
MCPA	94-74-6	0.02	mg/kg		----	----	<0.04	<0.04	----
2,4-DP	120-36-5	0.02	mg/kg		----	----	<0.04	<0.04	----
2,4-D	94-75-7	0.02	mg/kg		----	----	<0.04	<0.04	----
Triclopyr	55335-06-3	0.02	mg/kg		----	----	<0.04	<0.04	----
2,4,5-TP (Silvex)	93-72-1	0.02	mg/kg		----	----	<0.04	<0.04	----
2,4,5-T	93-76-5	0.02	mg/kg		----	----	<0.04	<0.04	----
MCPB	94-81-5	0.02	mg/kg		----	----	<0.04	<0.04	----
Picloram	1918-02-1	0.02	mg/kg		----	----	<0.04	<0.04	----
Clopyralid	1702-17-6	0.02	mg/kg		----	----	<0.04	<0.04	----
Fluroxypyr	69377-81-7	0.02	mg/kg		----	----	<0.04	<0.04	----
<b>EP068S: Organochlorine Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.05	%		----	----	102	88.8	----
<b>EP068T: Organophosphorus Pesticide Surrogate</b>									
DEF	78-48-8	0.05	%		----	----	85.1	75.6	----
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	0.5	%		80.8	95.7	92.5	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		76.6	91.2	96.4	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%		45.3	49.0	63.3	----	----
<b>EP075(SIM)T: PAH Surrogates</b>									
2-Fluorobiphenyl	321-60-8	0.5	%		97.3	101	85.9	----	----
Anthracene-d10	1719-06-8	0.5	%		83.4	81.7	93.7	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		82.6	94.3	99.8	----	----
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		93.6	88.3	84.6	----	----
Toluene-D8	2037-26-5	0.2	%		59.9	95.7	94.5	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		34.7	102	105	----	----
<b>EP202S: Phenoxyacetic Acid Herbicide Surrogate</b>									
2,4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		----	----	97.7	90.4	----



## Analytical Results

Sub-Matrix: **WATER**  
 (Matrix: **WATER**)

Client sample ID

				D1	D2	----	----	----
Client sampling date / time				16-Oct-2020 00:00	16-Oct-2020 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES2036358-005	ES2036358-006	-----	-----	-----
				Result	Result	----	----	----
<b>EG020T: Total Metals by ICP-MS</b>								
Arsenic	7440-38-2	0.001	mg/L	0.002	0.035	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0021	----	----	----
Chromium	7440-47-3	0.001	mg/L	0.002	0.062	----	----	----
Copper	7440-50-8	0.001	mg/L	0.004	0.051	----	----	----
Lead	7439-92-1	0.001	mg/L	0.002	0.095	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.004	0.031	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.019	0.654	----	----	----
<b>EG035T: Total Recoverable Mercury by FIMS</b>								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----
<b>EP068A: Organochlorine Pesticides (OC)</b>								
alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	----	----	----
beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	----	----	----
gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	----	----	----
delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	----	----	----
Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	----	----	----
Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	----	----	----
Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	----	----	----
4,4'-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	----	----	----
Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	----	----	----
4,4'-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	----	----	----
4,4'-DDT	50-29-3	2.0	µg/L	<2.0	<2.0	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	----	----	----
Methoxychlor	72-43-5	2.0	µg/L	<2.0	<2.0	----	----	----
^ Total Chlordane (sum)	----	0.5	µg/L	<0.5	<0.5	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L	<0.5	<0.5	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	<0.5	----	----	----



## Analytical Results

Sub-Matrix: **WATER**  
 (Matrix: **WATER**)

Client sample ID

				D1	D2	----	----	----
Client sampling date / time				16-Oct-2020 00:00	16-Oct-2020 00:00	----	----	----
Compound	CAS Number	LOR	Unit	<b>ES2036358-005</b>	<b>ES2036358-006</b>	-----	-----	-----
				Result	Result	----	----	----

### EP068A: Organochlorine Pesticides (OC) - Continued

### EP068B: Organophosphorus Pesticides (OP)

Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	<2.0	----	----	----
Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	----	----	----
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	<2.0	----	----	----
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	----	----	----
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	----	----	----
Parathion	56-38-2	2.0	µg/L	<2.0	<2.0	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	----	----	----
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	----	----	----
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	----	----	----
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	----	----	----

### EP075(SIM)B: Polynuclear Aromatic Hydrocarbons

Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----



## Analytical Results

Sub-Matrix: <b>WATER</b> (Matrix: <b>WATER</b> )				Client sample ID	D1	D2	----	----	----
Client sampling date / time					16-Oct-2020 00:00	16-Oct-2020 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES2036358-005	ES2036358-006	-----	-----	-----
					Result	Result	----	----	----
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	----	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L		<20	30	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	450	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	420	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	870	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	30	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	790	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	120	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	910	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	----	----
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L		<1	<1	----	----	----
Toluene	108-88-3	2	µg/L		<2	22	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	----	----	----
^ Total Xylenes	----	2	µg/L		<2	<2	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	22	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	----	----	----
<b>EP202A: Phenoxyacetic Acid Herbicides by LCMS</b>									
4-Chlorophenoxy acetic acid	122-88-3	10	µg/L		<10	36	----	----	----
2,4-DB	94-82-6	10	µg/L		<10	<10	----	----	----
Dicamba	1918-00-9	10	µg/L		<10	<10	----	----	----



## Analytical Results

Sub-Matrix: **WATER**  
 (Matrix: **WATER**)

Client sample ID

				D1	D2	----	----	----
Client sampling date / time				16-Oct-2020 00:00	16-Oct-2020 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES2036358-005	ES2036358-006	-----	-----	-----
				Result	Result	----	----	----
<b>EP202A: Phenoxyacetic Acid Herbicides by LCMS - Continued</b>								
Mecoprop	93-65-2	10	µg/L	<10	<10	----	----	----
MCPA	94-74-6	10	µg/L	<10	<10	----	----	----
2,4-DP	120-36-5	10	µg/L	<10	<10	----	----	----
2,4-D	94-75-7	10	µg/L	<10	<10	----	----	----
Triclopyr	55335-06-3	10	µg/L	<10	<10	----	----	----
Silvex (2,4,5-TP/Fenoprop)	93-72-1	10	µg/L	<10	<10	----	----	----
2,4,5-T	93-76-5	10	µg/L	<10	<10	----	----	----
MCPB	94-81-5	10	µg/L	<10	<10	----	----	----
Picloram	1918-02-1	10	µg/L	<10	<10	----	----	----
Clopyralid	1702-17-6	10	µg/L	<10	<10	----	----	----
Fluroxypyr	69377-81-7	10	µg/L	<10	<10	----	----	----
2,6-D	575-90-6	10	µg/L	<10	<10	----	----	----
2,4,6-T	575-89-3	10	µg/L	<10	<10	----	----	----
<b>EP068S: Organochlorine Pesticide Surrogate</b>								
Dibromo-DDE	21655-73-2	0.5	%	99.6	82.9	----	----	----
<b>EP068T: Organophosphorus Pesticide Surrogate</b>								
DEF	78-48-8	0.5	%	98.4	71.8	----	----	----
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>								
Phenol-d6	13127-88-3	1.0	%	25.8	18.9	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%	56.9	39.1	----	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%	75.1	66.0	----	----	----
<b>EP075(SIM)T: PAH Surrogates</b>								
2-Fluorobiphenyl	321-60-8	1.0	%	71.6	60.6	----	----	----
Anthracene-d10	1719-06-8	1.0	%	87.8	72.4	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%	92.0	75.4	----	----	----
<b>EP080S: TPH(V)/BTEX Surrogates</b>								
1,2-Dichloroethane-D4	17060-07-0	2	%	99.6	119	----	----	----
Toluene-D8	2037-26-5	2	%	100	120	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	91.2	110	----	----	----
<b>EP202S: Phenoxyacetic Acid Herbicide Surrogate</b>								
2,4-Dichlorophenyl Acetic Acid	19719-28-9	10	%	108	104	----	----	----



## Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP068S: Organochlorine Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	49	147
<b>EP068T: Organophosphorus Pesticide Surrogate</b>			
DEF	78-48-8	35	143
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
<b>EP075(SIM)T: PAH Surrogates</b>			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
<b>EP202S: Phenoxyacetic Acid Herbicide Surrogate</b>			
2,4-Dichlorophenyl Acetic Acid	19719-28-9	45	139

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP068S: Organochlorine Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	67	111
<b>EP068T: Organophosphorus Pesticide Surrogate</b>			
DEF	78-48-8	67	111
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
<b>EP075(SIM)T: PAH Surrogates</b>			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
<b>EP202S: Phenoxyacetic Acid Herbicide Surrogate</b>			
2,4-Dichlorophenyl Acetic Acid	19719-28-9	64	140

Page : 12 of 12  
Work Order : ES2036358  
Client : ROBERT CARR & ASSOCIATES P/L  
Project : 15111



Sub-Matrix: <b>WATER</b>		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP202S: Phenoxyacetic Acid Herbicide Surrogate - Continued			

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: ES2036358</b>	<b>Page</b>	<b>: 1 of 23</b>
<b>Client</b>	<b>: ROBERT CARR &amp; ASSOCIATES P/L</b>	<b>Laboratory</b>	<b>: Environmental Division Sydney</b>
<b>Contact</b>	<b>: MS FIONA BROOKER</b>	<b>Contact</b>	<b>: Grace White</b>
<b>Address</b>	<b>: PO BOX 175 CARRINGTON NSW, AUSTRALIA 2294</b>	<b>Address</b>	<b>: 277-289 Woodpark Road Smithfield NSW Australia 2164</b>
<b>Telephone</b>	<b>: +61 02 4902 9200</b>	<b>Telephone</b>	<b>: +61 2 8784 8555</b>
<b>Project</b>	<b>: 15111</b>	<b>Date Samples Received</b>	<b>: 16-Oct-2020</b>
<b>Order number</b>	<b>: ----</b>	<b>Date Analysis Commenced</b>	<b>: 19-Oct-2020</b>
<b>C-O-C number</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 23-Oct-2020</b>
<b>Sampler</b>	<b>: R Lamont</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: SYBQ/400/18</b>		
<b>No. of samples received</b>	<b>: 6</b>		
<b>No. of samples analysed</b>	<b>: 6</b>		



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW



## General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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**

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: 3317820)									
ES2036323-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	18	20	11.8	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	10	10	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	9	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	22	16	32.8	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	57	41	32.1	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	72	92	23.8	0% - 50%
ES2036358-004	S4	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	9	8	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	11	10	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	29	24	17.8	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3317822)									
ES2036323-004	Anonymous	EA055: Moisture Content	----	0.1	%	7.6	8.7	14.1	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3317821)									
ES2036323-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES2036358-004	S4	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3314427)									
ES2036323-002	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



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 (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3314427) - continued									
ES2036323-002	Anonymous	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: Endrin ketone	53494-70-5	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
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES2036356-010	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: Endrin ketone	53494-70-5	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
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3315878)									
ES2036485-001	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	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 (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3315878) - continued									
ES2036485-001	Anonymous	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: Endrin ketone	53494-70-5	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
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3314427)									
ES2036323-002	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit

**EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3314426)**



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: Polynuclear Aromatic Hydrocarbons (QC Lot: 3314426) - continued									
ES2036323-002	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 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
ES2036356-010	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 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



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: Polynuclear Aromatic Hydrocarbons (QC Lot: 3315435)									
ES2035610-021	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 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
		EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3314425)							
ES2036323-002	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES2036356-010	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3315436)									
ES2035610-021	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3317457)									
ES2036412-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EW2004686-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3314425)									
ES2036323-002	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES2036356-010	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	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 (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3314425) - continued									
ES2036356-010	Anonymous	EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3315436)									
ES2035610-021	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3317457)									
ES2036412-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EW2004686-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 3317457)									
ES2036412-001	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
EW2004686-001	Anonymous	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
		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	
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 3314654)									
EM2018020-001	Anonymous	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2,4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2,4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2,4-D	94-75-7	0.02	mg/kg	1.25	1.18	6.09	0% - 50%
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2,4,5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2,4,5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
ES2036244-008	Anonymous	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2,4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit

Page : 9 of 23  
 Work Order : ES2036358  
 Client : ROBERT CARR & ASSOCIATES P/L  
 Project : 15111



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 (%)
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 3314654) - continued									
ES2036244-008	Anonymous	EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit		
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 3316196)									
EP2011203-001	Anonymous	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
ES2036244-024	Anonymous	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit

Page : 10 of 23  
 Work Order : ES2036358  
 Client : ROBERT CARR & ASSOCIATES P/L  
 Project : 15111



Sub-Matrix: <b>SOIL</b>				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 3316196) - continued									
ES2036244-024	Anonymous	EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
Sub-Matrix: <b>WATER</b>				Laboratory 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 (QC Lot: 3317723)									
ES2036331-001	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	0.009	0.010	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.056	0.060	8.02	0% - 20%
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.033	0.035	5.41	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.021	0.022	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.062	0.061	0.00	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.089	0.090	0.00	0% - 50%
ES2036295-001	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	0.015	0.015	0.00	0% - 50%
		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	0.003	0.002	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.013	0.013	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3317721)									
ES2036273-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES2036331-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3315638)									
ES2036357-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES2036401-007	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3315638)									
ES2036357-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES2036401-007	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 3315638)									
ES2036357-004	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	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		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
ES2036401-007	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

Page : 11 of 23  
 Work Order : ES2036358  
 Client : ROBERT CARR & ASSOCIATES P/L  
 Project : 15111



Sub-Matrix: **WATER**

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: 3315638) - continued									
ES2036401-007	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
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 3317130)									
EM2018052-001	Anonymous	EP202-SL: 4-Chlorophenoxy acetic acid	122-88-3	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: 2,4-DB	94-82-6	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Dicamba	1918-00-9	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Mecoprop	93-65-2	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: MCPA	94-74-6	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: 2,4-DP	120-36-5	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: 2,4-D	94-75-7	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Triclopyr	55335-06-3	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Silvex (2,4,5-TP/Fenoprop)	93-72-1	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: 2,4,5-T	93-76-5	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: MCPB	94-81-5	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Picloram	1918-02-1	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Clopyralid	1702-17-6	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Fluroxypyr	69377-81-7	10	µg/L	<10	<10	0.00	No Limit
EM2018085-022	Anonymous	EP202-SL: 4-Chlorophenoxy acetic acid	122-88-3	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: 2,4-DB	94-82-6	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Dicamba	1918-00-9	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Mecoprop	93-65-2	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: MCPA	94-74-6	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: 2,4-DP	120-36-5	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: 2,4-D	94-75-7	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Triclopyr	55335-06-3	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Silvex (2,4,5-TP/Fenoprop)	93-72-1	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: 2,4,5-T	93-76-5	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: MCPB	94-81-5	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Picloram	1918-02-1	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Clopyralid	1702-17-6	10	µg/L	<10	<10	0.00	No Limit
		EP202-SL: Fluroxypyr	69377-81-7	10	µg/L	<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**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3317820)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	88.2	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	114	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	97.8	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	103	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.1 mg/kg	86.5	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	92.8	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	74.6	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3317821)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.0847 mg/kg	98.6	70.0	105
EP068A: Organochlorine Pesticides (OC) (QCLot: 3314427)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	104	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	91.2	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	104	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	101	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	105	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	101	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	105	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	97.1	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	94.7	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	101	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	97.6	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	97.2	66.0	116
EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	97.4	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.3	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	96.3	69.0	115
EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	97.6	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	104	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	104	62.0	124
EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	104	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	108	64.0	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	96.1	54.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 3315878)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	108	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	95.7	65.0	117



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP068A: Organochlorine Pesticides (OC) (QCLot: 3315878) - continued								
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	105	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	106	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	97.7	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	106	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	102	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	108	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	102	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	103	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	106	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	107	66.0	116
EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	99.4	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	94.6	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	99.6	69.0	115
EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	100	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	102	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	99.0	62.0	124
EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	96.2	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	106	64.0	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	93.5	54.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3314427)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	96.5	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.1	62.0	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	83.0	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.0	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	81.4	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	108	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	104	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	87.6	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	101	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	104	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	101	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	76.1	70.0	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.4	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	93.8	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	82.7	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	100	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	92.6	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	97.4	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	71.9	41.0	123



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3315878)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	84.8	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	102	62.0	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	92.7	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	76.2	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	78.1	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	102	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	99.9	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	78.9	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	106	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	103	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	106	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	85.4	70.0	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	98.0	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	108	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.2	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	87.4	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	104	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	103	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	64.5	41.0	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3314426)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	94.7	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	101	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	97.0	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	94.1	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	98.5	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	98.7	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	96.9	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	93.9	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	104	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	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	105	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	99.9	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	97.2	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	97.1	61.0	121
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	89.4	62.0	118
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	99.5	63.0	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3315435)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	90.0	77.0	125



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3315435) - continued								
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	94.6	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	95.1	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	98.6	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	90.3	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	97.6	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	95.1	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	91.2	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	94.9	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	91.9	68.0	116
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	97.4	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	94.7	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	90.3	61.0	121
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	97.8	62.0	118
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	90.5	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3314425)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	91.0	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	91.1	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	89.1	71.0	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3315436)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	98.3	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	93.7	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	88.4	71.0	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3317457)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	102	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3314425)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	91.4	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	90.7	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	78.1	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3315436)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	93.0	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	90.3	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	75.0	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3317457)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	103	68.4	128
EP080: BTEXN (QCLot: 3317457)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	94.1	62.0	116



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP080: BTEXN (QCLot: 3317457) - continued								
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	97.6	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	95.5	65.0	117
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	101	66.0	118
	106-42-3							
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	101	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	100	63.0	119
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3314654)								
EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	0.1 mg/kg	68.1	54.4	128
EP202: 2,4-DB	94-82-6	0.02	mg/kg	<0.02	0.1 mg/kg	74.0	45.5	130
EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	0.1 mg/kg	68.2	51.7	135
EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	0.1 mg/kg	71.0	60.0	130
EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	0.1 mg/kg	66.5	56.8	131
EP202: 2,4-DP	120-36-5	0.02	mg/kg	<0.02	0.1 mg/kg	66.8	50.0	141
EP202: 2,4-D	94-75-7	0.02	mg/kg	<0.02	0.1 mg/kg	71.5	68.5	131
EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	0.1 mg/kg	68.0	50.8	141
EP202: 2,4,5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	0.1 mg/kg	64.0	40.8	126
EP202: 2,4,5-T	93-76-5	0.02	mg/kg	<0.02	0.1 mg/kg	72.3	57.4	139
EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	0.1 mg/kg	66.3	38.9	137
EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	0.1 mg/kg	62.5	48.7	129
EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	0.1 mg/kg	61.3	49.4	106
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	0.1 mg/kg	65.2	53.2	128
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3316196)								
EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	0.1 mg/kg	75.3	54.4	128
EP202: 2,4-DB	94-82-6	0.02	mg/kg	<0.02	0.1 mg/kg	69.7	45.5	130
EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	0.1 mg/kg	73.4	51.7	135
EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	0.1 mg/kg	70.3	60.0	130
EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	0.1 mg/kg	60.5	56.8	131
EP202: 2,4-DP	120-36-5	0.02	mg/kg	<0.02	0.1 mg/kg	65.9	50.0	141
EP202: 2,4-D	94-75-7	0.02	mg/kg	<0.02	0.1 mg/kg	77.6	68.5	131
EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	0.1 mg/kg	67.1	50.8	141
EP202: 2,4,5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	0.1 mg/kg	63.2	40.8	126
EP202: 2,4,5-T	93-76-5	0.02	mg/kg	<0.02	0.1 mg/kg	73.3	57.4	139
EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	0.1 mg/kg	66.0	38.9	137
EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	0.1 mg/kg	64.9	48.7	129
EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	0.1 mg/kg	61.4	49.4	106
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	0.1 mg/kg	67.2	53.2	128

Sub-Matrix: <b>WATER</b>	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
		Spike	Spike Recovery (%)	Recovery Limits (%)



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EG020T: Total Metals by ICP-MS (QCLot: 3317723)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	108	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.4	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.6	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	104	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.6	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	104	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	106	79.0	117
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3317721)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	103	77.0	111
EP068A: Organochlorine Pesticides (OC) (QCLot: 3314406)								
EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	5 µg/L	80.7	64.9	107
EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	5 µg/L	79.6	58.3	111
EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	5 µg/L	82.8	69.0	117
EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	5 µg/L	83.9	70.0	112
EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	5 µg/L	89.1	68.9	110
EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	5 µg/L	80.4	65.2	108
EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	5 µg/L	85.2	65.8	109
EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	5 µg/L	85.8	67.1	107
EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	5 µg/L	83.8	64.1	110
EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	5 µg/L	83.8	66.7	112
EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	5 µg/L	80.9	63.2	111
EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	5 µg/L	86.7	65.2	113
EP068: 4,4`-DDE	72-55-9	0.5	µg/L	<0.5	5 µg/L	86.8	66.0	112
EP068: Endrin	72-20-8	0.5	µg/L	<0.5	5 µg/L	84.5	65.2	113
EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	5 µg/L	85.0	67.3	114
EP068: 4,4`-DDD	72-54-8	0.5	µg/L	<0.5	5 µg/L	84.9	72.0	122
EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	5 µg/L	101	66.9	109
EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	5 µg/L	103	65.2	112
EP068: 4,4`-DDT	50-29-3	2	µg/L	<2.0	5 µg/L	104	65.2	112
EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	5 µg/L	87.7	63.8	110
EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	5 µg/L	76.1	61.1	114
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3314406)								
EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	5 µg/L	78.5	65.6	114
EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	5 µg/L	83.4	63.7	113
EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	5 µg/L	22.4	19.7	48.0
EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	5 µg/L	77.5	69.5	110
EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	5 µg/L	82.7	71.1	110
EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	5 µg/L	85.7	77.0	119
EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	5 µg/L	82.6	70.0	124



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3314406) - continued								
EP068: Malathion	121-75-5	0.5	µg/L	<0.5	5 µg/L	89.6	68.4	116
EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	5 µg/L	83.5	68.6	112
EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	5 µg/L	83.7	75.0	119
EP068: Parathion	56-38-2	2	µg/L	<2.0	5 µg/L	81.4	67.0	121
EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	5 µg/L	79.3	69.0	121
EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	5 µg/L	91.7	71.8	110
EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	5 µg/L	84.3	67.5	112
EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	5 µg/L	91.8	64.1	116
EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	5 µg/L	83.9	67.8	114
EP068: Ethion	563-12-2	0.5	µg/L	<0.5	5 µg/L	85.2	74.0	120
EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	5 µg/L	103	66.2	114
EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	5 µg/L	96.4	51.6	128
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3314404)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	75.7	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	92.6	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	95.6	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	92.0	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	83.6	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	85.6	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	85.0	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	84.9	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	81.1	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	81.6	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	79.9	61.7	119
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	99.9	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	80.3	59.9	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	80.5	61.2	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	79.7	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3314405)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	79.0	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	95.0	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	91.3	56.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3315638)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	91.3	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3314405)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	79.2	57.9	119



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3314405) - continued								
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	96.6	62.5	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	90.8	61.5	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3315638)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	89.3	75.0	127
EP080: BTEXN (QCLot: 3315638)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	91.7	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	93.0	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	90.9	70.0	120
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	88.5	69.0	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	91.7	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	113	70.0	120
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3317130)								
EP202-SL: 4-Chlorophenoxy acetic acid	122-88-3	10	µg/L	<10	100 µg/L	101	82.0	136
EP202-SL: 2,4-DB	94-82-6	10	µg/L	<10	100 µg/L	94.2	65.0	147
EP202-SL: Dicamba	1918-00-9	10	µg/L	<10	100 µg/L	98.8	83.0	137
EP202-SL: Mecoprop	93-65-2	10	µg/L	<10	100 µg/L	97.9	75.0	143
EP202-SL: MCPA	94-74-6	10	µg/L	<10	100 µg/L	101	76.0	140
EP202-SL: 2,4-DP	120-36-5	10	µg/L	<10	100 µg/L	91.3	76.0	144
EP202-SL: 2,4-D	94-75-7	10	µg/L	<10	100 µg/L	96.9	77.0	139
EP202-SL: Triclopyr	55335-06-3	10	µg/L	<10	100 µg/L	95.2	77.0	141
EP202-SL: Silvex (2,4,5-TP/Fenoprop)	93-72-1	10	µg/L	<10	100 µg/L	87.9	75.0	143
EP202-SL: 2,4,5-T	93-76-5	10	µg/L	<10	100 µg/L	94.4	78.0	140
EP202-SL: MCPB	94-81-5	10	µg/L	<10	100 µg/L	91.1	69.2	139
EP202-SL: Picloram	1918-02-1	10	µg/L	<10	100 µg/L	91.6	70.0	144
EP202-SL: Clopyralid	1702-17-6	10	µg/L	<10	100 µg/L	93.5	70.0	145
EP202-SL: Fluroxypyr	69377-81-7	10	µg/L	<10	100 µg/L	104	77.0	145

## 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 Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
<b>EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3317820)</b>							
ES2036323-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	87.4	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	86.4	70.0	130



Page : 21 of 23  
 Work Order : ES2036358  
 Client : ROBERT CARR & ASSOCIATES P/L  
 Project : 15111



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3315435) - continued							
ES2035610-021	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	89.8	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.8	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3314425)							
ES2036323-002	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	96.3	73.0	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	112	53.0	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	122	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3315436)							
ES2035610-021	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	88.6	73.0	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	72.2	53.0	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	77.2	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3317457)							
EW2004686-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	87.6	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3314425)							
ES2036323-002	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	114	73.0	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	117	53.0	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	118	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3315436)							
ES2035610-021	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	92.6	73.0	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	83.0	53.0	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	62.4	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3317457)							
EW2004686-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	89.6	70.0	130
EP080: BTEXN (QCLot: 3317457)							
EW2004686-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	82.1	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	81.2	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	83.6	70.0	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	83.6	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	84.6	70.0	130
	EP080: Naphthalene	91-20-3	2.5 mg/kg	71.5	70.0	130	
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3314654)							
EM2018020-001	Anonymous	EP202: Mecoprop	93-65-2	0.1 mg/kg	71.8	60.0	140
		EP202: MCPA	94-74-6	0.1 mg/kg	64.9	57.0	143
		EP202: 2,4-D	94-75-7	0.1 mg/kg	# Not Determined	68.0	139
		EP202: Triclopyr	55335-06-3	0.1 mg/kg	70.0	51.0	145

Page : 22 of 23  
 Work Order : ES2036358  
 Client : ROBERT CARR & ASSOCIATES P/L  
 Project : 15111



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3314654) - continued							
EM2018020-001	Anonymous	EP202: 2.4.5-T	93-76-5	0.1 mg/kg	69.7	57.0	142
		EP202: Picloram	1918-02-1	0.1 mg/kg	64.3	49.0	138
		EP202: Clopyralid	1702-17-6	0.1 mg/kg	56.5	49.0	149
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3316196)							
EP2011203-001	Anonymous	EP202: Mecoprop	93-65-2	0.1 mg/kg	79.2	60.0	140
		EP202: MCPA	94-74-6	0.1 mg/kg	65.2	57.0	143
		EP202: 2.4-D	94-75-7	0.1 mg/kg	80.6	68.0	139
		EP202: Triclopyr	55335-06-3	0.1 mg/kg	68.4	51.0	145
		EP202: 2.4.5-T	93-76-5	0.1 mg/kg	73.0	57.0	142
		EP202: Picloram	1918-02-1	0.1 mg/kg	58.5	49.0	138
		EP202: Clopyralid	1702-17-6	0.1 mg/kg	54.6	49.0	149
Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 3317723)							
ES2036273-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	104	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	92.4	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	85.9	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	96.8	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	86.1	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	97.6	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	100	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3317721)							
ES2036273-002	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	95.0	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3315638)							
ES2036357-004	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	111	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3315638)							
ES2036357-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	112	70.0	130
EP080: BTEXN (QCLot: 3315638)							
ES2036357-004	Anonymous	EP080: Benzene	71-43-2	25 µg/L	106	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	106	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	110	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	109	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	114	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	99.3	70.0	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3317130)							
EM2018052-001	Anonymous	EP202-SL: Mecoprop	93-65-2	100 µg/L	98.1	75.0	143
		EP202-SL: MCPA	94-74-6	100 µg/L	89.8	76.0	140
		EP202-SL: 2,4-D	94-75-7	100 µg/L	97.8	77.0	139
		EP202-SL: Triclopyr	55335-06-3	100 µg/L	86.6	77.0	141
		EP202-SL: 2,4,5-T	93-76-5	100 µg/L	83.9	78.0	140
		EP202-SL: Picloram	1918-02-1	100 µg/L	99.4	70.0	144
		EP202-SL: Clopyralid	1702-17-6	100 µg/L	98.0	70.0	145

## QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2036358	Page	: 1 of 8
Client	: ROBERT CARR & ASSOCIATES P/L	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Telephone	: +61 2 8784 8555
Project	: 15111	Date Samples Received	: 16-Oct-2020
Site	: ----	Issue Date	: 23-Oct-2020
Sampler	: R Lamont	No. of samples received	: 6
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.
- **NO** Duplicate outliers occur.
- **NO** 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

- **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.





Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = 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
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)		16-Oct-2020	----	----	----	20-Oct-2020	30-Oct-2020	✓
S1,	S2,							
S3,	S4							
EG005(ED093)T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)		16-Oct-2020	20-Oct-2020	14-Apr-2021	✓	21-Oct-2020	14-Apr-2021	✓
S1,	S2,							
S3,	S4							
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T)		16-Oct-2020	20-Oct-2020	13-Nov-2020	✓	21-Oct-2020	13-Nov-2020	✓
S1,	S2,							
S3,	S4							
EP068A: Organochlorine Pesticides (OC)								
Soil Glass Jar - Unpreserved (EP068)		16-Oct-2020	20-Oct-2020	30-Oct-2020	✓	21-Oct-2020	29-Nov-2020	✓
S4								
Soil Glass Jar - Unpreserved (EP068)		16-Oct-2020	20-Oct-2020	30-Oct-2020	✓	22-Oct-2020	29-Nov-2020	✓
S3								
EP068B: Organophosphorus Pesticides (OP)								
Soil Glass Jar - Unpreserved (EP068)		16-Oct-2020	20-Oct-2020	30-Oct-2020	✓	21-Oct-2020	29-Nov-2020	✓
S4								
Soil Glass Jar - Unpreserved (EP068)		16-Oct-2020	20-Oct-2020	30-Oct-2020	✓	22-Oct-2020	29-Nov-2020	✓
S3								
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM))		16-Oct-2020	20-Oct-2020	30-Oct-2020	✓	21-Oct-2020	29-Nov-2020	✓
S1,	S2,							
S3								
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080)		16-Oct-2020	20-Oct-2020	30-Oct-2020	✓	21-Oct-2020	30-Oct-2020	✓
S1,	S2,							
S3								
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Soil Glass Jar - Unpreserved (EP080)		16-Oct-2020	20-Oct-2020	30-Oct-2020	✓	21-Oct-2020	30-Oct-2020	✓
S1,	S2,							
S3								
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080)		16-Oct-2020	20-Oct-2020	30-Oct-2020	✓	21-Oct-2020	30-Oct-2020	✓
S1,	S2,							
S3								



Matrix: **SOIL**

Evaluation: \* = Holding time breach ; ✓ = 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
EP202A: Phenoxyacetic Acid Herbicides by LCMS							
Soil Glass Jar - Unpreserved (EP202) S4	16-Oct-2020	19-Oct-2020	30-Oct-2020	✓	19-Oct-2020	28-Nov-2020	✓
Soil Glass Jar - Unpreserved (EP202) S3	16-Oct-2020	20-Oct-2020	30-Oct-2020	✓	20-Oct-2020	29-Nov-2020	✓

Matrix: **WATER**

Evaluation: \* = Holding time breach ; ✓ = 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
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) D1,	D2	16-Oct-2020	20-Oct-2020	14-Apr-2021	✓	20-Oct-2020	14-Apr-2021	✓
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) D1,	D2	16-Oct-2020	----	----	----	20-Oct-2020	13-Nov-2020	✓
EP068A: Organochlorine Pesticides (OC)								
Amber Glass Bottle - Unpreserved (EP068) D1,	D2	16-Oct-2020	20-Oct-2020	23-Oct-2020	✓	22-Oct-2020	29-Nov-2020	✓
EP068B: Organophosphorus Pesticides (OP)								
Amber Glass Bottle - Unpreserved (EP068) D1,	D2	16-Oct-2020	20-Oct-2020	23-Oct-2020	✓	22-Oct-2020	29-Nov-2020	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM)) D1,	D2	16-Oct-2020	20-Oct-2020	23-Oct-2020	✓	22-Oct-2020	29-Nov-2020	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) D1,	D2	16-Oct-2020	20-Oct-2020	23-Oct-2020	✓	22-Oct-2020	29-Nov-2020	✓
Amber VOC Vial - Sulfuric Acid (EP080) D1,	D2	16-Oct-2020	22-Oct-2020	30-Oct-2020	✓	22-Oct-2020	30-Oct-2020	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) D1,	D2	16-Oct-2020	20-Oct-2020	23-Oct-2020	✓	22-Oct-2020	29-Nov-2020	✓
Amber VOC Vial - Sulfuric Acid (EP080) D1,	D2	16-Oct-2020	22-Oct-2020	30-Oct-2020	✓	22-Oct-2020	30-Oct-2020	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) D1,	D2	16-Oct-2020	22-Oct-2020	30-Oct-2020	✓	22-Oct-2020	30-Oct-2020	✓
EP202A: Phenoxyacetic Acid Herbicides by LCMS								
Amber Glass Bottle - Unpreserved (EP202-SL) D1,	D2	16-Oct-2020	----	----	----	20-Oct-2020	23-Oct-2020	✓



## 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		Count		Rate (%)		Quality Control Specification	
Analytical Methods	Method	QC	Regular	Actual	Expected		Evaluation
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	3	28	10.71	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	3	27	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	3	27	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	27	7.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	27	7.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	27	7.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	27	7.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	27	7.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	27	7.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	19	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	12	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202-SL	2	14	14.29	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-MS - Suite A	EG020A-T	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	14	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202-SL	1	14	7.14	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-MS - Suite A	EG020A-T	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202-SL	1	14	7.14	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-MS - Suite A	EG020A-T	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	7.14	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	19	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	12	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202-SL	1	14	7.14	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-MS - Suite A	EG020A-T	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	14	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



## 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 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 Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl <sub>2</sub> ) (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 SnCl <sub>2</sub> which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 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 Schedule B(3).
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. 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 Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	SOIL	In house: LCMS (Electrospray in negative mode). Residues of acid herbicides are extracted from soil samples under the alkaline condition. An aliquot of the alkaline aqueous phase is taken and acidified before a SPE cleanup. After eluting off from the SPE cartridge, residues of acid herbicides are dissolved in HPLC mobile phase prior to instrument analysis.
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 (SnCl <sub>2</sub> )(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 SnCl <sub>2</sub> which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).



Analytical Methods	Method	Matrix	Method Descriptions
Pesticides by GCMS	EP068	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample 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 Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 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 Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 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 Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 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 Schedule B(3)
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202-SL	WATER	In house: LCMS (Electrospray in negative mode). After adding surrogate and acetic acid, water samples are injected on a C18 column for LC/MS determination.

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 Schedule B(3).
Extraction for Phenoxy Acid Herbicides in Soils.	EP202-PR	SOIL	In-House: Alkaline extract followed by SPE clean up of acidified portion of the sample extract.
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 Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 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 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.

## CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ **Sydney:** 277 Woodpark Rd, Smithfield NSW 2176  
 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com  
☐ **Newcastle:** 5 Rosegum Rd, Warabrook NSW 2304  
 Ph:02 4988 9433 E:samples.newcastle@alsenviro.com

☐ **Brisbane:** 32 Shand St, Stafford QLD 4053  
 Ph: 07 3243 7222 E: [samples.brisbane@alsenviro.com](mailto:samples.brisbane@alsenviro.com)  
☐ **Townsville:** 14-15 Desma Ct, Bohle QLD 4818  
 Ph: 07 4796 0600 E: [townsville.environmental@alsenviro.com](mailto:townsville.environmental@alsenviro.com)

☐ **Melbourne:** 2-4 Westall Rd, Springvale VIC 3171  
Ph: 03 8549 9600 E: [samples.melbourne@aisenviro.com](mailto:samples.melbourne@aisenviro.com)

☐ **Adelaide:** 2-1 Burma Rd, Pooraka SA 5095  
Ph: 08 8359 0990 E: [adelaide@aisenviro.com](mailto:adelaide@aisenviro.com)

☐ Perth: 10 Hod Way, Malaga WA 6090  
Ph: 08 9209 7655 E: [samples.perth@aleenviro.com](mailto:samples.perth@aleenviro.com)

☐ Launceston: 27 Wellington St, Launceston TAS 7250  
Ph: 03 6331 2450 E: [launceston@aleenviro.com](mailto:launceston@aleenviro.com)

CLIENT: RCA Australia		TURNAROUND REQUIREMENTS : <input checked="" type="checkbox"/> Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: 92 Hill Street, Carrington		(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):		Custody Seal Intact? Yes No	
RCA Ref No: 15111		ALS QUOTE NO.: SYBQ_400_17		Free Ice / frozen Ice bricks present upon receipt? Yes No	
Seaham		COC SEQUENCE NUMBER (Circle)		Random Sample Temperature on Receipt: 9.2	
PROJECT MANAGER: Fiona Brooker		CONTACT PH: 0408 687 529		Other comment:	
SAMPLER: R Lamont		SAMPLER MOBILE: 0401 002 912		RECEIVED BY: [Signature]	
COC Emailed to ALS? ( YES / NO)		EDD FORMAT (or default):		DATE/TIME: 16/10/20	
Email Reports to: administrator@rca.com.au + richiel@rca.com.au, fionab@rca.com.au		RELINQUISHED BY: [Signature]		DATE/TIME: 16/10/20	
Email Invoice to: as above		DATE/TIME: 16/10/20		DATE/TIME: 16/10/20	


COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required),							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	S-26	S-12 OCP/OPP	Phenoxy Acid Herbicides - standard level	Metals	W-26T	W-12	Phenoxy Acid Herbicides - standard level - water	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	S1	16/10/20	S			X							
2	S2	↓	S			X							
3	S3		S			X	X	X					
4	S4		S				X	X	X				
5	D1		W										
6	D2		W							X	X	X	
										X	X	X	
					TOTAL								

LAB OF ORIGIN:  
NEWCASTLE

ANALYSED

Environmental Division  
 Sydney  
 Work Order Reference  
**ES2036358**



Telephone : + 61-2-8784 8555

**Water Container Codes:** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic  
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;  
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solts; B = Unpreserved Bag.

Environmental Division  
Sydney  
Work Order Reference  
**ES2036358**



Telephone : + 61-2-8784 8555

## SAMPLE RECEIPT NOTIFICATION (SRN)

**Work Order : ES2036358**

<b>Client</b>	: <b>ROBERT CARR &amp; ASSOCIATES P/L</b>	<b>Laboratory</b>	: Environmental Division Sydney
<b>Contact</b>	: MS FIONA BROOKER	<b>Contact</b>	: Grace White
<b>Address</b>	: PO BOX 175 CARRINGTON NSW, AUSTRALIA 2294	<b>Address</b>	: 277-289 Woodpark Road Smithfield NSW Australia 2164
<b>E-mail</b>	: fionab@rca.com.au	<b>E-mail</b>	: Grace.White@ALSGlobal.com
<b>Telephone</b>	: +61 02 4902 9200	<b>Telephone</b>	: +61 2 8784 8555
<b>Facsimile</b>	: +61 02 4902 9299	<b>Facsimile</b>	: +61-2-8784 8500
<b>Project</b>	: 15111	<b>Page</b>	: 1 of 3
<b>Order number</b>	: ----	<b>Quote number</b>	: ES2017ROBCAR0004 (SYBQ/400/18)
<b>C-O-C number</b>	: ----	<b>QC Level</b>	: NEPM 2013 B3 & ALS QC Standard
<b>Site</b>	: ----		
<b>Sampler</b>	: R Lamont		

### Dates

<b>Date Samples Received</b>	: 16-Oct-2020 11:06	<b>Issue Date</b>	: 16-Oct-2020
<b>Client Requested Due Date</b>	: 23-Oct-2020	<b>Scheduled Reporting Date</b>	: <b>23-Oct-2020</b>

### Delivery Details

<b>Mode of Delivery</b>	: Undefined	<b>Security Seal</b>	: Not Available
<b>No. of coolers/boxes</b>	: ----	<b>Temperature</b>	: 9.2°C
<b>Receipt Detail</b>	:	<b>No. of samples received / analysed</b>	: 6 / 6

### 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
- **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.

## 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	SOIL - EA055-103 Moisture Content	SOIL - EP202(solids) Phenoxycetic acids	SOIL - S-02 8 Metals (incl. Digestion)	SOIL - S-12 OC/OP Pesticides	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES2036358-001	16-Oct-2020 00:00	S1	✓				✓
ES2036358-002	16-Oct-2020 00:00	S2	✓				✓
ES2036358-003	16-Oct-2020 00:00	S3	✓	✓		✓	✓
ES2036358-004	16-Oct-2020 00:00	S4	✓	✓	✓	✓	

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - W-12 OC/OP Pesticides	WATER - W-26T TRH/BTEXN/PAH/Total 8 Metals
ES2036358-005	16-Oct-2020 00:00	D1	✓	✓
ES2036358-006	16-Oct-2020 00:00	D2	✓	✓

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EP202SL Phenoxycetic Acid
ES2036358-005	16-Oct-2020 00:00	D1	✓
ES2036358-006	16-Oct-2020 00:00	D2	✓



## Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

### Requested Deliverables

#### ALL INVOICES

- *AU Certificate of Analysis - NATA (COA)	Email	administrator@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	administrator@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	administrator@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	administrator@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	administrator@rca.com.au
- Chain of Custody (CoC) (COC)	Email	administrator@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	administrator@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	administrator@rca.com.au
- EDI Format - XTab (XTAB)	Email	administrator@rca.com.au

#### FIONA BROOKER

- *AU Certificate of Analysis - NATA (COA)	Email	fionab@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	fionab@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	fionab@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	fionab@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	fionab@rca.com.au
- Chain of Custody (CoC) (COC)	Email	fionab@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	fionab@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	fionab@rca.com.au
- EDI Format - XTab (XTAB)	Email	fionab@rca.com.au

#### Richie Lamont

- *AU Certificate of Analysis - NATA (COA)	Email	richiel@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	richiel@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	richiel@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	richiel@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	richiel@rca.com.au
- Chain of Custody (CoC) (COC)	Email	richiel@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	richiel@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	richiel@rca.com.au
- EDI Format - XTab (XTAB)	Email	richiel@rca.com.au

# Appendix G

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## Summary of Results

*Soil Results Summary  
HSL/ESL Comparison*

Sample Identification	PQL	Guideline <sup>A</sup>				S1	S2	S3	S4
Sample Depth (m) <sup>B</sup>		HSL 'A' HSL 'B'	ESL URPOS	Sensitive ML	DC A	0.01	0.01	0.01	0.01
Date		SAND 0-<1m	Coarse	Coarse		16/10/20	16/10/20	16/10/20	16/10/20
Sample Profile						sand clay	sand clay	sand clay	sand clay
Dominant Stratum <sup>C</sup>						sand	sand	sand	sand
Sample Purpose						Investigation	Investigation	Investigation	Investigation
Sample collected by						RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)									
Benzene	0.2	0.5	50		100	3.7	<0.2	<0.2	--
Toluene	0.5	160	85		14000	0.6	<0.5	<0.5	--
Ethylbenzene	0.5	55	70		4500	<0.5	<0.5	<0.5	--
meta- and para-Xylene	0.5					<0.5	<0.5	<0.5	--
ortho-Xylene	0.5					<0.5	<0.5	<0.5	--
Total Xylenes	1	40	105		12000	0.5	0.5	0.5	--
Polycyclic Aromatic Hydrocarbons (PAH)									
Naphthalene	1	3	170		1400	<1	<1	<1	--
Total Recoverable Hydrocarbons (TRH)									
TRH C <sub>6</sub> -C <sub>10</sub>	10			700	4400	<10	<10	<10	--
TRH >C <sub>10</sub> -C <sub>16</sub>	50		120	1000	3300	<10	<10	<10	--
TRH >C <sub>16</sub> -C <sub>34</sub>	100		300	2500	4500	<50	<50	<50	--
TRH >C <sub>34</sub> -C <sub>40</sub>	100		2800	10000	6300	<100	<100	<100	--
F1	10	45	180			<10	<10	<10	--
F2	50	110				<50	<50	<50	--

All results are in units of mg/kg.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

F1 = TRH C<sub>6</sub>-C<sub>10</sub> minus BTEX. F1 PQL deemed equal TRH C<sub>6</sub>-C<sub>10</sub>.

F2 = TRH >C<sub>10</sub>-C<sub>16</sub> minus naphthalene. F2 PQL deemed = TRH >C<sub>10</sub>-C<sub>16</sub>.

<sup>A</sup> ASC NEPM 1999 (amended April 2013) Vapour Based Health Screening Levels (HSL) 'A' (Residential)

<sup>A</sup> ASC NEPM 1999 (amended April 2013) Ecological Screening Levels (ESL) URPOS (Urban Residential and Public Open Space)

<sup>A</sup> ASC NEPM 1999 (amended April 2013) Management Limits (ML) Sensitive Sites (Residential, open space)

<sup>A</sup> CRC Care Technical Report 10, September 2011 Direct Contact (DC) Health Screening Levels 'A' (Residential)

<sup>B</sup> Start of sample, generally over a 0.1m interval

<sup>C</sup> Note that this is a generalisation for the purpose of comparing to the HSL criteria. Where two strata equally represented, most conservative criterion used

NL designates 'Not Limiting' indicating that the pore water concentration required to constitute a vapour risk is higher than the solubility capacity for that compound based on a petroleum mixture. Vapour is therefore not a risk for this compound.

Results for TRH have been compared to TPH guidelines.

Presented ESL for naphthalene is an Ecological Investigation Level

ESL are applicable for material at less than 2m depths below finished surface/ground level

For the purpose of the Tier 1 ESL/EIL assessment, all background concentrations are assumed to be zero

ESL for TRH >C<sub>16</sub>-C<sub>34</sub> and >C<sub>34</sub>-C<sub>40</sub> are low reliability

Results shown in **BOLD** are in excess of the vapour based HSL

Results shown in shading are >250% of the vapour based HSL

Results shown in underline are in excess of the ESL

Results shown in *italics* are in excess of the management limit

Results shown in patterned cells are in excess of the direct contact HSL

Where summation required (Xylene, F1, F2) calculation includes components reported as non detected as 1/2 PQL.

*Soil Results Summary  
HIL/EIL Comparison*

Sample Identification	PQL	Guideline <sup>A</sup>		S1	S2	S3	S4
Sample Depth (m) <sup>B</sup>		HIL 'A'	EIL URPOS	0.01	0.01	0.01	0.01
Date				16/10/20	16/10/20	16/10/20	16/10/20
Sample Profile				sand clay	sand clay	sand clay	sand clay
Sample Purpose				Investigation	Investigation	Investigation	Investigation
Sample collected by				RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL
Polycyclic Aromatic Hydrocarbons (PAH)							
Naphthalene	0.5		170	<0.5	<0.5	<0.5	--
Acenaphthylene	0.5			<0.5	<0.5	<0.5	--
Acenaphthene	0.5			<0.5	<0.5	<0.5	--
Fluorene	0.5			<0.5	<0.5	<0.5	--
Phenanthrene	0.5			<0.5	<0.5	<0.5	--
Anthracene	0.5			<0.5	<0.5	<0.5	--
Fluoranthene	0.5			<0.5	<0.5	<0.5	--
Pyrene	0.5			<0.5	<0.5	<0.5	--
Benz(a)anthracene	0.5			<0.5	<0.5	<0.5	--
Chrysene	0.5			<0.5	<0.5	<0.5	--
Benzo(b)&(j)fluoranthene	0.5			<0.5	<0.5	<0.5	--
Benzo(k)fluoranthene	0.5			<0.5	<0.5	<0.5	--
Benzo(a) pyrene	0.5		0.7	<0.5	<0.5	<0.5	--
Indeno(1,2,3-c,d)pyrene	0.5			<0.5	<0.5	<0.5	--
Dibenz(a,h)anthracene	0.5			<0.5	<0.5	<0.5	--
Benzo(g,h,i)perylene	0.5			<0.5	<0.5	<0.5	--
Carcinogenic PAH (B(a)P equivalent)	1.21	3		0.605	0.605	0.605	--
Sum of reported PAH	8	300		4	4	4	--
Metals							
Arsenic	5	100	100	10	7	<5	<5
Cadmium	1	20		<1	<1	<1	<1
Chromium	2	100	190	20	17	10	9
Copper	5	6000	280	7	5	<5	<5
Mercury	0.1	40		<0.1	<0.1	<0.1	<0.1
Lead	5	300	1100	14	7	9	11
Nickel	2	400	30	5	3	<2	<2
Zinc	5	7400	230	82	23	12	29
Organochlorine Pesticides (OCP)							
alpha-BHC	0.05			--	--	<0.05	<0.05
Hexachlorobenzene (HCB)	0.05	10		--	--	<0.05	<0.05
beta-BHC	0.05			--	--	<0.05	<0.05
gamma-BHC	0.05			--	--	<0.05	<0.05
delta-BHC	0.05			--	--	<0.05	<0.05
Heptachlor	0.05	6		--	--	<0.05	<0.05
Aldrin	0.05			--	--	<0.05	<0.05
Heptachlor epoxide	0.05			--	--	<0.05	<0.05
Total Chlordane (sum)	0.05	50		--	--	<0.05	<0.05
trans-Chlordane	0.05			--	--	<0.05	<0.05
alpha-Endosulfan	0.05			--	--	<0.05	<0.05
cis-Chlordane	0.05			--	--	<0.05	<0.05
Dieldrin	0.05			--	--	<0.05	<0.05
4,4`-DDE	0.05			--	--	<0.05	<0.05
Endrin	0.05	10		--	--	<0.05	<0.05
Endosulfan (sum)	0.05			--	--	<0.05	<0.05
beta-Endosulfan	0.05			--	--	<0.05	<0.05
4,4`-DDD	0.05			--	--	<0.05	<0.05
Endrin aldehyde	0.05			--	--	<0.05	<0.05
Endosulfan sulfate	0.05			--	--	<0.05	<0.05
4,4`-DDT	0.2		180	--	--	<0.2	<0.2
Endrin ketone	0.05			--	--	<0.05	<0.05
Methoxychlor	0.2	300		--	--	<0.2	<0.2
DDT+DDD+DDE	0.15	240		--	--	0.05	0.05
Aldrin + Dieldrin	0.1	6		--	--	0.05	0.05
Endosulfan	0.1	270		--	--	0.05	0.05

*Soil Results Summary*  
*HIL/EIL Comparison*

Sample Identification	PQL	Guideline <sup>A</sup>		S1	S2	S3	S4
Sample Depth (m) <sup>B</sup>		HIL 'A'	EIL URPOS	0.01	0.01	0.01	0.01
Date				16/10/20	16/10/20	16/10/20	16/10/20
Organophosphorous Pesticides (OPP)							
Dichlorvos	0.05			--	--	<0.05	<0.05
Demeton-S-methyl	0.05			--	--	<0.05	<0.05
Monocrotophos	0.2			--	--	<0.2	<0.2
Dimethoate	0.05			--	--	<0.05	<0.05
Diazinon	0.05			--	--	<0.05	<0.05
Chlorpyrifos-methyl	0.05			--	--	<0.05	<0.05
Parathion-methyl	0.2			--	--	<0.2	<0.2
Malathion	0.05			--	--	<0.05	<0.05
Fenthion	0.05			--	--	<0.05	<0.05
Chlorpyrifos	0.05	160		--	--	<0.05	<0.05
Parathion	0.2			--	--	<0.2	<0.2
Pirimphos-ethyl	0.05			--	--	<0.05	<0.05
Chlorfenvinphos	0.05			--	--	<0.05	<0.05
Bromophos-ethyl	0.05			--	--	<0.05	<0.05
Fenamiphos	0.05			--	--	<0.05	<0.05
Prothiofos	0.05			--	--	<0.05	<0.05
Ethion	0.05			--	--	<0.05	<0.05
Carbophenothion	0.05			--	--	<0.05	<0.05
Azinphos Methyl	0.05			--	--	<0.05	<0.05
Herbicides							
4-Chlorophenoxy acetic acid	0.02			--	--	<0.04	<0.04
2,4-DB	0.02			--	--	<0.04	<0.04
Dicamba	0.02			--	--	<0.04	<0.04
Mecoprop	0.02	600		--	--	<0.04	<0.04
MCPA	0.02	600		--	--	<0.04	<0.04
2,4-DP	0.02			--	--	<0.04	<0.04
2,4-D	0.02	900		--	--	<0.04	<0.04
Triclopyr	0.02			--	--	<0.04	<0.04
2,4,5-TP (Silvex)	0.02			--	--	<0.04	<0.04
2,4,5-T	0.02	600		--	--	<0.04	<0.04
MCPB	0.02	600		--	--	<0.04	<0.04
Picloram	0.02	4500		--	--	<0.04	<0.04
Clopyralid	0.02			--	--	<0.04	<0.04
Fluroxypyr	0.02			--	--	<0.04	<0.04

All results are in units of mg/kg.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

<sup>A</sup> ASC NEPM 1999 (amended April 2013) Health Investigation Levels (HIL) 'A' (Residential).

<sup>A</sup> ASC NEPM 1999 (amended April 2013) Ecological Investigation Levels (EIL) URPOS (Urban Residential and Public Open Space).

<sup>B</sup> Start of sample, generally over a 0.1m interval

The Carcinogenic PAH value is calculated by multiplying the concentration of each of the 8 carcinogenic PAH compounds by its B(a)P toxic equivalence factor and summing these products.

HIL for Chromium are for Chromium VI

Presented ecological value for benzo(a)pyrene is a low reliability Ecological Screening Level

ESL are applicable for material at less than 2m depths below finished surface/ground level

For the purpose of the Tier 1 ESL/EIL assessment, all background concentrations are assumed to be zero

EIL for Naphthalene are for fresh (<2years) Naphthalene

EIL for Arsenic are for aged (>2years) Arsenic

EIL for Chromium are the added contaminant limit for aged (>2years) Chromium III in soils of 1% clay, the most conservative of the criteria.

EIL for Copper are the added contaminant limit for aged (>2years) Copper in soils of pH 6.5.

EIL for Lead are the added contaminant limit for aged (>2years) Lead.

EIL for Nickel are the added contaminant limit for aged (>2years) Nickel in soils of 5% CEC the most conservative of the criteria.

EIL for Zinc are the added contaminant limit for aged (>2years) Zinc in soils of 5% CEC and pH of 6.5, the most conservative of the criteria at pH 6.5.

EIL for DDT are for fresh (<2years) DDT

Results shown in **BOLD** are in excess of the HIL

Results shown in shading are >250% of the HIL

Results shown in underline are in excess of EIL

Where summation required (PAH, OCP) calculation includes components reported as non detected as 1/2 PQL.

Mr B Statham C/- Le Mottee Group  
Preliminary Site (Contamination) Assessment  
792 Seaham Road, Seaham  
RCA ref:15111-401/0, November 2020

Prepared by: RJL  
Checked by:FB

Surface Water Results Summary  
Ecological and Drinking Water Comparison

Sample Identification	PQL	Ecological <sup>A</sup>	Human Health	D1	D2
Date		Fresh Water	(Ingestion) Guideline <sup>B</sup>	16/10/20	16/10/20
Sample Purpose				Assessment	Assessment
Sample collected by				RCA -RJL	RCA -RJL
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)					
Benzene	0.001	0.95	0.001	<0.001	<0.001
Toluene	0.002	0.18	0.8	<0.002	0.022
Ethylbenzene	0.002	0.08	0.3	<0.002	<0.002
meta- and para-Xylene	0.002	0.275		<0.002	<0.002
ortho-Xylene	0.002	0.35		<0.002	<0.002
Total Xylenes	0.004		0.6	0.002	0.002
Total Recoverable Hydrocarbons (TRH)					
TRH C <sub>6</sub> -C <sub>10</sub>	0.02			<0.02	0.03
TRH >C <sub>10</sub> -C <sub>16</sub>	0.1			<0.1	<0.1
TRH >C <sub>16</sub> -C <sub>34</sub>	0.1			<0.1	0.79
TRH >C <sub>34</sub> -C <sub>40</sub>	0.1			<0.1	0.12
TRH C <sub>6</sub> -C <sub>40</sub>	0.32	0.007		0.16	0.99
Polycyclic Aromatic Hydrocarbons (PAH)					
Naphthalene	0.001	0.016		<0.001	<0.001
Acenaphthylene	0.001			<0.001	<0.001
Acenaphthene	0.001			<0.001	<0.001
Fluorene	0.001			<0.001	<0.001
Phenanthrene <sup>C</sup>	0.001	0.0006		<0.001	<0.001
Anthracene <sup>C</sup>	0.001	0.00001		<0.001	<0.001
Fluoranthene <sup>C</sup>	0.001	0.001		<0.001	<0.001
Pyrene	0.001			<0.001	<0.001
Benz(a)anthracene	0.001			<0.001	<0.001
Chrysene	0.001			<0.001	<0.001
Benzo(b)&(j)fluoranthene	0.001			<0.001	<0.001
Benzo(k)fluoranthene	0.001			<0.001	<0.001
Benzo(a) pyrene <sup>C</sup>	0.001	0.0001	0.00001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene	0.001			<0.001	<0.001
Dibenz(a,h)anthracene	0.001			<0.001	<0.001
Benzo(g,h,i)perylene	0.001			<0.001	<0.001
Metals					
Arsenic	0.001	0.013	0.01	0.002	0.035
Cadmium	0.0001	0.0002	0.002	<0.0001	0.0021
Chromium	0.001	0.001	0.05	0.002	0.062
Copper	0.001	0.0014	2	0.004	0.051
Lead	0.001	0.0034	0.01	0.002	0.095
Mercury <sup>C</sup>	0.0001	0.00006	0.001	<0.0001	<0.0001
Nickel	0.001	0.011		0.004	0.031
Zinc	0.005	0.008		0.019	0.654
Organochlorine Pesticides (OCP) <sup>C</sup>					
alpha-BHC	0.0005			<0.0005	<0.0005
HCB	0.0005			<0.0005	<0.0005
beta-BHC	0.0005			<0.0005	<0.0005
gamma-BHC	0.0005			<0.0005	<0.0005
delta-BHC	0.0005			<0.0005	<0.0005
Heptachlor	0.0005	0.00001		<0.0005	<0.0005
Aldrin	0.0005	0.000001	0.0003	<0.0005	<0.0005
Heptachlor epoxide	0.0005		0.0003	<0.0005	<0.0005
trans-Chlordane	0.0005			<0.0005	<0.0005
alpha-Endosulfan	0.0005			<0.0005	<0.0005
cis-Chlordane	0.0005			<0.0005	<0.0005
Dieldrin	0.0005	0.00001	0.0003	<0.0005	<0.0005
DDE	0.0005	0.00003		<0.0005	<0.0005
Endrin	0.0005	0.00001		<0.0005	<0.0005
beta-Endosulfan	0.0005			<0.0005	<0.0005

Surface Water Results Summary  
Ecological and Drinking Water Comparison

Sample Identification	PQL	Ecological <sup>A</sup>	Human Health	D1	D2
Date		Fresh Water	(Ingestion) Guideline <sup>B</sup>	16/10/20	16/10/20
DDD	0.0005		0.03	<0.0005	<0.0005
Endrin aldehyde	0.0005			<0.0005	<0.0005
Endosulfan sulfate	0.0005			<0.0005	<0.0005
DDT	0.0005	0.000006	0.009	<0.0005	<0.0005
Endrin ketone	0.0005			<0.0005	<0.0005
Methoxychlor	0.002	<i>0.000005</i>		<0.002	<0.002
Chlordane	0.0005	0.00003	0.002	0.0005	0.0005
Endosulfan	0.0005	0.00003	0.02	0.0005	0.0005
<b>Organophosphorous Pesticides (OPP)</b>					
Dichlorvos	0.0005		0.005	<0.0005	<0.0005
Demeton-S-methyl	0.0005	<i>0.004</i>		<0.0005	<0.0005
Monocrotophos	0.002			<0.002	<0.002
Dimethoate	0.0005	0.00015	0.007	<0.0005	<0.0005
Diazinon	0.0005	0.00001	0.004	<0.0005	<0.0005
Chlorpyrifos-methyl	0.0005			<0.0005	<0.0005
Parathion-methyl	0.002		0.0007	<0.002	<0.002
Malathion	0.0005	0.00005	0.07	<0.0005	<0.0005
Fenthion	0.0005	0.0002	0.007	<0.0005	<0.0005
Chlorpyrifos <sup>C</sup>	0.0005	0.00001	0.01	<0.0005	<0.0005
Parathion	0.002	0.000004	0.02	<0.002	<0.002
Pirimiphos-ethyl	0.0005			<0.0005	<0.0005
Bromophos-ethyl	0.0005			<0.0005	<0.0005
Fenamiphos	0.0005		0.5	<0.0005	<0.0005
Prothiofos	0.0005			<0.0005	<0.0005
Ethion	0.0005		4	<0.0005	<0.0005
Carbophenothion	0.0005			<0.0005	<0.0005
Total Chlorfenvinphos	0.0005		0.002	0.0005	0.0005
<b>Phenoxy Acid Herbicides</b>					
4-Chlorophenoxy acetic acid	0.01			<0.01	0.036
2,4-DB	0.01			<0.01	<0.01
Dicamba	0.01			<0.01	<0.01
Mecoprop	0.01			<0.01	<0.01
MCPA	0.01			<0.01	<0.01
2,4-DP	0.01			<0.01	<0.01
2,4-D	0.01			<0.01	<0.01
Triclopyr	0.01			<0.01	<0.01
Silvex (2,4,5-TP/Fenoprop)	0.01			<0.01	<0.01
2,4,5-T	0.01			<0.01	<0.01
Clopyralid	0.01			<0.01	<0.01
Fluroxypyr	0.01			<0.01	<0.01
2,6-D	0.01			<0.01	<0.01

All results are in units of mg/L

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

<sup>A</sup> % Protection Level for Receiving Water Type. 95% used except for bioaccumulative compounds for which 99% is used

<sup>B</sup> Australian Drinking Water Guidelines.

<sup>C</sup> Bioaccumulative Compounds

Ecological guidelines in *italics* are low level reliability guidelines

Ecological arsenic guideline based on As (III) for marine and As (V) for fresh, the lowest of presented guidelines.

Drinking Water arsenic guidelines are based on total arsenic

Guidelines for chromium are based on Cr (VI)

Ecological guidelines for mercury are based on inorganic mercury.

Drinking Water guidelines for mercury are based on total mercury.

Results for TRH have been compared to TPH guidelines.

Results shown in shading are in excess of the 99% aquatic ecosystems guidelines

Results shown in **BOLD** are in excess of the 95% aquatic ecosystems guidelines

Results shown in underline are in excess of the human health (ingestion) guideline

Where summation required (Xylene, TRH, PAH, OPP) calculation includes components reported as non detected as 1/2 PQL.