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TARAGO FORMER STATION MASTERS COTTAGE
DETAILED SITE INVESTIGATION

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Project no.	**318001679**
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Description	**This document presents the results of a Detailed Site Investigation of Tarago Former Station Masters Cottage (SMC) located at 106 Goulburn St, Tarago, 2580, NSW.**

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EXECUTIVE SUMMARY

Ramboll Australia Pty Ltd (Ramboll) was engaged by UGL Regional Linx Pty Limited (UGL) to conduct a Detailed Site Investigation (DSI) at the residential property known as the 'former Station Master's Cottage (SMC)', located at 106 Goulburn Street, Tarago, NSW (here in referred to as the site). The site is currently unoccupied and comprises a single brick dwelling, adjacent sheds and partially fenced garden. The site is located adjacent to the Goulburn – Bombala rail corridor and Tarago railway station.

Previous investigation has been limited to lead as the primary contaminant of concern related to historic rail operations and in particular load out of ore concentrates through the adjacent rail corridor. The investigation identified an exceedance of commercial and industrial use in excess of 250% of the guideline, i.e. hotspot concentration, and a number of occurrences of concentrations above unrestricted residential use, to which the site is currently zoned. Thus, the site is under care and maintenance with an Interim Environmental Management Plan (IEMP) until remediation of the site is complete. Concentrations of lead were generally reduced outside of the fenced portion of site adjacent to the Goulburn Street/ Boyd Street road reserve and was not considered to be pose an exposure risk.

It is understood however that Transport for New South Wales (TfNSW) on behalf of the property owner (the Transport Asset Holding Entity) requested a DSI be completed to assess the suitability of the site for future use in accordance with current residential zoning. A broader range of contaminants of potential concern (COPC) were identified relating to the historic residential use of the site including other metals, hydrocarbons, asbestos, pesticides and herbicides. Assessment of lead was included to assist in further delineation of impact across the site. A preliminary conceptual site model (CSM) was developed as part of the sampling and analysis quality plan (SAQP) which took into consideration the previous sampling and detailed the potential contaminant sources, pathways and sensitive receptors.

The objectives of this DSI was to assess the suitability of the site for both commercial/industrial and residential with accessible soils land uses.

The scope of works completed comprised review of historic contaminated land assessments relevant to the site, supplementary intrusive assessment of soil and refinement of the site's CSM.

Intrusive assessment was conducted across both the fenced portion and open area alongside the roadside through the advancement of hand augers to a depth of 0.5 metres below ground level (mbgl). The vertical extent was identified based on the shallow impact observed during previous investigations of the site and broader local area, and depth of fill. Assessment of asbestos was limited to surface soils in the absence of anthropogenic material within the fill profile.

Results of the investigation found concentrations of lead in excess of unrestricted residential use were widespread across the fenced portion of the site except for the south western area. The depth of impact was generally superficial; however some isolated areas extended to 0.25 mbgl. Exceedances of the commercial and industrial lead criterion were also observed within the fenced portion of the site in two locations.

Proximity to either the dwelling or rail corridor were not necessarily attributable to higher lead concentrations. Concentrations of lead were generally reduced outside of the fenced portion of site adjacent to the Goulburn Street/ Boyd Street road reserve and suitability was not considered to have changed from previous assessment.

Ecological exceedances were reported of both copper and zinc, of which the latter was observed in both fill and natural material. The exceedance of the zinc EIL within the natural profile may be associated with zinc's increased mobility extending through the profile and could be related to ore dust from activities within the adjacent rail corridor or imported fill.

Following the investigation, the refined CSM source-pathway-receptor linkages identified:

- Complete exposure pathways were identified to human receptors under both unrestricted residential and commercial/ industrial land use scenarios through inhalation, incidental ingestion, absorption and dermal contact
- There was negligible potential for migration/transport of lead contamination to offsite receptors given that impact was confined to the fenced portion of the site and as such, imposes a physical barrier in its current state
- There is potential for plant root uptake and contact exposure to ecological communities from copper and zinc concentrations. However, the vegetation and transient wildlife present are considered to be of low ecological value and the copper and zinc levels may be representative of natural background ranges.

Based on the exposure pathways, the fenced portion of the site, in its current state, is not considered suitable for residential use, as permissible under current zoning, without mitigation or management if used. Concentrations of lead also indicate that the fenced area of the site is also not suitable for commercial or industrial land use due to the presence of a hotspot in the southern garden. It is noted that the site is currently vacant, with the impacted portion of the site fenced off and therefore there is not a complete contaminant exposure pathway at present.

It is considered that the site should continue to be managed under the IEMP until a remedial strategy has been chosen and implemented. The interim management measures will also assist in the management of potential ecological exposure risks identified from zinc and copper. The non-fenced portion of the site alongside Goulburn and Boyd Street is considered suitable for current use without restriction.

ABBREVIATIONS

Measures	Description
%	per cent
ha	Hectare
km	Kilometres
m	Metre
mAHD	Metres Australian Height Datum
mbgl	Metres below ground level
mg/kg	Milligrams per Kilogram
mm	Millimetre
ACM	Asbestos Containing Material
AF	Asbestos Fines
AHD	Australian Height Datum
ALS	Australian Laboratory Services
BaP	Benzo(a)pyrene
BTEX	Benzene, Toluene, Ethylbenzene & Xylenes (Monocyclic Aromatic Hydrocarbons)
CLM Act	NSW Contaminated Land Management Act 1997
COC	Chain of Custody
COPC	Contaminants of Potential Concern
Council	Goulburn Mulwaree Shire
DP	Deposited Plan
DQI	Data Quality Indicator
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EMP	Environmental Management Plan
EPA	Environment Protection Authority (NSW)
ESL	Ecological Screening Level
FA	Fibrous Asbestos
HIL	Health Investigation Level
HSL	Health Screening Level
LCS	Laboratory Control Sample
LEP	Local Environment Plan
LOR	Limit of Reporting
MAH	Monocyclic Aromatic Hydrocarbons
Mercury	Inorganic mercury unless noted otherwise
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Ni: Nickel, Pb: Lead, Zn: Zinc, Hg: Mercury
ML	Management Limits
MS	Matrix Spike
NATA	National Association of Testing Authorities
NC	Not Calculated
ND	Not Detected
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NL	Non-Limiting
n	Number of Samples
OCPs	Organochlorine Pesticides

OPPs	Organophosphorus Pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PID	Photoionisation Detector
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference
SAQP	Sampling Analysis and Quality Plan
TPHs	Total Petroleum Hydrocarbons
TRHs	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
VMP	Voluntary Management Proposal
-	On tables is "not calculated", "no criteria" or "not applicable"

1. INTRODUCTION

Ramboll Australia Pty Ltd (Ramboll) was engaged by UGL Regional Linx Pty Limited (UGL) to conduct a Detailed Site Investigation (DSI) at the residential property known as the 'former Station Master's Cottage, located at 106 Goulburn Street, Tarago, NSW (herein referred to as the site or SMC).

The site is located adjacent to the former Woodlawn Mines Ore Concentrate Load-Out Complex (the loadout complex) which operated between the 1970s and 1990s and rail corridor on the Country Regional Network (CRN) in Tarago, NSW. Concentrates of lead, zinc, and copper were produced and freighted through the loadout complex and rail network.

Previous investigation has been limited to lead as the primary contaminant of concern related to historic rail operations and in particular load out of ore concentrates through the adjacent rail corridor ((Ramboll, 2020a) (Ramboll, 2020b)). Widespread occurrences of lead concentrations in excess of unrestricted residential use were reported as was a hotspot level under commercial and industrial use. Thus, the site is under care and maintenance with an Interim Environmental Management Plan (IEMP,) until remediation of the site is complete. Concentrations of lead were generally reduced outside of the fenced portion of site adjacent to the Goulburn Street/ Boyd Street road reserve and was not considered to be pose an exposure risk.

It is understood that Transport for New South Wales (TfNSW) on behalf of the property owner (the Transport Asset Holding Entity) requested a DSI be completed to assess the suitability of the site for future use in accordance with current residential zoning and has included a broader range of contaminants of potential concern (COPC) relating to the historic residential use of the site.

This report has been prepared in accordance with Table 2.3 of the NSW Environmental Protection Authority (NSW EPA, 2020) Consultants reporting on contaminated land: Contaminated Land Guidelines.

1.1 Background

On 25 March 2020, the NSW Environment Protection Authority (NSW EPA) declared the adjacent rail corridor as significantly contaminated under Section 11 of the CLM Act 1997 (Declaration Number 20201103). The declaration defines the substance of concern in soil ("the Contaminant") to be lead and that contamination had migrated from the adjacent rail corridor to the site. Further detail of contamination at or originating from the adjacent rail corridor was described as follows:

1. lead concentrations in soil within the rail corridor (Lot 22 DP1202608) exceed national guideline values for the protection of human health and the environment
2. lead contamination has impacted adjacent land at 106 Goulburn Street, Tarago (Lot 1 DP816626), with soil found to contain lead at concentrations exceeding national guideline values for the protection of human health and the environment
3. there are complete exposure pathways to lead for occupants of 106 Goulburn Street, as well as potentially complete exposure pathways for persons working within the rail corridor and
4. there are potentially complete exposure pathways for onsite and offsite ecological receptors.

On 3 August 2022 the NSW EPA declared the site to be significantly contaminated under Section 11 of the CLM Act (Declaration Number: 20221105; Area Number 3455). The site was published on the EPA's list of notified sites as "contamination is regulated by the EPA under the CLM Act".

The EPA describes that remediation will be required to facilitate residential land-use in accordance with current zoning under the Goulburn-Mulwaree Council LEP (2009).

A voluntary management proposal (VMP) was prepared to define how the Contaminant and associated risks would be managed and this was approved by the NSW EPA on 28 May 2020. The site was acquired by the Transport Asset Holding Entity (TAHE) in 2022 from private owners. Risks associated with exposure to site contamination are currently managed under an interim Environmental Management Plan (Ramboll, 2023a). As required under the IEMP, the site is currently not occupied.

1.2 Objectives

The objectives of the DSI were to assess the suitability of the site for both commercial/industrial and residential with accessible soils land uses.

1.3 Scope of Work

The DSI was carried out in accordance with the National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM) (NEPC, 2013).
The scope of work performed to meet the objectives comprised:

1. Review of historical and public information and identification of remaining data gaps
2. Development of a Sampling and Analysis Quality plan (SAQP)
3. Hand augering of eight soil boreholes to an indicative extent of 0.5 mbgs
4. Collection of bulk and discrete soil samples
5. Laboratory analysis for assessment of metals and hydrocarbons, with surficial soils also assessed for asbestos, pesticides and herbicides
6. Assessment of laboratory results against the assessment criteria comprising of residential and commercial/ industrial land use.
7. Assessment of data quality and reliability.
8. Refinement of the conceptual site model.
9. Assessment of areas requiring remediation, if required.
10. Preparation this report.

1.4 Regulatory Requirements

This DSI has been prepared in general accordance with the following guidance documents:

- National Environment Protection Council (NEPC), *National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013* (NEPC, 2013)
- NSW EPA, Contaminated Sites: *Guidelines for Consultants Reporting on Contaminated Lands* (NSW EPA, 2020)
- NSW EPA, *Guidelines for the Site Auditor Scheme (3rd Edition)* (NSW EPA, 2017)
- NSW EPA, *Sampling Design Guidelines Part 1 – application* (NSW EPA, 2022)

2. SITE DESCRIPTION

2.1 Site Identification

The site is shown in **Figure 1, Appendix 1** whilst details are presented in **Table 2-1.**

Table 2-1: Site Identification

Information	Description
Street Address:	106 Goulburn Street, Tarago
Property Details	Tarago Former Station Master's Cottage
Identifier:	Lot 1 DP816626
Site Area:	Approximately 1,550 m^2
Local Government:	Goulburn Mulwaree Shire
Property Owner:	TAHE
Zoning	RU6 Transition
EPA Management Status	Declared significantly contaminated on 04 August 2022
Site Use:	Partially fenced, of which the fenced portion was a private residence (currently vacant). Future Land Use Commercial / Industrial

2.2 Site Condition

Until recently the site was generally used as a private residence except for the area outside the eastern fence. The area outside the fence was generally accessible by the public as an extension of grassed area adjacent to the intersection of Goulburn Street and Boyd Street. On 25th March 2020, the adjacent rail corridor was deemed significantly contaminated by the NSW EPA (Declaration Number: 20211103), following which TfNSW relocated the residents, leaving the site vacant. In 2022 TAHE purchased the property and the site remains unoccupied and under care and maintenance until remediation of the site is complete.

Ramboll inspection of the site found that the main residence comprised a brick building with metal roof with a metal carport annexed to the northern end and a small timber and metal shed annexed to the western side. Concrete slabs were observed on ground as flooring in the rear sunroom, laundry, front verandah and carport. These areas step up to flooring in the kitchen, bathroom, loungeroom and bedrooms (the main part of the house). Evidence of sub-floor ventilation was observed in the outer walls of the main part of the house and indicate this area is suspended on short piers. No access points were observed and the floor was not much higher than the ground level indicating minimal clearance. On this basis sub-floor access is considered more likely to be present through the floor inside the house and uncontrolled access is considered unlikely.

2.3 Surrounding Environment

Nearby surrounding land use includes:

- North: Rail corridor
- East: Goulburn Street then residential and commercial land parcels
- South: Rail corridor (Tarago Train Station)
- West: Rail corridor

2.4 Site History

Tarago station opened on 3 January 1884 when the Bombala line was opened as a single line from Joppa Junction. It served as the terminus until the line was extended to Bungendore on 4 March 1885. The construction contract for the Joppa Junction to Bungendore section was awarded to W S Topham & J Angus (tramway contractors) on 3 October 1882 (Heritage NSW, 2023).

The contract for construction of a station building, Station Master's residence, and goods shed is recorded as being let to G. & C. Horn on 17 December 1883 and Tarago as being officially opened on 3 January 1884. The exact date that the station building and other original buildings were completed is unclear, but it is likely that it was much later than the official opening of January 1884 - either that or the construction of the station buildings began earlier than December 1883 (Heritage NSW, 2023).

The station building is a five-room example of a standard roadside station. The station buildings are constructed of brick with a painted finish and feature gabled roofs clad in corrugated iron with corbelled brick chimneys. The platform verandah has a decorative timber valance and is supported on timber posts with curved iron brackets. Timber sash windows have moulded surrounds and sills. The station buildings have since undergone some minor repair and conservation works circa. 1994 (Heritage NSW, 2023). It is noted that the carport appears to have been a later addition, although the date is unknown). As the cottage generally predates the operation of the Loadout Complex the potential for contamination beneath the cottage is low (with potential exception of the carport).

Historic use of the adjacent Goulburn – Bombala rail corridor included operation of the Loadout Complex from the 1970s – 1990s. Concentrates were produced at the Woodlawn Mine approximately 8 km west of site and included a zinc concentrate consisting mainly of sphalerite (zinc sulfide), a lead concentrate of galena (lead sulfide) and copper concentrates of chalcopyrite (copper iron sulfide).

2.5 Topography and Hydrology

The site slopes gently east toward the Mulwaree River consistent with surrounding topography which is characterised by roadside table drains and swales in parkland directing surface water north-east from the site.

It is considered likely that surface water will infiltrate site soils during low – moderate rainfall events and flow east to Goulburn Street drains (similar to the surrounding rail corridor) during high rainfall events.

2.6 Geology

Review of the Australian Geoscience Information Network portal (AUSGIN, 2020) identified regional geology including channel and flood plain alluvium (gravel, sand and clay) locally formed as calcrete overlying quaternary sedimentary rock.

Previous investigations have observed shallow topsoil overlying clayey sands and silts, with varying gravel content, overlying sandy clays (Ramboll, 2020b).

2.7 Hydrogeology

Review of the NSW Department of Planning Industry Environment MinView portal (NSW DPIE, 2020) identified 12 wells within a 500 m radius from the site. Review of drilling and construction details for registered wells indicates the shallowest regional aquifer is present in gravel layers from 5.5 – 18.6 mbgl with deeper aquifers present in fractures of underlying shale, siltstone and limestone from 50 – 74 mbgl.

During recent site assessment (Ramboll, 2020a) a groundwater well was observed in the south-east area of the fenced yard with depth to groundwater encountered at approximately 5 mbgl. The well was sampled and analysed for lead, and based on subsequent analyses groundwater was considered suitable for use in irrigation, livestock watering and once settled of suspended sediment, for domestic potable use.

3. PREVIOUS INVESTIGATIONS

Previous investigation of the site was limited to lead as the primary COPC ((Ramboll, 2020a), (Ramboll, 2020b)). The investigation identified lead at levels exceeding the assessment criteria protective of human health under an unrestricted residential land use (Health Investigation Level (HIL) A, (NEPC, 2013)) scenario. Specifically:

- Concentrations of lead (mg/kg) exceeding human health criteria were found in soils less than 0.4 metres below ground level (mbgl)
- Loadings of lead (µg/m^2) exceeding human health criteria were found in dust on interior and exterior surfaces of the house

Concentrations of lead indicative of lead-based paints were found in flaking paint on the front verandah of the house. The distribution of lead concentrations exceeding adopted human health are shown in **Figure 2**, **Appendix 1**.

The investigation also found that:

- Concentration of lead in groundwater was suitable for livestock, irrigation or potable drinking water once suspended sediments have settled with a maximum concentration of 0.002 mg/L reported
- Concentration of lead in the rainwater tank was less than the drinking water guidelines (NHMRC, 2011) with a concentration of 0.004mg/L noting that periodic removal of sediment is recommended by the NSW Department of Health (NSW DoH, 2022).

Soil sampling on the property but located outside of the eastern fence line (SS116) reported a lead concentration of 250 mg/kg which is below HIL for both low density residential land use (300 mg/kg) and public open space land use (600 mg/kg). This is consistent with results of other sampling along Goulburn and Boyd Streets reported in the Detailed Site Investigation of the broader community ((Ramboll, 2020b) (Ramboll, 2021)). As such the contaminant exposure risk of lead onsite outside the eastern fence is considered low and not requiring management.

3.1 Integrity Assessment

The information which has been reviewed is limited to publicly available information and previous assessment of the site. It is considered that the history of the site and the nearby land uses are well known and documented, especially given the contaminant status of the site and NSW EPA involvement.

The information is considered adequate with respect to understanding the site's history and COPC to allow for assessment and conclusions regarding site suitability to be drawn.

4. PRELIMINARY CONCEPTUAL SITE MODEL

A conceptual site model (CSM is) a site-specific qualitative description of the source(s) of contamination, the pathway(s) by which contaminants may migrate through the environmental media, and the populations (human or ecological) that may potentially be exposed and is commonly known as a SPR linkage. In order for a receptor to be exposed to a chemical contaminant derived from a Site, there should be an exposure pathway linking the source of contamination and the exposed population. An exposure pathway describes the course a chemical or physical agent takes from the source to the exposed individual and generally includes the following elements:

- a source and mechanism of chemical release
- a retention or transport medium (or media where chemicals are transferred between media)
- a point of potential human contact with the contaminated media
- an exposure route (e.g., ingestion, inhalation) at the point of exposure.

Lead contamination in soil was found at concentrations exceeding national guideline values for the protection of human health and the environment. There are complete exposure pathways to human health and the environment from lead at the site. Groundwater and rainwater tanks were not found to have been impacted during the prior assessment (Ramboll, 2020a) and therefore are not considered to be an area of concern within the preliminary CSM. The other COPC have not been previously assessed and therefore the exposure risk is unknown.

Based on the previous site investigation and historic use of the site for residential purposes contaminants of potential concern are outlined in **Table 4-1.**

Table 4-1: Potential Areas and Contaminants of Concern

Area of Concern	Potential Activities of Environmental Concern	Contaminants of Potential Concern (COPC)
Surface Soils	Migration of lead from the rail corridor and former Loadout Complex	Lead
Surface Soils and Fill	Importation of fill material and historic use of the site may have resulted in soil contamination. Shallow fill was observed particularly along the western site boundary	TRH, BTEXN, PAH, OCPs/OPPs, herbicides, metals and asbestos
Buildings	Lead paint is present onsite buildings	Lead
Asbestos	Asbestos in fill, from the potential demolition of historical buildings and/or poor maintenance, and from proximity to the rail corridor	Bonded and friable ACM
Surface Water	No surface water bodies or channels are present onsite and the site is predominantly grassed: as such it is considered that surface water runoff would be negligible as it would infiltrate into soil.	N/A
Rainwater tanks	Depositional dust generated from the rail corridor and former Loadout Complex may have accumulated within the rainwater tank and impacted water and sediment. Lead in rainwater tank water and sediment has been previously assessed and was found to be suitable for potable use (Ramboll, 2020a) and therefore is not considered to be a potential area of concern unless other metals are identified.	Metals – if observed in soil

Area of Concern	Potential Activities of Environmental Concern	Contaminants of Potential Concern (COPC)
Groundwater	Leaching/ migration of contaminants through soil could occur. Lead has been previously assessed (Ramboll, 2020a) and was not considered to be a risk.	TRH, BTEXN, PAH, and metals (excluding lead) – if observed at depth in the soil profile.

The exposure pathways and potential risk to receptors from the potential areas of concern and COPCs are summarised in **Table 4-2**.

Table 4-2 Conceptual Site Model Summary

	Potential Unacceptable Risk		
Exposure Pathway	**Site Workers**	**Residential Owner**	**Terrestrial Ecology**
Dermal contact with contaminated soil	Possible	Possible	NA
Ingestion / inhalation of contaminated soil	Possible	Possible	NA
Biological uptake of contaminants from soil	NA	Possible	Possible

NA – not applicable

4.1 Data Gaps

The primary data gap identified in the preliminary conceptual site model are COPCs other than lead that may be present in shallow soils, fill or in relation to historic residential land use. Further delineation of lead is also required to inform remediation planning.

5. ASSESSMENT CRITERIA

5.1 Soil

The criteria proposed for the assessment of soil contamination were sourced from the following references:

- National Environment Protection Council (NEPC), National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013
- Friebel, E & Nadebaum, (2011), Health screening levels for petroleum hydrocarbons in soil and groundwater. CRC CARE Technical Report no.10, CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia

The NEPM (2013) provides health-based soil investigation levels (HILs) and ecological-based investigation levels (EILs) for various land uses. The NEPM (2013) also introduced health-based and ecological screening levels (HSLs and ESLs), management limits and direct contact HSLs for petroleum hydrocarbons.

Based on potential for commercial / industrial or residential land use in the future, the assessment criteria adopted for the site are as follows:

- HIL A – Health investigation level for residential use including residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children's day care centres, preschools and primary schools.
- HIL D – Health investigation level for commercial/industrial such as shops, offices, factories and industrial sites. The HILs are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are generic to all soil types and apply generally to a depth of 3 m below the surface for industrial use.
- HSL A/B – Health screening levels for low-high density residential. The HSLs can be modified based on the general soil type (sand, silt or clay). In instances where this is unknown the most conservative value is adopted.
- HSL D – Health screening levels for commercial/industrial use apply to assess vapour intrusion. The HSLs can be modified based on the general soil type (sand, silt or clay). In instances where this is unknown the most conservative value is adopted.
- EIL for urban recreational and public open space and EIL for commercial/ industrial use – ecological investigations levels applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and generally apply to the top 2 m of soil.
- ESL for urban recreational /public open space and ESL commercial/ industrial use – ecological screening levels developed for selected petroleum hydrocarbon compounds and fractions and are applicable for assessing risk to terrestrial ecosystems. These are also generally applicable to the top 2m of soil.
- Management Limits where concentrations above these limits may indicate poor aesthetics, high odour and potentially explosive vapour. Management limits are to be applied after consideration of relevant ESLs and HSLs.
- HSLs for Direct Contact have been adopted for the direct contact of contaminated soil for residential and commercial/industrial.
- HSLs for Intrusive Maintenance Workers have been adopted for workers who carry out work in shallow trenches (maximum depth of 1m). Exposure may occur through inhalation of volatiles or through direct contact from contaminated soils from surface to 2m below ground level (Friebel and Nadebaum, 2011).

Table 5-1: Soil Assessment Criteria – Health and Ecological Investigation Levels

Contaminant (mg/kg)	HIL A – Low density residential	HIL D – Commercial/ Industrial	EIL – Urban Residential and Public Open Space [1]	EIL - Commercial/ Industrial [1]
Metals				
Arsenic	100	3,000	100	160
Cadmium	20	900	--	--
Chromium	100	3,600	190	310
Copper	6,000	240,000	95	140
Mercury	40	730	--	--
Lead	300	1,500	1,100	1,800
Nickel	400	6,000	30	55
Zinc	7,400	400,000	70	110
PAHs				
Naphthalene	--	--	170	370
Carcinogenic PAH (B(a)P equivalent)	3	40	--	--
Sum of reported PAH	300	4,000	--	--
OCP/OPP				
Chlordane	50	530	--	--
DDT	--	--	180	640
Heptachlor	6	50	--	--
HCB	10	80	--	--
Methoxychlor	300	2,500	--	--
Mirex	10	100	--	--
Toxaphene	20	160	--	--
DDT+DDD+DDE	240	3,600	--	--
Aldrin + Dieldrin	6	45	--	--
Endrin	10	100	--	--
Endosulfan	270	2,000	--	--
Chlorpyrifos	160	2,000	--	--
Atrazine	320	2,500	--	--
Bifenthrin	600	4,500	--	--

[1] Ecological criteria are based on standard values, likely to be conservative, with the following assumptions:
Chromium (III) EIL, based on a low clay content (% clay) of 1%
Nickel EIL, based on CEC of 5cmol/kg
Copper EIL, based on CEC of 5cmol/kg
Zinc EIL, based on slightly acidic soil pH of 4.0 and CEC of 5cmol/kg
Site specific EILs may be derived as and if required.

The applicable HSL assessment criteria for petroleum hydrocarbons in soil are presented in **Table 5-2.**

The most conservative guideline value has been adopted for each analyte. This is generally values in sand/coarse soil, however site-specific guideline values could be adopted based on the soil type encountered during the investigation works.

Table 5-2: Soil Health Screening Levels for Vapour Intrusion HSL D and Intrusive Maintenance Worker - Sand[1]

Contaminant (mg/kg)	HSL A/B (Low-High Density Residential)				HSL-D (commercial/industrial)				Intrusive Maintenance Worker (Shallow Trench)		
	0 - <1m	1m - <2m	2m - <4m	4m+	0m- <1m	1m - <2m	2m - <4m	4m+	0m - <2m	2m - <4m	4m+
Toluene	160	220	310	540	NL	NL	NL	NL	NL	NL	NL
Ethylbenzene	55	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Xylenes	40	60	95	170	230	NL	NL	NL	NL	NL	NL
Naphthalene	3	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL
Benzene	0.5	0.5	0.5	0.5	3	3	3	3	77	160	NL
F1[2]	45	70	110	200	260	370	630	NL	NL	NL	NL
F2[3]	110	240	440	NL	NL		NL	NL	NL	NL	NL

NL The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

[1] (For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

[2] To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

[3] To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Table 5-3 identifies the Ecological Screening Levels, Management Limits and Direct Contact for Petroleum hydrocarbons and speciated PAHs in soil.

Table 5-3: Ecological Screening Levels, Management Limits and Direct Contact for Petroleum Hydrocarbons and speciated PAHs in Soil

Contaminant (mg/kg)	ESLs (coarse soil)		Management Limits[1] (coarse soil)		Direct Contact[4]		
	Urban Residential / Public Open Space	Commercial / Industrial	Urban Residential / Public Open Space	Commercial /Industrial	HSL A	HSL D	Intrusive Maintenance Worker
F1 C6- C10	180[2,3]	215[2,3]	700	700	4,400	26,000	82,000
F2 >C10-C16	120[2,3]	170[2,3]	1,000	1,000	3,300	20,000	62,000
F3 >C16-C34	300	1,700	2,500	3,500	4,500	27,000	85,000
F4 >C34-C40	2,800	3,300	10,000	10,000	6,300	38,000	120,000
Benzene	50	75	-	-	100	430	1100
Toluene	85	135	-	-	14,000	99,000	120,000

Ethylbenzene	70	165	-	-	4,500	27,000	85,000
Xylenes	45[5]	95[5]	-	-	12,000	81,000	130,000
Naphthalene	170	370	-	-	1,400	11,000	29,000
B(a)P	20[6]	72[6]	-	-	-	-	-

[1] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.
[2] To obtain F1 subtract the sum of BTEX concentrations from C6-C10 fraction.
[3] The ESL is of moderate reliability and all remaining ESLs are of low reliability.
[4] Direct Contact are applied to surface soils or soils that could result in immediate contact.
[5] Fine grained value adopted as it is the most conservative value
[6] Benzo(a)Pyrene ESL derived from Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Canadian Council of Ministers of the Environment (CCME), 2010 (Residential/Parkland Land Use).

5.2 Asbestos

The HSLs for asbestos are applicable for assessing human health risk via the exposure pathway of inhalation of airborne asbestos and are presented in **Table 5-4**. The HSLs are generic to all soil types.

Table 5-4: Health Screening Levels for Asbestos Contamination in Soil (w/w)

Form of asbestos	Residential A[1]	Commercial/Industrial D[2]
Bonded ACM	0.01	0.05%
FA and AF[3] (friable asbestos)	0.001%	
All forms of asbestos	No visible asbestos for surface soil	

Fibrous Asbestos (FA) is asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure.
Asbestos Fines (AF) includes free fibres, small fibre bundles and small fragments of bonded ACM that pass through a 7mm x 7mm sieve.
[1] Residential A with garden/accessible soil also includes children's day care centres, preschools, and primary schools.
[2] Commercial/industrial D includes premises such as shops, offices, factories, and industrial sites.
[3] The screening level of 0.001% w/w asbestos in soil for FA and AF (i.e., non-bonded/ friable asbestos) only applies where the FA and FA can be quantified by gravimetric procedures. This screening level is not applicable to free fibres.

6. DATA QUALITY OBJECTIVES

Prior to the investigation, Ramboll prepared the '*Sampling Analysis and Quality Plan (SAQP) Tarago Former Station Master Cottage'*, June 2023 (Ramboll, 2023b).

The SAQP was developed to scope and plan the execution of soil investigation in order to define the site's source-pathway–receptor model in relation to the COPC which include metals, asbestos, hydrocarbons, pesticides and herbicides. The investigation has been limited to soil only given the inferred shallow nature of impact identified during previous investigations on and surrounding the site. The following sections provide a summary of the SAQP (Ramboll, 2023b).

The SAQP included Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs) for the investigation in accordance with the seven-step DQO process, endorsed in Schedule B2 of the NEPM (2013). The DQOs set quality assurance and quality control parameters for the field and laboratory program to ensure data of appropriate reliability will be used to assess site contamination. The DQOs are outlined in **Table 6-1**.

Table 6-1: Data Quality Objectives

DQO	Outcome
Step 1: State the Problem	The site has been declared significantly contaminated by the NSW EPA. Ramboll (2020b) identified lead contamination in soil at the site however the extent of impact is not fully delineated. Additionally, historical activities on or adjacent to the site may have resulted in contamination from other COPCs which have not been assessed to date.
Step 2: Identify the Decision	1. Are the data collected of sufficient quality to meet the project objectives? 2. Are the data reliable? 3. What is the lateral and vertical extent of soil contamination from COPCs at the site? 4. What is the site suitability for future use by assessing against residential and commercial/industrial land use scenarios? 5. What are the potential risks to human health and the environment and is further assessment of those risks required?
Step 3: Identify Inputs to the Decision	1. Historical soil data from previous investigations completed by Ramboll at the site. 2. Complete analysis of collected soil samples for COPCs at the site. (**Figure 1**, **Appendix 1** 3. Analyse the data and compare to the assessment criteria outlined in **Section 5.** 4. Refine the CSM and identify risks to receptors.
Step 4: Define the Study Boundaries	Spatial boundaries are the cadastral boundaries of the site, comprising Lot 1 DP816626, refer to **Figure 1, Appendix1.** Vertical boundaries: The assessment will be limited vertically to an indicative depth of 0.5 mbgl based on previous investigations indicating limited vertical migration of COPCs. Temporal boundaries: The temporal boundary is limited to the data collected during the investigation.
Step 5: Develop a Decision Rule	The statistical parameters of interest are the concentrations of COPCs. The action levels are the assessment criteria outlined in **Section 5.** The decision rules for this investigation are as follows:

DQO	Outcome
	1. If it is determined that the data generated through this investigation is reliable, complete, comparable, accurate and representative then this information will be used to address the assessment objectives. 2. If it is determined that the data generated through this investigation is not suitable, comprehensive or reliable for use in achieving the goals of the study, then further investigations may be recommended to reduce uncertainties. 3. If it is determined that insufficient information is available to make conclusions on the risk to human health or ecological receptors, then further investigation or remediation may be required.
Step 6: Specify the acceptance criteria	The acceptance criteria are as follows: 1. Probability that 95% of data will satisfy the DQIs, therefore a limit on decision error will be 5% that a conclusive statement may be incorrect. 2. Comparing individual concentrations against the relevant assessment criteria and if discrete samples are more than the assessment criteria, then: a) Comparing the 95% upper confidence limit of mean against the assessment criteria also ensuring that: b) The standard deviation of the results is less than 50% of the relevant assessment criteria, and c) No single value exceeds 250% of the relevant assessment criteria. d) Specific contaminant of concern (e.g., response to carcinogens may be more conservative). e) The area of site in question and the potential lateral and vertical extent of questionable information. f) Whether the uncertainty can be effectively managed by site management controls or plans.
Step 7: Optimise the Design for Obtaining Data	Previous investigations at the site and on the adjacent land infer lead contamination to be present in soil to a depth of 0.4 mbgl. Data gaps include the unknown lateral extent of lead contamination and the potential for other COPCs to be present based on historical site and adjacent activities. The overall design of the investigation on the site considered these factors, this is outlined in **Section 6.1.**

6.1 Sampling Rationale

A summary of the sampling rationale is outlined in **Table 6-2** with sampling locations provided in **Figure 3, Appendix 1**.

Table 6-2: Summary of Sampling Rationale

Sampling Location	Rationale	Proposed Sample Locations	Proposed Sample Collection	Proposed Laboratory Analysis
Surface soils Shallow fill/ soil	Number of locations is the minimum recommended for systematic sampling pattern for a site less than 0.2 ha. Asbestos impact is considered to be limited to the surface is related to demolition, poor maintenance or adjacent site activities. Asbestos may be present in fill if anthropogenic material is encountered.	Advancing eight soil auger bores across the site to 0.5 mbgl. Gravimetric assessment of soils in surficial soils (0-0.1 mbgl)	Gravimetric assessment of asbestos in surficial soils (0 – 0.1 mbgl) will be completed in the field and will be accompanied by collection of samples from sieved fines for asbestos % w/w analyses. Collection of samples from 0-0.1 mbgl at each auger location Collection of samples from at least 0.2 and 0.5 mbgl at each auger location.	All surface soils will be analysed for asbestos AF+FA (500 mL fines samples). All surface soil samples will be analysed for metals, PAH, TRH, BTEX. Four samples will additionally be analysed for pesticides and herbicides (likely to be from surficial samples). Eight samples (excluding QA) will be analysed for metals, BTEXN, PAH, TRH.

7. QUALITY

The 2023 soil investigation works were completed on 15 June 2022. A Dial Before You Dig (DBYD) for underground services check was completed prior to fieldwork. Sample locations were marked out and cleared by a suitably qualified and experienced locator prior to the commencement of subsurface works. Sampling locations were moved as required due to underground or overhead services at the time of the subsurface clearance.

Sampling was completed in accordance with the SAQP, which comprised the collection of discrete and bulk (10L minimum) samples are the surface and additional discrete soil samples at depth. Exceptions were two gravimetric samples, HA05 and HA06, which comprised of a smaller sample volume due to difficulties during sample collection.

A quality assurance assessment of the 2023 DQIs, as defined within the SAQP (Ramboll, 2023b) is presented in **Table 7-1** and **Table 7-2**.

Historical results, collected from the site during wider investigation of the Tarago area (Ramboll, 2020b) assessing for lead impact only, have been used as part of site characterisation due to the nature of lead which is unlikely to have significantly changed or degraded . Quality assurance and quality control assessment was undertaken at the time of sampling as part of the broader site area and was considered to be appropriate for the requirements of the NEPM (NEPC, 2013) to meet the project objectives (Ramboll, 2020b).

Table 7-1: Sampling and Analysis Methodology Assessment

Sampling Methodology	Ramboll's Assessment
Sampling Pattern, Density and Locations	Soil samples were collected from eight boreholes advanced across the site on a systematic pattern whilst also taking into account of previous locations. The sampling density aligns with the number of sampling locations required for characterisation of a site less than 0.2 hectare as described in Table 2 of the NSW EPA (2022) *Contaminated Sites Sampling Design Guidelines*. Sampling locations were chosen on an approximate square grid pattern around previous locations (refer to **Appendix 1**, **Figure 2**).
Sample Depths	Soil samples were collected from eight boreholes at the following depths: 0.05, 0.25 and 0.5 m bgl. Gravimetric assessment of soils for asbestos were conducted across an approximate 0.5 by 0.5 m area in the upper 0.2 m profile of the soil which was comprised of topsoil fill.
Sample Collection Method	Boreholes were advanced using non-destructive digging (i.e., hand auger) to 0.5 m. Samples were collected directly from the hand auger or from a sampling trowel. The collection of bulk samples for gravimetric asbestos assessment comprised the collection of a 10 L bucket from upper soil horizon only (maximum of 0.2 m depth). Based on sample type, a soil density of 1.65 kg/L was applied to the sample weights to allow for sample volume calculation. Each 10L sample was then passed through a 7 mm sieve and > 7mm fraction was visually assessed for ACM. The <7mm (fine) material was spread across a cleared area of the site surface for inspection of fragments. An approximate 500 g sub-sample was collected from the fines and submitted to the laboratory for the presence of AF/FA. Dedicated single use nitrile gloves were worn during sample collection. Gloves were changed between each sampling location. All samples collected for chemical characterisation were screened in the field with a photonionisation detector (PID) for the presence of volatiles. The maximum

	concentration observed was 0.6 ppm and this is not considered indicative of volatile contaminants.
Decontamination Procedures	The hand auger and hand trowel were decontaminated between each borehole location by rinsing with a surfactant free decontamination solution (i.e., Alquinox). Dedicated nitrile gloves were disposed of after use.
Sample Storage and Handling	Samples were stored in an insulated cooler filled with ice in the field and in transit to the laboratory.
Chain of Custody	Samples were delivered to the laboratory under chain of custody conditions. The chain of custody forms were signed by the laboratory on receipt of the samples. Chain of custody forms are included with the laboratory reports provided in **Appendix 3**.
Sampling Logs	Sampling logs were completed by suitably qualified and experienced Ramboll personnel and are provided in **Appendix 4**. Recording of logs was conducted in general accordance with AS1726-2017 – Geotechnical Site Investigations.

Table 7-2: Field and Laboratory QA/QC

Sampling Methodology	Ramboll's Assessment
Field Quality Control Samples	Schedule B3 of the NEPM (NEPC, 2013) recommends collecting a field duplicate for 1 in 20 primary samples, equalling an acceptable duplicate rate of 5% or higher. The intra-laboratory sample collection frequency was slightly less than the SAQP with a collection rate of 4.5%. This is considered to be a minor non-conformance and does not significantly impact upon the dataset. In total intra- and inter-laboratory duplicate samples were collected for soil at a rate of 12.5%. One rinsate sample was collected from the hand trowel at the end of the day of fieldwork. One trip spike and trip blank pair was included within the QA testing regime due to the analytical suite including volatile compounds.
Field Quality Control Results	Duplicate/triplicate soil results are included in the Results Tables in **Appendix 5**. Relative percentage differences (RPDs) were calculated for intra- and inter-laboratory duplicate pairs. Relative percent difference (RPD) results for soil samples were generally within the acceptance range of less than 30% with the following exceptions: • Endrin aldehyde reported an RPD of 33% due to a detectable concentration of 0.07 mg/kg in the primary sample whilst below in both the inter and intra-laboratory duplicates. Whilst some uncertainty may be present, it is considered to be conservative. • Arsenic (33%), chromium (36%) and copper (35%) reported elevated RPD between the primary and intralaboratory duplicate. These are considered to be due to the heterogeneity of the topsoil fill sampled. The primary sample reported the highest concentration in all cases and therefore any uncertainty is not considered to be significant. Additional non-conformances were observed due to differing PQL between the primary and secondary laboratories, however as both laboratories have PQL below site criteria, this is not considered to be significant. The rinsate sample reported concentrations below the laboratory PQL with the exception of lead which was reported equal to the laboratory limit of 0.001 mg/L. Filtered metal analysis was undertaken by the laboratory and therefore the rinsate metal results may indicate a potential underestimation. Whilst the detection of lead and potential underestimation is present, it is not considered to impact upon the characterisation of the dataset, particularly given that none of the sample concentrations were close to the lead site criterion.

Sampling Methodology	Ramboll's Assessment
	Concentrations of TRH and BTEXN in the trip blanks were less than the laboratory detection limits and the trip spikes were within the targeted recovery range of 70 – 130%.
National Association of Testing Authorities (NATA) Registered Laboratory and NATA Endorsed Methods	Eurofins was used as the primary laboratory and ALS was used as the secondary laboratory to undertake the analysis. Eurofins and ALS are NATA accredited for the analyses conducted and are experienced in the analytical requirements for potentially contaminated soil and water.
Analytical Methods	A summary of the analytical methods adopted by each of the laboratories is included in the respective laboratory certificates provided in **Appendix 3**.
Holding Times	Samples were submitted within appropriate holding times for all analytes. Review of the chain of custody documentation and laboratory certificates indicate that laboratory holding times were met.
Laboratory PQL	Laboratory PQLs were below the adopted criteria.
Laboratory Quality Control Samples	As part of the analytical procedures, Eurofins and ALS undertook internal quality assurance testing. Results are contained within the laboratory report included in **Appendix 3**.
Laboratory Quality Control Results	All results for laboratory internal QAQC testing was generally acceptable with the following exceptions: Primary Laboratory, report 1001666: • Half of the samples reported BTEX surrogates with low recoveries between 56% and 69%. This indicated some uncertainty in regards to the samples and a potential for under estimation of the true concentration. However, none of the samples reported detectable concentrations of BTEX, which is well below the site criteria, and therefore the uncertainty is not considered to significantly impact on characterisation. • One of the OCP surrogates on HA07-0.05 reported a recovery of 58%. This is indicated a potential under-estimation of the sample, however as all compounds were below detection and well below the site criteria any uncertainty is not considered to be significant. • Acid herbicide surrogate, warfarin reported a recovery of 131% on HA01-0.05 which is considered to be a minor non-conformance which may indicate a potential over-estimation and therefore may be conservative. • One of the PAH surrogates on HA07-0.05 reported a recovery of 135%. This is indicated a potential over-estimation and therefore any uncertainty is conservative. Secondary laboratory, report ES2320976: • OPP surrogate reported a recovery of 61% on the triplicate sample. This is indicated a potential under-estimation of the sample, however as all compounds were below detection and well below the site criteria any uncertainty is not considered to be significant. • Herbicide surrogate reported a recovery of 64% on the triplicate sample. This is indicated a potential under-estimation of the sample, however as all compounds were below detection and well below the site criteria any uncertainty is not considered to be significant. • A number of metals on anomyous duplicate samples reported RPD over 30%. Chromium (73%), arsenic (52%), copper (58%) were reported on one sample and lead (62%) and zinc (31%) were reported on the second internal duplicate. Generally the concentrations of the metals were low, however as the samples were external to the project, no further comment regarding significance can be made. • Azinophos Methyl (OPP) reported a low LCS recovery of 56%. This was within the laboratory's acceptance range (41-123%) and as the sample reported concentrations below PQL, it is not considered to be significant.

Sampling Methodology	Ramboll's Assessment
	• Herbicide LCS's for MCPB, Picloram, and Clopyralid reported low recoveries of 60% and 61%. These were within the laboratory's acceptance range and as the sample reported concentrations below PQL, it is not considered to be significant. • Herbicide matrix spike recoveries ranged between 61% and 65% for Mecoprop, Picloram and Clopyralid. These were within the laboratory's acceptance range and as the sample reported concentrations below PQL, it is not considered to be significant.

7.1 Data Quality Indicators Assessment

DQIs have been established to set acceptance limits on field and laboratory data collected as part of the DSI. The DQIs were outlined in the SAQP (Ramboll, 2023b) and are reproduced in **Table 7-3**.

Table 7-3: DQI Assessment

Sampling Methodology	Ramboll's Assessment
Completeness	Completeness is a measure of whether all the data necessary to meet the objectives was collected. All soil samples were collected as per the SAQP (Ramboll, 2023b) with the exception of two gravimetric samples. The two bulk samples comprised of material which was less than the minimum 10 L specified within the NEPM (2013) with volumes of 7.6 and 7.6 L recorded. This shortfall was due to sample collection difficulties in the fill material. It does indicate some uncertainty, however in the absence of asbestos being encountered across the broader site investigation and the exterior of the dwelling comprising of brick, it is not considered to significantly impact upon the characterisation of the site. Laboratory analysis of the 500 ml asbestos samples were undertaken on the fines material following the material passing through the 7mm sieve in accordance with the SAQP (Ramboll, 2023b). It is noted that analysis of a sub-sample from the sieved fines is not recommended particularly in the investigation of AF, however visible bonded ACM and FA can be used as the primary measure of contamination (WA DOH, 2021). Given that in general friable asbestos from degradation of bonded ACM is generally minor (WA DOH, 2021) and the site's history does not indicate a high portion of potential asbestos impact to be AF, it is unlikely that no analysis of an undisturbed sample indicates a significant data gap in characterising the site. It is noted that no asbestos in any form was observed on the site. Ramboll considers the investigation to be complete.
Comparability	Comparability is the confidence that data may be considered to be equivalent for each sampling and analytical event. Sampling was completed by experienced Ramboll personnel using standard operating procedures. The laboratory analysis was undertaken by NATA registered laboratories using accredited analytical methods.
Representativeness	Representativeness is the confidence that data are representative of each medium present on site. In the field, representativeness was achieved by collecting samples from an adequate number of locations and depths.
Precision	Precision is a measure of the reproducibility of the data. In the field, Ramboll achieved precision by using standard operating procedures for the collection of soil samples and by collecting intra-laboratory and inter-laboratory duplicate samples for analysis. As outlined in **Table 7-2** no elevated variation between concentrations were reported to be significant between the primary and secondary

Sampling Methodology	Ramboll's Assessment
	laboratory and RPD results for intra-laboratory duplicate samples were within acceptable limits. At the laboratory, precision is assessed using blind duplicate samples and split duplicates. As outlined in **Table 7-2**, internal laboratory RPD were acceptable with the exception of one duplicate outlier from secondary laboratory ALS, and no detections were made in blank samples.
Accuracy	Accuracy is a measure of the closeness of a measurement to the true parameter value. In the field, Ramboll achieved accuracy by using standard operating procedures for the collection of soil samples and by collecting a rinsate sample and a trip spike/blank pair for analysis. As outlined in **Table 7-2**, the rinsate reported concentrations below detections with the exception of lead which reported a concentration equal to the PQL. Concentrations of TRH and BTEXN in the trip blanks were less than the laboratory detection limits and the trip spikes were within the targeted recovery percentage. At the laboratory, precision is assessed using blind replicate samples and split samples. As outlined in **Table 7-2**, all results for laboratory control samples and surrogates were generally acceptable and no detections were made in blank samples. As results are deemed to be accurate, the highest concentrations, which were reported in the primary sample has been adopted for the purposes of characterisation.
Sensitivity	Sensitivity is a measure of the suitability of the laboratory results against the adopted assessment criteria. Sensitivity is achieved through the laboratory PQL, which must fall below assessment criteria values to allow for appropriate comparison of data. As outlined in **Table 7-2**, PQLs for each analyte were below the respective assessment criteria.

Overall, it is considered that the data obtained during the DSI generally complied with the DQIs, noting that a degree of conservatism has been employed, and as such the data is of suitable quality to meet the project Data Quality Objectives (DQOs).

8. RESULTS

8.1 Field Observations

Table 8-1: General Site Observations

Condition	Description
Date of Activity	15 June 2023
Topography	The site sits at the base of a hill located to the west. The site was relatively flat at the time of the sampling event, although there is a gentle gradient to the east towards the Mulwaree River which was consistent with the surrounding topography.
Location and Extent of Fill	Fill material was observed at all sampling locations to at least 0.2 mbgl but did extend to the full vertical extent of assessment in parts of the site. No significant volumes of anthropogenic material or other visual or olfactory signs of impact within the fill was recorded.
Site Hydrology	Aside from the building footprint, the site is grassed and therefore it is expected that surface water will generally infiltrate into soils. Based on the site topography, during high volume or sustained rainfall events surface water runoff is expected to generally run easterly towards Goulburn Street drains.
Groundwater	Groundwater has previously been assessed through sampling of a well located in the south eastern area of the fenced garden. Groundwater quality was found to be suitable for use in irrigation, livestock watering and once suspended sediments had settled, for domestic potable use (Ramboll, 2020a). The shallowest groundwater is expected to be present in gravel layers between 5.5 and 18.6 mbgl based on surrounding registered bores (Ramboll, 2023a).
Preferential Water Courses	No water bodies are present on the site however a swale is located 40m north of the site. Mulwaree River is located 500 m to the east of the site. Surface water flow in the surrounding area is characterised by roadside table drains and swales in parkland which direct surface water north-east from the site.
Conditions at Site Boundary	The site was bordered by a railway line to the west on a higher elevation than the site. The eastern boundary of the site ran parallel to a Goulburn Street/ Boyd Street on the same elevation as the property. A deteriorating wooden fence surrounds the front of the property and a corrugated iron fence at the back of the property.
Visible Signs of Contamination	At the time of the sampling event there were no obvious visual or olfactory signs of contamination on the site.
Visible Signs of Plant Stress	During the sampling event, vegetation at the site included a hedge around the majority of the property border and two larger trees at the northern and southern ends. Vegetation did not have any visible signs of stress.
Presence of Drums, Wastes and Fill Material	No drums or wastes were encountered during the site inspection. Fill material was observed at each sampling location however no

	anthropogenic material was encountered within the fill with the exception of some glass at 0.1 mbgl in HA04.
Odours	At the time of the sampling event no odours were noted.
Condition of Buildings and Structures	The main structure on the site is a house. The house was deteriorating slightly with rotting wood and rusting fixtures observed. The interior of the building was not observed.

8.2 Soil and Bedrock Profile

A summary of the generalised lithology encountered during the investigation is summarised in **Table 8-2**. Soil logs are included in **Appendix 4**.

Table 8-2: Generalised Site Lithology

Depth (mbgl)	Soil Description
0.0 – 0.2	Fill: Gravelly SAND TOPSOIL; dark brown, dry, coarse to medium grained, rootletsgrass on surface, minor quartz gravels (1-2 mm). Minor amounts of anthropogenic material comprising of glass fragments were encountered at 0.1 mbgl at HA04 in the southern area of the site.
0.3 – 0.5	Fill: Clayey SAND/ SAND; brown, coarse to medium grained, loose, dry – slightly moist
0.45 – >0.5	Sandy CLAY; brown/grey with orange mottles, minor black gravels (1-2 mm), dry to slightly moist, low to moderate plasticity, soft to firm

8.3 Soil Analytical Results

The results of the soil assessment are presented in **Appendix 5** and copies of the laboratory reports are presented in **Appendix 3**.

In-field gravimetric assessment was conducted on the surface soil across the eight locations did not encounter ACM fragments greater than 7 mm in size, nor were any suspect fragments encountered in the fines. Laboratory gravimetric assessment of 500 mL fines samples identified no trace amounts of fibrous asbestos or asbestos fines at any location. Therefore, the percentage weight for weight of asbestos fines/ friable asbestos (AF/FA) was less than the HIL Tier 1 criteria (NEPC, 2013).

A total of 16 primary soil samples were collected as part of the intrusive investigation and submitted for laboratory analysis of which all were submitted for metals and hydrocarbons, whilst 25% were additionally analysed for pesticide and herbicides. Results which reported concentrations greater than laboratory PQL are summarised in **Table 8-3** whilst the full results are tabulated in **Appendix 5**.

Concentrations of BTEXN, PAH, OCP and herbicides were below laboratory PQL in all samples. One surface sample, HA01 located outside of the fenced area in the south of the site, reported a low concentration of OPP compound Endrin aldehyde. The deeper sample from 0.4-0.5 mbgl at HA08 reported a low concentration of TRH C34-C40 well below ecological and direct contact criteria.

As summarised in **Table 8-3**, all concentrations were below the applied human health guidelines with the exception of Lead which reported seven exceedances of the unrestricted residential criterion and one in excess of the commercial and industrial criterion. Three of the concentrations are considered to be at hotspot (>250%) when compared to the residential criterion. Statistical analysis of the current 2023 lead dataset reported a 95%UCLaverage concentration of 611.3

mg/kg which is below the HIL D commercial/industrial guideline for lead of 1500 mg/kg. The UCL calculation is provided in **Appendix 6**.

Some ecological exceedances, as summarised in **Table 8-3**, were reported for lead, copper and zinc however it is noted that the values used are the most conservative and are intended for screening purposes. Previous investigation of the greater area included the collection of samples and analysing for parameters which allow for the derivation of site-specific EIL (SS-EIL, (Ramboll, 2020b)) in accordance with the NEPM toolbox calculator (2013). A comparison of the dataset against SS-EIL are presented in Table 8-4, whilst the information used to derive the values are provided in **Appendix 7**. The concentrations indicate that zinc and, to a lesser extent, copper are present in concentrations in excess of ecological criteria. Given the 95%UCL value of lead, this contaminant is not considered to present an exposure risk to ecological communities.

No exceedance of management limits, direct contact or intrusive worker criterion were reported for hydrocarbon compounds as presented in the results summary tables in **Appendix 5**. Soil exceedances are shown in **Figure 3, Appendix 1.**

Table 8-3: Soil Exceedances (mg/kg)

Analyte	No. of samples/ Detects	Average	Max. Conc.	No. of human health exceedances		No. of ecological exceedances	
				HIL A	HIL D	EIL A	EIL D
Arsenic	16/16	16	66	0	0	0	0
Cadmium	11/16	5.2	13	0	0	**0**	**0**
Chromium (total)	16/16	14	30	0	0	**0**	**0**
Copper	16/16	38	440	0	0	**5**	**5**
Lead	16/16	244	**1600**	**7**	**1**	**2**	0
Mercury	4/16	0.15	0.2	0	0	0	0
Nickel	6/16	8	12	0	0	0	0
Zinc	16/16	604	2000	0	0	**14**	**14**
TRH C6-C10 less BTEX (F1)	0/16	<20		-	-	0	0
>C10 - C16 Fraction (minus Naphthalene)	0/16	<50		-	-	0	0
TRH >C16-C34	0/16	<100		-	-	0	0
TRH >C34-C40	1/16	-	180	-	-	0	0

Analyte	No. of samples/ Detects	Average	Max. Conc.	No. of human health exceedances		No. of ecological exceedances	
				HIL A	HIL D	EIL A	EIL D
Endrin aldehyde	¼	-	0.07	-	-	-	-

All concentrations are in mg/kg
***Bold** are in excess of the HIL A criteria*
Underlined concentrations are in excess of the HIL D criteria

Table 8-4: Ecological Exceedances Compared Against SS-EIL (mg/kg)

Analyte	SS-EIL A[1]	SS-EIL D[1]	Average Conc.	Max Conc.	95%UCL	No. > SS-EIL A	No. > SS-EIL D
Copper	110	160	38	440	ND	**5**	**3**
Lead	1100 [2]	1800 [2]	244	1600	611.3	2	0
Zinc	250	370	604	2000	ND	**12**	**10**

All concentrations are in mg/kg
[1] All contaminants are considered to be aged based on the CSM and potential contaminant sources
[2] SS-EIL calculator is not recommended and therefore standard values for aged contaminants have been adopted
ND – Not determined due to elevated standard deviation (>50%) of the adopted criteria.

9. SITE CHARACTERISATION

Following the completion of the site investigation, lead is considered to be the primary contaminant of concern as it was the only contaminant which reported concentrations in excess of the human health criterion. Exceedances of ecological criteria were observed within the fill for zinc and copper.

Prior assessment of the site comprised analysis of lead to shallow depths up to 0.4 mbgl which was generally within the fill profile comprising of topsoil and sands with variable clay content. Due to the nature of metal impact, which will not degrade over time and no works being undertaken in the interim, all samples have been included in characterisation of the site. Elevated lead concentrations were generally restricted to the shallow (0.05-0.10 mbgl) sample however some isolated occurrences of impact extend to 0.2-0.25 mbgl. **Table 9-1** summarises the combined concentrations from both investigations within the surficial soil (0-0.05 mgbl) profile based on a conservative approach due to greatest potential soil accessibility and highest concentrations.

Table 9-1: Whole SMC Lead Characterisation (mg/kg)

Analyte	No. of samples/ Detects	Average	Max. Conc.	SD	95% UCL	No. of human health exceedances		No. of ecological exceedances	
						HIL A	HIL D	EIL A	EIL D
Lead	22/22	854	3,800	775	1,185	22	2	5	1

ST- standard deviation

All concentrations are in mg/kg

Two exceedances of commercial and industrial use were reported with one concentration in excess of 250% of the guideline, i.e. hotspot, which was located in the central southern portion of the fenced garden area of the site. The extent of impact is considered to be limited vertically and laterally based on adjacent samples and the building footprint. The second exceedance of commercial and industrial use was slightly greater than the criterion by 1.07 times and was encountered along the western boundary between the rail corridor and dwelling and therefore could be attributable to either lead based paint from the dwelling or impact from the Loadout Complex activities.

Concentrations in excess of unrestricted residential use (HIL A) were observed across the majority of the fenced portion of the site, with the exception of the south western portion (HA08 and SS138). The vertical delineation of lead at HA07 in regards to an unrestricted residential exposure scenario was not confirmed during this assessment as the concentrations were not hotspots and were below the primary criteria (HIL D). Concentrations of lead were generally reduced outside of the fenced portion of site adjacent to the Goulburn Street/ Boyd Street road reserve.

Ecological exceedances were reported of both copper and zinc, of which the latter was observed in both fill and natural material. SS-EIL were derived for copper and lead based on local conditions assessed during the previous greater Tarago area and rail corridor DSI (Ramboll,

2020b). The maximum copper exceedance was four times the residential ecological exposure scenario. The maximum zinc concentration, 2000 mg/kg, was reported at the surface in the northern area of the site, within proximity to the corrugated iron boundary fence and rail corridor.

The natural clay profile was encountered in three locations, the north, north east and central southern portion of the site (HA02, HA04 and HA05) respectively. Samples analysed from the natural profile reported concentrations of zinc in excess of the ecological criterion which may be indicative of the metals increased mobility causing extended impact through the profile and associated with ore dust from activities within the adjacent rail corridor or imported fill.

The fenced portion of the site, in its current state, is not considered suitable for unrestricted residential use, as permissible under current zoning, without mitigation or management. Concentrations of lead also indicate that the fenced area of the site is also not suitable for commercial or industrial land use due to the presence of a hotspot in the southern garden. It is considered that that site should continue to be managed under the IEMP (Ramboll, 2023a) until a remedial strategy has been chosen and implemented. This should include the maintenance of ground cover, such as grass, to minimise the potential for surface water runoff and potential mobilisation of lead impacted sediments. It is considered that the interim management measures will also assist in the management of potential ecological exposure risks identified from zinc and copper.

10. REVISED CONCEPTUAL SITE MODEL

The Preliminary CSM presented in **Section 4** has been updated following completion of the targeted DSI field investigations by Ramboll in June 2023, of which the following provides a summary with reference to both commercial/industrial and residential with accessible soils land use.

The contaminant source is generally consistent with what has been previously identified, with the inclusion of zinc and copper from the source, and is considered to comprise of:

- Migration of lead, zinc and copper impacted soil from the adjacent CRN and Loadout Complex
- Leaching of lead, zinc and copper from impacted material from the adjacent CRN and Loadout Complex
- Degradation of building/ structures which included lead-based paint finishes.

In addition, this investigation has identified that imported fill material or migration and leaching of ore dust have led to copper and zinc reporting in excess of ecological criteria.

Given that elevated concentrations of other contaminants were not identified during the investigation, the quality of the fill on the site is not considered to be a significant contaminant source.

Table 10-1 summarises the potential exposure pathways and potential risk to receptors from the contaminants of concern.

10.1 Data Gaps

There is not considered to be a risk to groundwater and/or the rainwater tank in the absence of contamination that may pose a risk to human health identified from COPC other than lead, which has been previously investigated (Ramboll, 2020a), and the lead hotspot has been delineated. As such no data gaps were identified.

Table 10-1: Conceptual Site Model Summary

Exposure Pathway	Source Pathway Receptor Linkages				Details of Identified Risk
	Site Workers	Residential Owner	Intrusive Workers	Terrestrial Ecology	
Lead Concentrations in excess of HILs					
Ingestion of lead contaminated soil/ dust	Yes	Yes	Yes	-	Concentrations of lead were reported in excess of both HIL A and HIL D at levels which are considered to be unacceptable without mitigation and/or management.
Inhalation of lead contaminated soil/ dust	Yes	Yes	Yes	-	
Absorption through skin	Yes	Yes	Yes	-	If homegrown producing and consumption occurs in the future. Not currently a risk based on current flora present within the garden.
Biological uptake of lead from soil	-	Possible	-	Possible	
Dermal contact with lead contaminated soil/ dust	Yes	Yes	Yes	-	Dermal contact is included as there is a complete linkage, however it is generally not considered to be a major exposure pathway (NSW EPA, 2016).
Migration/transport of soil/sediment/dust from the site via surface water runoff, relocation or dust migration	No	No	No	-	Whilst surrounding land use to the east of the site includes residential dwellings, lead impact is generally confined inside of the fenced portion of the site and this should provide a physical barrier from contaminant migration.
Copper and zinc concentrations in excess of EILs					
Dermal contact, incidental ingestion and/or dust inhalation	-	-	-	Possible	Whilst the reported copper and zinc concentrations may present a risk to flora and fauna within the study area, the vegetation and transient wildlife present within the road verge study area are considered to be of low ecological value.
Plant root uptake	-	-	-	Possible	
Migration/transport of soil/sediment from the site via surface water runoff, relocation or dust migration	-	-	-	Possible	Concentrations may be sourced from migration and leaching of ore dust from the adjacent rail corridor activities or importation of fill.

			Concentrations of zinc were identified outside of the fenced portion of the site and therefore there may be some potential for migration during inclement weather or disturbance.

11. CONCLUSIONS AND RECOMMENDATIONS

Based on the exposure pathways, the fenced portion of the site, in its current state, is not considered suitable for residential use, as permissible under current zoning, without mitigation or management if it used. Concentrations of lead also indicate that the fenced area of the site is also not suitable for commercial or industrial land use due to the presence of a hotspot in the southern garden. It is noted that the site is currently vacant, with the impacted portion of the site fenced off and therefore there is not a complete contaminant exposure pathway at present.

It is considered that that site should continue to be managed under the IEMP (Ramboll, 2023a) until a remedial strategy has been chosen and implemented. The interim management measures are considered to also assist with potential ecological exposure risks identified from zinc and copper. The non-fenced portion of the site alongside Goulburn and Boyd Street is considered suitable for current use without restriction.

12. LIMITATIONS

Ramboll Australia Pty Ltd (Ramboll) prepared this report in accordance with the scope of work as outlined in our proposal to UGL Regional Linx dated 5 December 2022 and in accordance with our understanding and interpretation of current regulatory standards.

A representative program of sampling and laboratory analyses was undertaken as part of this investigation, based on past and present known uses of the site. While every care has been taken, concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. We cannot therefore preclude the presence of materials that may be hazardous. Site conditions may change over time. This report is based on conditions encountered at the Site at the time of the report and Ramboll disclaims responsibility for any changes that may have occurred after this time.

The conclusions presented in this report represent Ramboll's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll's knowledge as at the date of the assessment.

Ramboll did not independently verify all of the written or oral information provided to Ramboll during the course of this investigation. While Ramboll has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll was itself complete and accurate.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

12.1 User Reliance

This report has been prepared exclusively for UGL Regional Linx, which includes extension of reliance to Transport for New South Wales and the Transport Asset Holding Entity. This report may not be upon by any other persons or entities without Ramboll's express written permission.

13. REFERENCES

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APPENDIX 1
FIGURES

Imagery © ESRI world imagery

Legend

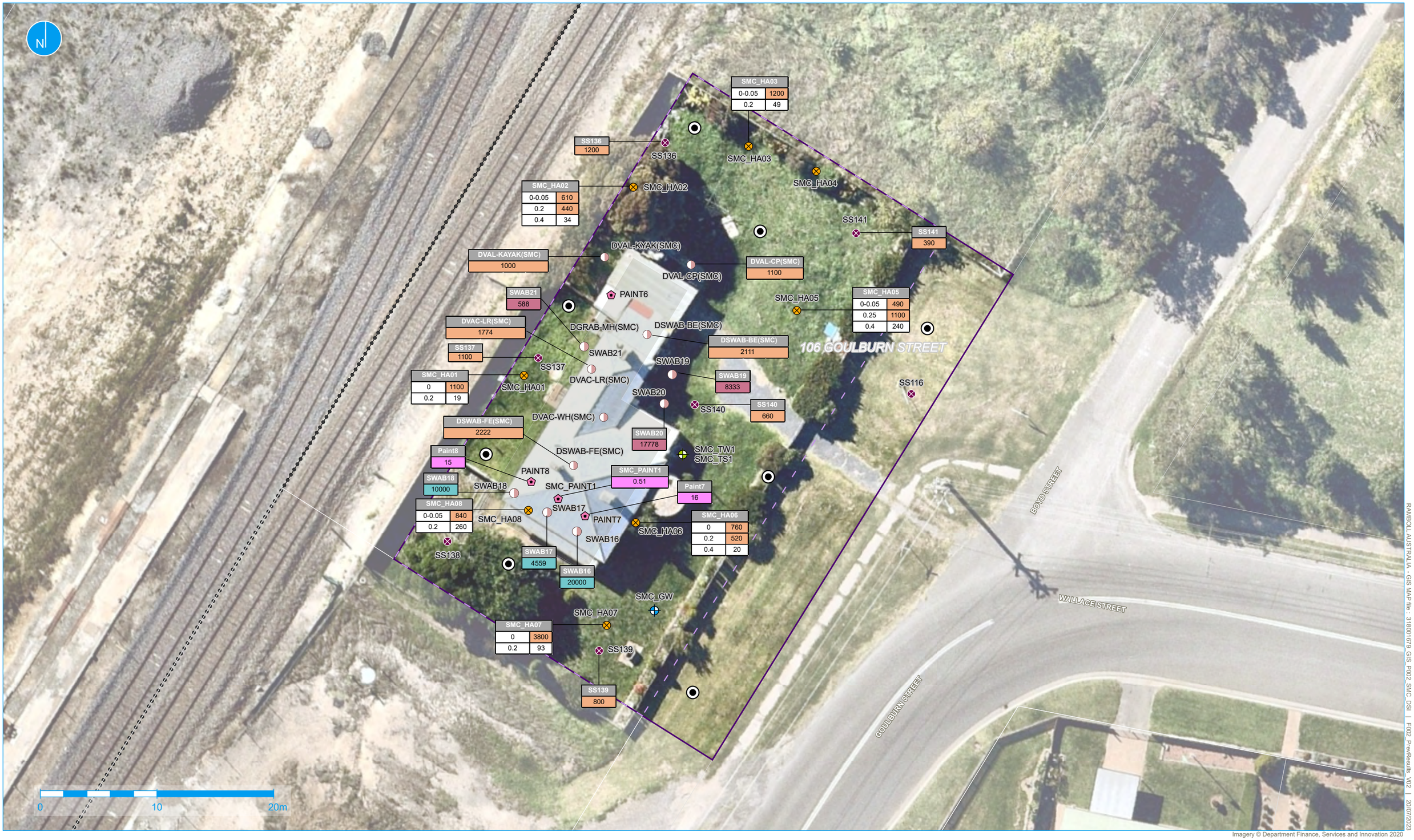
- Property boundary
- Site fence
- Surface water flow direction

A3
1:300

RAMBOLL AUSTRALIA - GIS MAP file : 318001679_GIS_P002_SMC_DSI | F001_Location_V02 | 20/07/2023

RAMBOLL

Figure 1 : Site Layout



RAMBOLL AUSTRALIA - GIS MAP file - 318001679_GIS_P002_SMC_DSI | F002_PrevResults_V02 | 20/07/2023

A3
1:300

Legend

- Property boundary
- Site fence
- Proposed hand auger location

Previous sample locations

- Groundwater sample
- Hand auger sample
- Shallow soil sample
- Tank water sample
- Dust sample
- Paint sample

Lead exceedance criteria

Soil	
Depth (m)	>300 (mg/kg)

Rainwater tank sediment
>300 (mg/kg)

Rainwater tank water
>0.01 (mg/L)

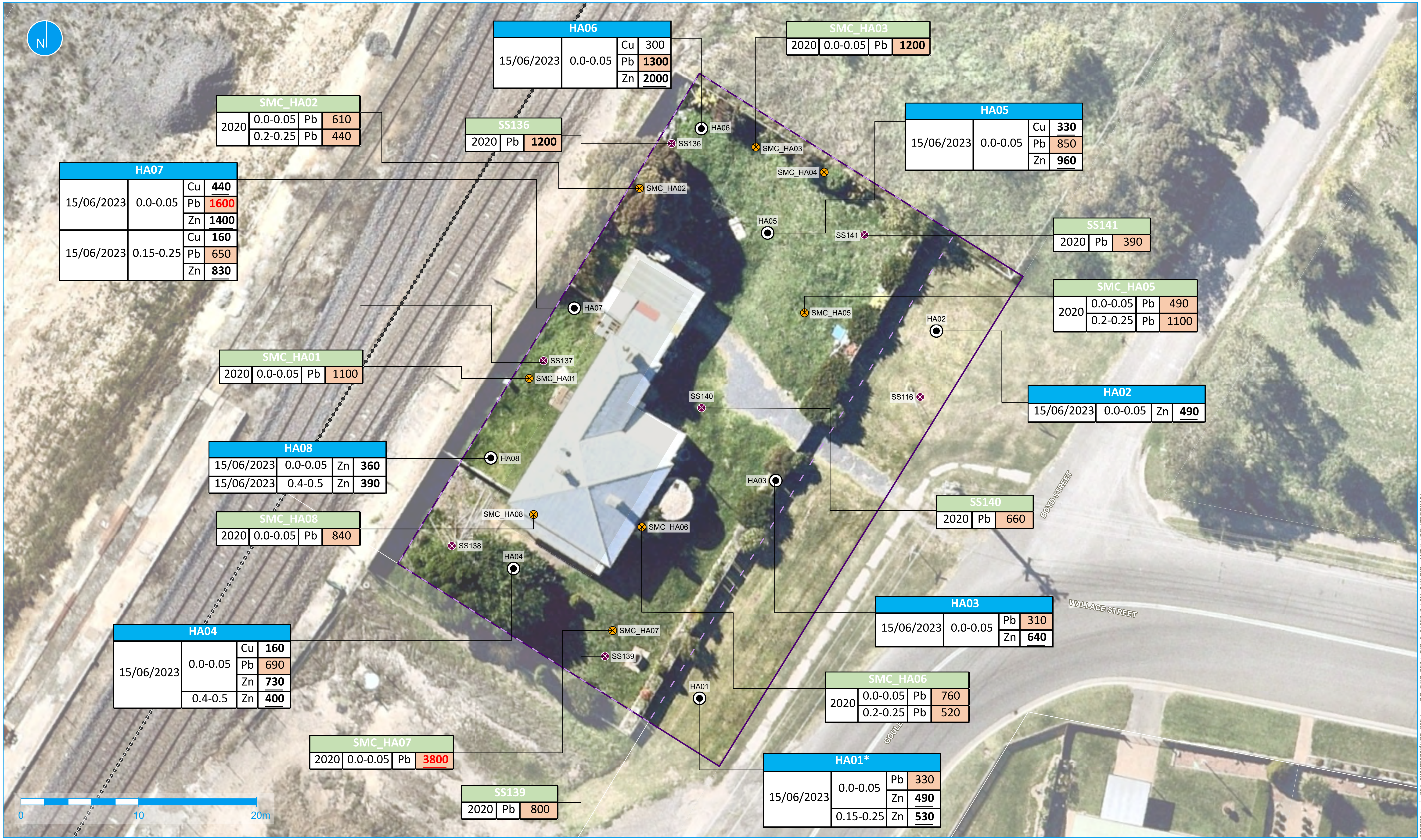
Paint
>0.1%

Dust Exterior
>4300 (µg/m2)

Dust Interior	
Floors	>108 (µg/m2)
Window Sills /	>1076 (µg/m2)

RAMBOLL

Figure 2 : Previous Investigations Results



RAMBOLL AUSTRALIA - GIS MAP file : 318001679_GIS_P002_SMC_DSI | F003_SampleLocations_V06 | 11/09/2023

Imagery © ESRI world imagery

A3
1:300

Legend

- Property boundary
- Site fence
- Hand auger sample location (June 2023)
  Sample name prefix "SMCDSI_"

Previous sample locations

- Hand auger sample
- Shallow soil sample

EIL criteria are based on aged SS-EIL values

- Samples collected during the 2020 investigation
- Samples collected during 2023 investigation

Exceedance criteria

Date	Depth (m)	Analyte	NEPM - HIL A RESIDENTIAL	NEPM - HIL D COMM/INDUSTRIAL	NEPM - EIL RESIDENTIAL	NEPM - EIL COMM/INDUST
		Copper - filtered (Cu)	6000 mg/kg	240000 mg/kg	**110 mg/kg**	160 mg/kg
		Lead - filtered (Pb)	300 mg/kg	1500 mg/kg	**1100 mg/kg**	1800 mg/kg
		Zinc - filtered (Zn)	7400 mg/kg	400000 mg/kg	**250 mg/kg**	370 mg/kg

**Following QA/QC assessment, the highest concentration (from the primary sample) has been adopted for the purposes of characterisation*

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Figure 3 : Soil Sampling Locations and Exceedances

APPENDIX 2
CALIBRATION CERTIFICATES

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-111096

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
	Recharge OK?	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
Pump	Operation	✓	
	Filter	✓	
	Flow	✓	
	Valves, Diaphragm	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	PID	✓	10.6 ev
Alarms	Beeper	✓	Low: 50ppm; High: 100ppm; TWA: ; STEL:
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		97ppm Isobutylene	NATA	SY532		97.5 ppm

Calibrated by: Jesse Stenroos

Calibration date: 13/06/2023

Next calibration due: 13/07/2023

APPENDIX 3
LABORATORY REPORTS

Certificate of Analysis

eurofins | Environment Testing

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025–Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Ramboll Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention:	Stephen Maxwell
Report	1001666-AID
Project Name	TARAGO DETAILED SITE INVESTIGATION
Project ID	318001679
Received Date	Jun 19, 2023
Date Reported	Jul 03, 2023

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name TARAGO DETAILED SITE INVESTIGATION
Project ID 318001679
Date Sampled Jun 15, 2023
Report 1001666-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
SMC-HA01-0.05	23-Jn0053326	Jun 15, 2023	Approximate Sample 358g Sample consisted of: Brown fine-grained clayey sandy soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
SMC-HA02-0.05	23-Jn0053328	Jun 15, 2023	Approximate Sample 171g / >400ml Sample consisted of: Brown fine-grained clayey sandy soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
SMC-HA03-0.05	23-Jn0053330	Jun 15, 2023	Approximate Sample 384g Sample consisted of: Brown fine-grained clayey sandy soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
SMC-HA04-0.05	23-Jn0053332	Jun 15, 2023	Approximate Sample 493g Sample consisted of: Brown fine-grained clayey sandy soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
SMC-HA05-0.05	23-Jn0053334	Jun 15, 2023	Approximate Sample 356g Sample consisted of: Brown fine-grained clayey sandy soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
SMC-HA06-0.05	23-Jn0053336	Jun 15, 2023	Approximate Sample 325g Sample consisted of: Brown fine-grained clayey sandy soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
SMC-HA07-0.05	23-Jn0053338	Jun 15, 2023	Approximate Sample 361g Sample consisted of: Brown fine-grained clayey sandy soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
SMC-HA08-0.05	23-Jn0053340	Jun 15, 2023	Approximate Sample 478g Sample consisted of: Brown fine-grained clayey sandy soil, organic debris and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	Jun 23, 2023	Indefinite

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NATA# 1261 Site# 25466

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Received: Jun 19, 2023 4:40 PM
Due: Jun 26, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: TARAGO DETAILED SITE INVESTIGATION
Project ID: 318001679

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Acid Herbicides	Metals M8 filtered	BTEX	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B7	BTEX
Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	SMC-HA01-0.05	Jun 15, 2023		Soil	S23-Jn0053326	X		X			X	X	X	
2	SMC-HA01-0.25	Jun 15, 2023		Soil	S23-Jn0053327							X	X	
3	SMC-HA02-0.05	Jun 15, 2023		Soil	S23-Jn0053328	X						X	X	
4	SMC-HA02-0.5	Jun 15, 2023		Soil	S23-Jn0053329							X	X	
5	SMC-HA03-0.05	Jun 15, 2023		Soil	S23-Jn0053330	X		X			X	X	X	
6	SMC-HA03-0.25	Jun 15, 2023		Soil	S23-Jn0053331							X	X	
7	SMC-HA04-0.05	Jun 15, 2023		Soil	S23-Jn0053332	X						X	X	

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Order No.:
Report #: 1001666
Phone: 02 9954 8118
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Received: Jun 19, 2023 4:40 PM
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Contact Name: Stephen Maxwell

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Project ID: 318001679

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Acid Herbicides	Metals M8 filtered	BTEX	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B7	BTEX
Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
8	SMC-HA04-0.5	Jun 15, 2023		Soil	S23-Jn0053333							X	X	
9	SMC-HA05-0.05	Jun 15, 2023		Soil	S23-Jn0053334	X		X			X	X	X	
10	SMC-HA05-0.25	Jun 15, 2023		Soil	S23-Jn0053335							X	X	
11	SMC-HA06-0.05	Jun 15, 2023		Soil	S23-Jn0053336	X						X	X	
12	SMC-HA06-0.5	Jun 15, 2023		Soil	S23-Jn0053337							X	X	
13	SMC-HA07-0.05	Jun 15, 2023		Soil	S23-Jn0053338	X		X			X	X	X	
14	SMC-HA07-0.25	Jun 15, 2023		Soil	S23-Jn0053339							X	X	
15	SMC-HA08-0.05	Jun 15, 2023		Soil	S23-Jn0053340	X						X	X	
16	SMC-HA08-0.5	Jun 15, 2023		Soil	S23-Jn0053341							X	X	

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Company Name: Ramboll Australia Pty Ltd
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Order No.:
Report #: 1001666
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 19, 2023 4:40 PM
Due: Jun 26, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: TARAGO DETAILED SITE INVESTIGATION
Project ID: 318001679

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Acid Herbicides	Metals M8 filtered	BTEX	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B7	BTEX
Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
17	QC100-15.623	Jun 15, 2023		Soil	S23-Jn0053342			X			X	X	X	
18	QC300-15.623	Jun 15, 2023		Water	S23-Jn0053343				X					
19	TRIP BLANK-150623	Jun 15, 2023		Soil	S23-Jn0053344					X				
20	TRIP SPIKE-150625	Jun 15, 2023		Soil	S23-Jn0053345									X
21	SMC-HA01-0.5	Jun 15, 2023		Soil	S23-Jn0053346		X							
22	SMC-HA02-0.25	Jun 15, 2023		Soil	S23-Jn0053347		X							
23	SMC-HA03-0.5	Jun 15, 2023		Soil	S23-Jn0053348		X							
24	SMC-HA04-0.25	Jun 15, 2023		Soil	S23-Jn0053349		X							
25	SMC-HA05-0.5	Jun 15, 2023		Soil	S23-Jn0053350		X							
26	SMC-HA06-	Jun 15, 2023		Soil	S23-Jn0053351		X							

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TARAGO DETAILED SITE INVESTIGATION
Project ID: 318001679

Order No.:
Report #: 1001666
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 19, 2023 4:40 PM
Due: Jun 26, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Acid Herbicides	Metals M8 filtered	BTEX	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B7	BTEX
Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
	0.25													
27	SMC-HA07-0.5	Jun 15, 2023		Soil	S23-Jn0053352		X							
28	SMC-HA08-0.25	Jun 15, 2023		Soil	S23-Jn0053353		X							
Test Counts						8	8	5	1	1	5	17	17	1

Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour **blue** indicates data provided by customer that may have an impact on the results.
5. This report replaces any interim results previously issued.

Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).
If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples (**% w/w**)
F/fld	Airborne fibre filter loading as Fibres (**N**) per Fields counted (**n**)
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane (**C**)
g, kg	Mass, e.g. of whole sample (**M**) or asbestos-containing find within the sample (**m**)
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM (**V** = **r** x **t**)
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane (**r**)
min	Time (**t**), e.g. of air sample collection period

Calculations

Airborne Fibre Concentration: $C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{V}\right)$

Asbestos Content (as asbestos): $\%\, w/w = \frac{(m \times P_A)}{M}$

Weighted Average (of asbestos): $\%_{WA} = \sum \frac{(m \times P_A)_x}{x}$

Terms

%asbestos	Estimated percentage of asbestos in a given matrix. May be derived from knowledge or experience of the material, informed by HSG264 *Appendix 2*, else assumed to be 15% in accordance with WA DOH *Appendix 2* (**P_A**).
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
AF	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to “non-bonded / friable”.
AFM	Airborne Fibre Monitoring, e.g. by the MFM.
Amosite	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
AS	Australian Standard.
Asbestos Content (as asbestos)	Total % w/w asbestos content in asbestos-containing finds in a soil sample (**% w/w)**.
Chrysotile	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
COC	Chain of Custody.
Crocidolite	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
Dry	Sample is dried by heating prior to analysis.
DS	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
FA	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
Fibre Count	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
Fibre ID	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory’s remit to assess degree of friability.
HSG248	UK HSE HSG248, *Asbestos: The Analysts Guide*, 2nd Edition (2021).
HSG264	UK HSE HSG264, *Asbestos: The Survey Guide* (2012).
ISO (also ISO/IEC)	International Organization for Standardization / International Electrotechnical Commission.
K Factor	Microscope constant (**K**) as derived from the effective filter area of the given AFM membrane used for collecting the sample (**A**) and the projected eyepiece graticule area of the specific microscope used for the analysis (**a**).
LOR	Limit of Reporting.
MFM (also NOHSC:3003)	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres*, 2nd Edition [NOHSC:3003(2005)].
NEPM (also ASC NEPM)	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
Organic	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
PCM	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
PLM	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
Sampling	Unless otherwise stated Eurofins are not responsible for sampling equipment or the sampling process.
SMF	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
SRA	Sample Receipt Advice.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
UK HSE HSG	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
UMF	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
WA DOH	Reference document for the NEPM. Government of Western Australia, *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (updated 2021), including Appendix Four: *Laboratory analysis*
Weighted Average	Combined average % w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample (**$\%_{WA}$**).

Comments

Samples received were less than the nominal 500mL as recommended in Section 4.10 of the NEPM Schedule B1 - Guideline on Investigation Levels for Soil and Groundwater.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Asbestos Counter/Identifier:

Sayeed Abu	Senior Analyst-Asbestos

Authorised by:

Laxman Dias	Senior Analyst-Asbestos

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Australia Pty Ltd
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NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Stephen Maxwell**

Report **1001666-S**
Project name TARAGO DETAILED SITE INVESTIGATION
Project ID 318001679
Received Date Jun 19, 2023

Client Sample ID			**SMC-HA01-0.05**	**SMC-HA01-0.25**	**SMC-HA02-0.05**	**SMC-HA02-0.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S23-Jn0053326**	**S23-Jn0053327**	**S23-Jn0053328**	**S23-Jn0053329**
Date Sampled			**Jun 15, 2023**	**Jun 15, 2023**	**Jun 15, 2023**	**Jun 15, 2023**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	76	69	74	60
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			SMC-HA01-0.05	SMC-HA01-0.25	SMC-HA02-0.05	SMC-HA02-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053326	S23-Jn0053327	S23-Jn0053328	S23-Jn0053329
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	102	106	101	100
p-Terphenyl-d14 (surr.)	1	%	95	101	94	98
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	-	-
a-HCH	0.05	mg/kg	< 0.05	-	-	-
Aldrin	0.05	mg/kg	< 0.05	-	-	-
b-HCH	0.05	mg/kg	< 0.05	-	-	-
d-HCH	0.05	mg/kg	< 0.05	-	-	-
Dieldrin	0.05	mg/kg	< 0.05	-	-	-
Endosulfan I	0.05	mg/kg	< 0.05	-	-	-
Endosulfan II	0.05	mg/kg	< 0.05	-	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	-
Endrin	0.05	mg/kg	< 0.05	-	-	-
Endrin aldehyde	0.05	mg/kg	0.07	-	-	-
Endrin ketone	0.05	mg/kg	< 0.05	-	-	-
g-HCH (Lindane)	0.05	mg/kg	< 0.05	-	-	-
Heptachlor	0.05	mg/kg	< 0.05	-	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	-
Methoxychlor	0.05	mg/kg	< 0.05	-	-	-
Toxaphene	0.5	mg/kg	< 0.5	-	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Dibutylchlorendate (surr.)	1	%	78	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	94	-	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	-	-	-
Bolstar	0.2	mg/kg	< 0.2	-	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	-	-	-
Chlorpyrifos	0.2	mg/kg	< 0.2	-	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	-	-	-
Coumaphos	2	mg/kg	< 2	-	-	-
Demeton-S	0.2	mg/kg	< 0.2	-	-	-
Demeton-O	0.2	mg/kg	< 0.2	-	-	-
Diazinon	0.2	mg/kg	< 0.2	-	-	-
Dichlorvos	0.2	mg/kg	< 0.2	-	-	-

Client Sample ID			SMC-HA01-0.05	SMC-HA01-0.25	SMC-HA02-0.05	SMC-HA02-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053326	S23-Jn0053327	S23-Jn0053328	S23-Jn0053329
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Dimethoate	0.2	mg/kg	< 0.2	-	-	-
Disulfoton	0.2	mg/kg	< 0.2	-	-	-
EPN	0.2	mg/kg	< 0.2	-	-	-
Ethion	0.2	mg/kg	< 0.2	-	-	-
Ethoprop	0.2	mg/kg	< 0.2	-	-	-
Ethyl parathion	0.2	mg/kg	< 0.2	-	-	-
Fenitrothion	0.2	mg/kg	< 0.2	-	-	-
Fensulfothion	0.2	mg/kg	< 0.2	-	-	-
Fenthion	0.2	mg/kg	< 0.2	-	-	-
Malathion	0.2	mg/kg	< 0.2	-	-	-
Merphos	0.2	mg/kg	< 0.2	-	-	-
Methyl parathion	0.2	mg/kg	< 0.2	-	-	-
Mevinphos	0.2	mg/kg	< 0.2	-	-	-
Monocrotophos	2	mg/kg	< 2	-	-	-
Naled	0.2	mg/kg	< 0.2	-	-	-
Omethoate	2	mg/kg	< 2	-	-	-
Phorate	0.2	mg/kg	< 0.2	-	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	-	-	-
Pyrazophos	0.2	mg/kg	< 0.2	-	-	-
Ronnel	0.2	mg/kg	< 0.2	-	-	-
Terbufos	0.2	mg/kg	< 0.2	-	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	-	-	-
Tokuthion	0.2	mg/kg	< 0.2	-	-	-
Trichloronate	0.2	mg/kg	< 0.2	-	-	-
Triphenylphosphate (surr.)	1	%	94	-	-	-
Acid Herbicides						
2.4-D	0.5	mg/kg	< 0.5	-	-	-
2.4-DB	0.5	mg/kg	< 0.5	-	-	-
2.4.5-T	0.5	mg/kg	< 0.5	-	-	-
2.4.5-TP	0.5	mg/kg	< 0.5	-	-	-
Actril (loxynil)	0.5	mg/kg	< 0.5	-	-	-
Dicamba	0.5	mg/kg	< 0.5	-	-	-
Dichlorprop	0.5	mg/kg	< 0.5	-	-	-
Dinitro-o-cresol	0.5	mg/kg	< 0.5	-	-	-
Dinoseb	0.5	mg/kg	< 0.5	-	-	-
MCPA	0.5	mg/kg	< 0.5	-	-	-
MCPB	0.5	mg/kg	< 0.5	-	-	-
Mecoprop	0.5	mg/kg	< 0.5	-	-	-
Warfarin (surr.)	1	%	131	-	-	-
Heavy Metals						
Arsenic	2	mg/kg	13	14	5.4	9.0
Cadmium	0.4	mg/kg	3.3	2.1	3.4	< 0.4
Chromium	5	mg/kg	13	30	8.5	30
Copper	5	mg/kg	95	50	78	20
Lead	5	mg/kg	330	140	190	30
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	5.6	9.1	< 5	12
Zinc	5	mg/kg	490	530	490	41
Sample Properties						
% Moisture	1	%	12	19	20	16

Client Sample ID			SMC-HA03-0.05	SMC-HA03-0.25	SMC-HA04-0.05	SMC-HA04-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053330	S23-Jn0053331	S23-Jn0053332	S23-Jn0053333
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	56	62	58	58
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	102	99	102	97
p-Terphenyl-d14 (surr.)	1	%	98	92	93	92

Client Sample ID			SMC-HA03-0.05	SMC-HA03-0.25	SMC-HA04-0.05	SMC-HA04-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053330	S23-Jn0053331	S23-Jn0053332	S23-Jn0053333
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	-	-
a-HCH	0.05	mg/kg	< 0.05	-	-	-
Aldrin	0.05	mg/kg	< 0.05	-	-	-
b-HCH	0.05	mg/kg	< 0.05	-	-	-
d-HCH	0.05	mg/kg	< 0.05	-	-	-
Dieldrin	0.05	mg/kg	< 0.05	-	-	-
Endosulfan I	0.05	mg/kg	< 0.05	-	-	-
Endosulfan II	0.05	mg/kg	< 0.05	-	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	-
Endrin	0.05	mg/kg	< 0.05	-	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-	-
Endrin ketone	0.05	mg/kg	< 0.05	-	-	-
g-HCH (Lindane)	0.05	mg/kg	< 0.05	-	-	-
Heptachlor	0.05	mg/kg	< 0.05	-	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	-
Methoxychlor	0.05	mg/kg	< 0.05	-	-	-
Toxaphene	0.5	mg/kg	< 0.5	-	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Dibutylchlorendate (surr.)	1	%	104	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	93	-	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	-	-	-
Bolstar	0.2	mg/kg	< 0.2	-	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	-	-	-
Chlorpyrifos	0.2	mg/kg	< 0.2	-	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	-	-	-
Coumaphos	2	mg/kg	< 2	-	-	-
Demeton-S	0.2	mg/kg	< 0.2	-	-	-
Demeton-O	0.2	mg/kg	< 0.2	-	-	-
Diazinon	0.2	mg/kg	< 0.2	-	-	-
Dichlorvos	0.2	mg/kg	< 0.2	-	-	-
Dimethoate	0.2	mg/kg	< 0.2	-	-	-
Disulfoton	0.2	mg/kg	< 0.2	-	-	-
EPN	0.2	mg/kg	< 0.2	-	-	-
Ethion	0.2	mg/kg	< 0.2	-	-	-
Ethoprop	0.2	mg/kg	< 0.2	-	-	-
Ethyl parathion	0.2	mg/kg	< 0.2	-	-	-
Fenitrothion	0.2	mg/kg	< 0.2	-	-	-
Fensulfothion	0.2	mg/kg	< 0.2	-	-	-
Fenthion	0.2	mg/kg	< 0.2	-	-	-
Malathion	0.2	mg/kg	< 0.2	-	-	-
Merphos	0.2	mg/kg	< 0.2	-	-	-

Client Sample ID			SMC-HA03-0.05	SMC-HA03-0.25	SMC-HA04-0.05	SMC-HA04-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053330	S23-Jn0053331	S23-Jn0053332	S23-Jn0053333
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Methyl parathion	0.2	mg/kg	< 0.2	-	-	-
Mevinphos	0.2	mg/kg	< 0.2	-	-	-
Monocrotophos	2	mg/kg	< 2	-	-	-
Naled	0.2	mg/kg	< 0.2	-	-	-
Omethoate	2	mg/kg	< 2	-	-	-
Phorate	0.2	mg/kg	< 0.2	-	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	-	-	-
Pyrazophos	0.2	mg/kg	< 0.2	-	-	-
Ronnel	0.2	mg/kg	< 0.2	-	-	-
Terbufos	0.2	mg/kg	< 0.2	-	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	-	-	-
Tokuthion	0.2	mg/kg	< 0.2	-	-	-
Trichloronate	0.2	mg/kg	< 0.2	-	-	-
Triphenylphosphate (surr.)	1	%	117	-	-	-
Acid Herbicides						
2.4-D	0.5	mg/kg	< 0.5	-	-	-
2.4-DB	0.5	mg/kg	< 0.5	-	-	-
2.4.5-T	0.5	mg/kg	< 0.5	-	-	-
2.4.5-TP	0.5	mg/kg	< 0.5	-	-	-
Actril (loxynil)	0.5	mg/kg	< 0.5	-	-	-
Dicamba	0.5	mg/kg	< 0.5	-	-	-
Dichlorprop	0.5	mg/kg	< 0.5	-	-	-
Dinitro-o-cresol	0.5	mg/kg	< 0.5	-	-	-
Dinoseb	0.5	mg/kg	< 0.5	-	-	-
MCPA	0.5	mg/kg	< 0.5	-	-	-
MCPB	0.5	mg/kg	< 0.5	-	-	-
Mecoprop	0.5	mg/kg	< 0.5	-	-	-
Warfarin (surr.)	1	%	112	-	-	-
Heavy Metals						
Arsenic	2	mg/kg	6.8	3.0	17	6.3
Cadmium	0.4	mg/kg	3.1	< 0.4	4.7	< 0.4
Chromium	5	mg/kg	8.7	8.8	14	19
Copper	5	mg/kg	65	7.7	160	8.6
Lead	5	mg/kg	310	37	690	17
Mercury	0.1	mg/kg	< 0.1	< 0.1	0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	6.2	7.9
Zinc	5	mg/kg	640	150	730	400
Sample Properties						
% Moisture	1	%	21	11	17	12

Client Sample ID			SMC-HA05-0.05	SMC-HA05-0.25	SMC-HA06-0.05	SMC-HA06-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053334	S23-Jn0053335	S23-Jn0053336	S23-Jn0053337
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	59	64	81	62
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	105	94	105	98
p-Terphenyl-d14 (surr.)	1	%	99	90	98	99

Client Sample ID			SMC-HA05-0.05	SMC-HA05-0.25	SMC-HA06-0.05	SMC-HA06-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053334	S23-Jn0053335	S23-Jn0053336	S23-Jn0053337
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	-	-
a-HCH	0.05	mg/kg	< 0.05	-	-	-
Aldrin	0.05	mg/kg	< 0.05	-	-	-
b-HCH	0.05	mg/kg	< 0.05	-	-	-
d-HCH	0.05	mg/kg	< 0.05	-	-	-
Dieldrin	0.05	mg/kg	< 0.05	-	-	-
Endosulfan I	0.05	mg/kg	< 0.05	-	-	-
Endosulfan II	0.05	mg/kg	< 0.05	-	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	-
Endrin	0.05	mg/kg	< 0.05	-	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-	-
Endrin ketone	0.05	mg/kg	< 0.05	-	-	-
g-HCH (Lindane)	0.05	mg/kg	< 0.05	-	-	-
Heptachlor	0.05	mg/kg	< 0.05	-	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	-
Methoxychlor	0.05	mg/kg	< 0.05	-	-	-
Toxaphene	0.5	mg/kg	< 0.5	-	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Dibutylchlorendate (surr.)	1	%	74	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	97	-	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	-	-	-
Bolstar	0.2	mg/kg	< 0.2	-	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	-	-	-
Chlorpyrifos	0.2	mg/kg	< 0.2	-	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	-	-	-
Coumaphos	2	mg/kg	< 2	-	-	-
Demeton-S	0.2	mg/kg	< 0.2	-	-	-
Demeton-O	0.2	mg/kg	< 0.2	-	-	-
Diazinon	0.2	mg/kg	< 0.2	-	-	-
Dichlorvos	0.2	mg/kg	< 0.2	-	-	-
Dimethoate	0.2	mg/kg	< 0.2	-	-	-
Disulfoton	0.2	mg/kg	< 0.2	-	-	-
EPN	0.2	mg/kg	< 0.2	-	-	-
Ethion	0.2	mg/kg	< 0.2	-	-	-
Ethoprop	0.2	mg/kg	< 0.2	-	-	-
Ethyl parathion	0.2	mg/kg	< 0.2	-	-	-
Fenitrothion	0.2	mg/kg	< 0.2	-	-	-
Fensulfothion	0.2	mg/kg	< 0.2	-	-	-
Fenthion	0.2	mg/kg	< 0.2	-	-	-
Malathion	0.2	mg/kg	< 0.2	-	-	-
Merphos	0.2	mg/kg	< 0.2	-	-	-

Client Sample ID			SMC-HA05-0.05	SMC-HA05-0.25	SMC-HA06-0.05	SMC-HA06-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053334	S23-Jn0053335	S23-Jn0053336	S23-Jn0053337
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Methyl parathion	0.2	mg/kg	< 0.2	-	-	-
Mevinphos	0.2	mg/kg	< 0.2	-	-	-
Monocrotophos	2	mg/kg	< 2	-	-	-
Naled	0.2	mg/kg	< 0.2	-	-	-
Omethoate	2	mg/kg	< 2	-	-	-
Phorate	0.2	mg/kg	< 0.2	-	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	-	-	-
Pyrazophos	0.2	mg/kg	< 0.2	-	-	-
Ronnel	0.2	mg/kg	< 0.2	-	-	-
Terbufos	0.2	mg/kg	< 0.2	-	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	-	-	-
Tokuthion	0.2	mg/kg	< 0.2	-	-	-
Trichloronate	0.2	mg/kg	< 0.2	-	-	-
Triphenylphosphate (surr.)	1	%	89	-	-	-
Acid Herbicides						
2.4-D	0.5	mg/kg	< 0.5	-	-	-
2.4-DB	0.5	mg/kg	< 0.5	-	-	-
2.4.5-T	0.5	mg/kg	< 0.5	-	-	-
2.4.5-TP	0.5	mg/kg	< 0.5	-	-	-
Actril (loxynil)	0.5	mg/kg	< 0.5	-	-	-
Dicamba	0.5	mg/kg	< 0.5	-	-	-
Dichlorprop	0.5	mg/kg	< 0.5	-	-	-
Dinitro-o-cresol	0.5	mg/kg	< 0.5	-	-	-
Dinoseb	0.5	mg/kg	< 0.5	-	-	-
MCPA	0.5	mg/kg	< 0.5	-	-	-
MCPB	0.5	mg/kg	< 0.5	-	-	-
Mecoprop	0.5	mg/kg	< 0.5	-	-	-
Warfarin (surr.)	1	%	130	-	-	-
Heavy Metals						
Arsenic	2	mg/kg	36	66	33	2.8
Cadmium	0.4	mg/kg	7.8	< 0.4	12	< 0.4
Chromium	5	mg/kg	11	11	11	5.4
Copper	5	mg/kg	330	8.5	300	5.4
Lead	5	mg/kg	850	17	1300	22
Mercury	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Zinc	5	mg/kg	960	200	2000	48
Sample Properties						
% Moisture	1	%	22	9.9	17	7.0

Client Sample ID			SMC-HA07-0.05	SMC-HA07-0.25	SMC-HA08-0.05	SMC-HA08-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053338	S23-Jn0053339	S23-Jn0053340	S23-Jn0053341
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	100
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	100
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	180
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	180
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	86	86	72	77
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	106	100	81	83
p-Terphenyl-d14 (surr.)	1	%	135	106	85	86

Client Sample ID			SMC-HA07-0.05	SMC-HA07-0.25	SMC-HA08-0.05	SMC-HA08-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053338	S23-Jn0053339	S23-Jn0053340	S23-Jn0053341
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 1	-	-	-
4.4'-DDD	0.05	mg/kg	< 0.5	-	-	-
4.4'-DDE	0.05	mg/kg	< 0.5	-	-	-
4.4'-DDT	0.05	mg/kg	< 0.5	-	-	-
a-HCH	0.05	mg/kg	< 0.5	-	-	-
Aldrin	0.05	mg/kg	< 0.5	-	-	-
b-HCH	0.05	mg/kg	< 0.5	-	-	-
d-HCH	0.05	mg/kg	< 0.5	-	-	-
Dieldrin	0.05	mg/kg	< 0.5	-	-	-
Endosulfan I	0.05	mg/kg	< 0.5	-	-	-
Endosulfan II	0.05	mg/kg	< 0.5	-	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.5	-	-	-
Endrin	0.05	mg/kg	< 0.5	-	-	-
Endrin aldehyde	0.05	mg/kg	< 0.5	-	-	-
Endrin ketone	0.05	mg/kg	< 0.5	-	-	-
g-HCH (Lindane)	0.05	mg/kg	< 0.5	-	-	-
Heptachlor	0.05	mg/kg	< 0.5	-	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.5	-	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.5	-	-	-
Methoxychlor	0.05	mg/kg	< 0.5	-	-	-
Toxaphene	0.5	mg/kg	< 10	-	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.5	-	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.5	-	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 1	-	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 1	-	-	-
Dibutylchlorendate (surr.)	1	%	58	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	103	-	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.5	-	-	-
Bolstar	0.2	mg/kg	< 0.5	-	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.5	-	-	-
Chlorpyrifos	0.2	mg/kg	< 0.5	-	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.5	-	-	-
Coumaphos	2	mg/kg	< 5	-	-	-
Demeton-S	0.2	mg/kg	< 0.5	-	-	-
Demeton-O	0.2	mg/kg	< 0.5	-	-	-
Diazinon	0.2	mg/kg	< 0.5	-	-	-
Dichlorvos	0.2	mg/kg	< 0.5	-	-	-
Dimethoate	0.2	mg/kg	< 0.5	-	-	-
Disulfoton	0.2	mg/kg	< 0.5	-	-	-
EPN	0.2	mg/kg	< 0.5	-	-	-
Ethion	0.2	mg/kg	< 0.5	-	-	-
Ethoprop	0.2	mg/kg	< 0.5	-	-	-
Ethyl parathion	0.2	mg/kg	< 0.5	-	-	-
Fenitrothion	0.2	mg/kg	< 0.5	-	-	-
Fensulfothion	0.2	mg/kg	< 0.5	-	-	-
Fenthion	0.2	mg/kg	< 0.5	-	-	-
Malathion	0.2	mg/kg	< 0.5	-	-	-
Merphos	0.2	mg/kg	< 0.5	-	-	-

Client Sample ID			SMC-HA07-0.05	SMC-HA07-0.25	SMC-HA08-0.05	SMC-HA08-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053338	S23-Jn0053339	S23-Jn0053340	S23-Jn0053341
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Methyl parathion	0.2	mg/kg	< 0.5	-	-	-
Mevinphos	0.2	mg/kg	< 0.5	-	-	-
Monocrotophos	2	mg/kg	< 5	-	-	-
Naled	0.2	mg/kg	< 0.5	-	-	-
Omethoate	2	mg/kg	< 5	-	-	-
Phorate	0.2	mg/kg	< 0.5	-	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.5	-	-	-
Pyrazophos	0.2	mg/kg	< 0.5	-	-	-
Ronnel	0.2	mg/kg	< 0.5	-	-	-
Terbufos	0.2	mg/kg	< 0.5	-	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.5	-	-	-
Tokuthion	0.2	mg/kg	< 0.5	-	-	-
Trichloronate	0.2	mg/kg	< 0.5	-	-	-
Triphenylphosphate (surr.)	1	%	73	-	-	-
Acid Herbicides						
2.4-D	0.5	mg/kg	< 0.5	-	-	-
2.4-DB	0.5	mg/kg	< 0.5	-	-	-
2.4.5-T	0.5	mg/kg	< 0.5	-	-	-
2.4.5-TP	0.5	mg/kg	< 0.5	-	-	-
Actril (loxynil)	0.5	mg/kg	< 0.5	-	-	-
Dicamba	0.5	mg/kg	< 0.5	-	-	-
Dichlorprop	0.5	mg/kg	< 0.5	-	-	-
Dinitro-o-cresol	0.5	mg/kg	< 0.5	-	-	-
Dinoseb	0.5	mg/kg	< 0.5	-	-	-
MCPA	0.5	mg/kg	< 0.5	-	-	-
MCPB	0.5	mg/kg	< 0.5	-	-	-
Mecoprop	0.5	mg/kg	< 0.5	-	-	-
Warfarin (surr.)	1	%	118	-	-	-
Heavy Metals						
Arsenic	2	mg/kg	20	12	7.9	3.5
Cadmium	0.4	mg/kg	13	4.1	1.8	1.9
Chromium	5	mg/kg	11	8.7	16	12
Copper	5	mg/kg	440	160	40	< 5
Lead	5	mg/kg	1600	650	120	17
Mercury	0.1	mg/kg	0.2	0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	6.8	< 5
Zinc	5	mg/kg	1400	830	360	390
Sample Properties						
% Moisture	1	%	32	17	16	12

Client Sample ID			QC100-15.623	TRIP BLANK-150623	TRIP SPIKE-150625
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053342	S23-Jn0053344	S23-Jn0053345
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons					
TRH C6-C9	20	mg/kg	< 20	-	-
TRH C10-C14	20	mg/kg	< 20	-	-
TRH C15-C28	50	mg/kg	< 50	-	-
TRH C29-C36	50	mg/kg	< 50	-	-
TRH C10-C36 (Total)	50	mg/kg	< 50	-	-
TRH C6-C10	20	mg/kg	< 20	-	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	-	-
TRH >C10-C16	50	mg/kg	< 50	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	-	-
TRH >C16-C34	100	mg/kg	< 100	-	-
TRH >C34-C40	100	mg/kg	< 100	-	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	-	-
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	-
Toluene	0.1	mg/kg	< 0.1	< 0.1	-
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	-
4-Bromofluorobenzene (surr.)	1	%	72	86	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	< 0.5	-	-
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-
Acenaphthene	0.5	mg/kg	< 0.5	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	-	-
Anthracene	0.5	mg/kg	< 0.5	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-
Chrysene	0.5	mg/kg	< 0.5	-	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	-
Fluoranthene	0.5	mg/kg	< 0.5	-	-
Fluorene	0.5	mg/kg	< 0.5	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-
Naphthalene	0.5	mg/kg	< 0.5	-	-
Phenanthrene	0.5	mg/kg	< 0.5	-	-
Pyrene	0.5	mg/kg	< 0.5	-	-
Total PAH*	0.5	mg/kg	< 0.5	-	-
2-Fluorobiphenyl (surr.)	1	%	84	-	-
p-Terphenyl-d14 (surr.)	1	%	90	-	-

Client Sample ID			QC100-15.623	TRIP BLANK-150623	TRIP SPIKE-150625
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053342	S23-Jn0053344	S23-Jn0053345
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit			
Organochlorine Pesticides					
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	-
a-HCH	0.05	mg/kg	< 0.05	-	-
Aldrin	0.05	mg/kg	< 0.05	-	-
b-HCH	0.05	mg/kg	< 0.05	-	-
d-HCH	0.05	mg/kg	< 0.05	-	-
Dieldrin	0.05	mg/kg	< 0.05	-	-
Endosulfan I	0.05	mg/kg	< 0.05	-	-
Endosulfan II	0.05	mg/kg	< 0.05	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-
Endrin	0.05	mg/kg	< 0.05	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-
Endrin ketone	0.05	mg/kg	< 0.05	-	-
g-HCH (Lindane)	0.05	mg/kg	< 0.05	-	-
Heptachlor	0.05	mg/kg	< 0.05	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-
Methoxychlor	0.05	mg/kg	< 0.05	-	-
Toxaphene	0.5	mg/kg	< 0.5	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-
Dibutylchlorendate (surr.)	1	%	97	-	-
Tetrachloro-m-xylene (surr.)	1	%	81	-	-
Organophosphorus Pesticides					
Azinphos-methyl	0.2	mg/kg	< 0.2	-	-
Bolstar	0.2	mg/kg	< 0.2	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	-	-
Chlorpyrifos	0.2	mg/kg	< 0.2	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	-	-
Coumaphos	2	mg/kg	< 2	-	-
Demeton-S	0.2	mg/kg	< 0.2	-	-
Demeton-O	0.2	mg/kg	< 0.2	-	-
Diazinon	0.2	mg/kg	< 0.2	-	-
Dichlorvos	0.2	mg/kg	< 0.2	-	-
Dimethoate	0.2	mg/kg	< 0.2	-	-
Disulfoton	0.2	mg/kg	< 0.2	-	-
EPN	0.2	mg/kg	< 0.2	-	-
Ethion	0.2	mg/kg	< 0.2	-	-
Ethoprop	0.2	mg/kg	< 0.2	-	-
Ethyl parathion	0.2	mg/kg	< 0.2	-	-
Fenitrothion	0.2	mg/kg	< 0.2	-	-
Fensulfothion	0.2	mg/kg	< 0.2	-	-
Fenthion	0.2	mg/kg	< 0.2	-	-
Malathion	0.2	mg/kg	< 0.2	-	-
Merphos	0.2	mg/kg	< 0.2	-	-

Client Sample ID			QC100-15.623	TRIP BLANK-150623	TRIP SPIKE-150625
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S23-Jn0053342	S23-Jn0053344	S23-Jn0053345
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit			
Organophosphorus Pesticides					
Methyl parathion	0.2	mg/kg	< 0.2	-	-
Mevinphos	0.2	mg/kg	< 0.2	-	-
Monocrotophos	2	mg/kg	< 2	-	-
Naled	0.2	mg/kg	< 0.2	-	-
Omethoate	2	mg/kg	< 2	-	-
Phorate	0.2	mg/kg	< 0.2	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	-	-
Pyrazophos	0.2	mg/kg	< 0.2	-	-
Ronnel	0.2	mg/kg	< 0.2	-	-
Terbufos	0.2	mg/kg	< 0.2	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	-	-
Tokuthion	0.2	mg/kg	< 0.2	-	-
Trichloronate	0.2	mg/kg	< 0.2	-	-
Triphenylphosphate (surr.)	1	%	82	-	-
Acid Herbicides					
2.4-D	0.5	mg/kg	< 0.5	-	-
2.4-DB	0.5	mg/kg	< 0.5	-	-
2.4.5-T	0.5	mg/kg	< 0.5	-	-
2.4.5-TP	0.5	mg/kg	< 0.5	-	-
Actril (loxynil)	0.5	mg/kg	< 0.5	-	-
Dicamba	0.5	mg/kg	< 0.5	-	-
Dichlorprop	0.5	mg/kg	< 0.5	-	-
Dinitro-o-cresol	0.5	mg/kg	< 0.5	-	-
Dinoseb	0.5	mg/kg	< 0.5	-	-
MCPA	0.5	mg/kg	< 0.5	-	-
MCPB	0.5	mg/kg	< 0.5	-	-
Mecoprop	0.5	mg/kg	< 0.5	-	-
Warfarin (surr.)	1	%	127	-	-
Heavy Metals					
Arsenic	2	mg/kg	9.3	-	-
Cadmium	0.4	mg/kg	2.5	-	-
Chromium	5	mg/kg	9.0	-	-
Copper	5	mg/kg	67	-	-
Lead	5	mg/kg	250	-	-
Mercury	0.1	mg/kg	< 0.1	-	-
Nickel	5	mg/kg	< 5	-	-
Zinc	5	mg/kg	380	-	-
Sample Properties					
% Moisture	1	%	13	-	-
BTEX					
Benzene	1	%	-	-	110
Ethylbenzene	1	%	-	-	110
m&p-Xylenes	1	%	-	-	100
o-Xylene	1	%	-	-	100
Toluene	1	%	-	-	110
Xylenes - Total	1	%	-	-	100
4-Bromofluorobenzene (surr.)	1	%	-	-	94

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Jun 24, 2023	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jun 24, 2023	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jun 24, 2023	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Jun 24, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Sydney	Jun 24, 2023	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8	Sydney	Jun 24, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Organochlorine Pesticides	Sydney	Jun 24, 2023	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Sydney	Jun 24, 2023	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Acid Herbicides	Melbourne	Jun 27, 2023	14 Days
- Method: LTM-ORG-2180 Phenoxy Acid Herbicides			
% Moisture	Sydney	Jun 23, 2023	14 Days
- Method: LTM-GEN-7080 Moisture			

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Order No.:
Report #: 1001666
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 19, 2023 4:40 PM
Due: Jun 26, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: TARAGO DETAILED SITE INVESTIGATION
Project ID: 318001679

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Acid Herbicides	Metals M8 filtered	BTEX	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B7	BTEX
Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	SMC-HA01-0.05	Jun 15, 2023		Soil	S23-Jn0053326	X		X			X	X	X	
2	SMC-HA01-0.25	Jun 15, 2023		Soil	S23-Jn0053327							X	X	
3	SMC-HA02-0.05	Jun 15, 2023		Soil	S23-Jn0053328	X						X	X	
4	SMC-HA02-0.5	Jun 15, 2023		Soil	S23-Jn0053329							X	X	
5	SMC-HA03-0.05	Jun 15, 2023		Soil	S23-Jn0053330	X		X			X	X	X	
6	SMC-HA03-0.25	Jun 15, 2023		Soil	S23-Jn0053331							X	X	
7	SMC-HA04-0.05	Jun 15, 2023		Soil	S23-Jn0053332	X						X	X	

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Project ID: 318001679

Eurofins Analytical Services Manager : Andrew Black

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Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
8	SMC-HA04-0.5	Jun 15, 2023		Soil	S23-Jn0053333							X	X	
9	SMC-HA05-0.05	Jun 15, 2023		Soil	S23-Jn0053334	X		X			X	X	X	
10	SMC-HA05-0.25	Jun 15, 2023		Soil	S23-Jn0053335							X	X	
11	SMC-HA06-0.05	Jun 15, 2023		Soil	S23-Jn0053336	X						X	X	
12	SMC-HA06-0.5	Jun 15, 2023		Soil	S23-Jn0053337							X	X	
13	SMC-HA07-0.05	Jun 15, 2023		Soil	S23-Jn0053338	X		X			X	X	X	
14	SMC-HA07-0.25	Jun 15, 2023		Soil	S23-Jn0053339							X	X	
15	SMC-HA08-0.05	Jun 15, 2023		Soil	S23-Jn0053340	X						X	X	
16	SMC-HA08-0.5	Jun 15, 2023		Soil	S23-Jn0053341							X	X	

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Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
17	QC100-15.623	Jun 15, 2023		Soil	S23-Jn0053342			X			X	X	X	
18	QC300-15.623	Jun 15, 2023		Water	S23-Jn0053343				X					
19	TRIP BLANK-150623	Jun 15, 2023		Soil	S23-Jn0053344					X				
20	TRIP SPIKE-150625	Jun 15, 2023		Soil	S23-Jn0053345									X
21	SMC-HA01-0.5	Jun 15, 2023		Soil	S23-Jn0053346		X							
22	SMC-HA02-0.25	Jun 15, 2023		Soil	S23-Jn0053347		X							
23	SMC-HA03-0.5	Jun 15, 2023		Soil	S23-Jn0053348		X							
24	SMC-HA04-0.25	Jun 15, 2023		Soil	S23-Jn0053349		X							
25	SMC-HA05-0.5	Jun 15, 2023		Soil	S23-Jn0053350		X							
26	SMC-HA06-	Jun 15, 2023		Soil	S23-Jn0053351		X							

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Sample Detail						Asbestos - WA guidelines	HOLD	Acid Herbicides	Metals M8 filtered	BTEX	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B7	BTEX
Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
	0.25													
27	SMC-HA07-0.5	Jun 15, 2023		Soil	S23-Jn0053352		X							
28	SMC-HA08-0.25	Jun 15, 2023		Soil	S23-Jn0053353		X							
Test Counts						8	8	5	1	1	5	17	17	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-HCH	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-HCH	mg/kg	< 0.05			0.05	Pass	
d-HCH	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-HCH (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	89			70-130	Pass	
TRH C10-C14	%	88			70-130	Pass	
TRH C6-C10	%	86			70-130	Pass	
TRH >C10-C16	%	85			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	96			70-130	Pass	
Toluene	%	82			70-130	Pass	
Ethylbenzene	%	100			70-130	Pass	
m&p-Xylenes	%	103			70-130	Pass	
o-Xylene	%	106			70-130	Pass	
Xylenes - Total*	%	104			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	78			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	85			70-130	Pass	
Acenaphthylene	%	88			70-130	Pass	
Anthracene	%	73			70-130	Pass	
Benz(a)anthracene	%	84			70-130	Pass	
Benzo(a)pyrene	%	85			70-130	Pass	
Benzo(b&j)fluoranthene	%	78			70-130	Pass	
Benzo(g.h.i)perylene	%	77			70-130	Pass	
Benzo(k)fluoranthene	%	99			70-130	Pass	
Chrysene	%	82			70-130	Pass	
Dibenz(a.h)anthracene	%	80			70-130	Pass	
Fluoranthene	%	75			70-130	Pass	
Fluorene	%	88			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	80			70-130	Pass	
Naphthalene	%	88			70-130	Pass	
Phenanthrene	%	75			70-130	Pass	
Pyrene	%	76			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	109			70-130	Pass	
4.4'-DDD	%	112			70-130	Pass	
4.4'-DDE	%	102			70-130	Pass	
4.4'-DDT	%	79			70-130	Pass	
a-HCH	%	108			70-130	Pass	
Aldrin	%	105			70-130	Pass	
b-HCH	%	104			70-130	Pass	
d-HCH	%	107			70-130	Pass	
Dieldrin	%	102			70-130	Pass	
Endosulfan I	%	108			70-130	Pass	
Endosulfan II	%	112			70-130	Pass	
Endosulfan sulphate	%	86			70-130	Pass	
Endrin	%	97			70-130	Pass	
Endrin aldehyde	%	77			70-130	Pass	
Endrin ketone	%	109			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
g-HCH (Lindane)	%	116			70-130	Pass	
Heptachlor	%	113			70-130	Pass	
Heptachlor epoxide	%	114			70-130	Pass	
Hexachlorobenzene	%	106			70-130	Pass	
Methoxychlor	%	92			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	85			70-130	Pass	
Dimethoate	%	109			70-130	Pass	
Ethion	%	94			70-130	Pass	
Fenitrothion	%	123			70-130	Pass	
Methyl parathion	%	104			70-130	Pass	
Mevinphos	%	80			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	104			80-120	Pass	
Cadmium	%	101			80-120	Pass	
Chromium	%	108			80-120	Pass	
Copper	%	108			80-120	Pass	
Lead	%	99			80-120	Pass	
Mercury	%	108			80-120	Pass	
Nickel	%	106			80-120	Pass	
Zinc	%	104			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	S23-Jn0049729	NCP	%	73			70-130	Pass	
TRH C10-C14	R23-Jn0019938	NCP	%	88			70-130	Pass	
TRH C6-C10	S23-Jn0049729	NCP	%	70			70-130	Pass	
TRH >C10-C16	R23-Jn0019938	NCP	%	77			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S23-Jn0045372	NCP	%	101			70-130	Pass	
4.4'-DDD	S23-Jn0045372	NCP	%	111			70-130	Pass	
4.4'-DDE	S23-Jn0045372	NCP	%	104			70-130	Pass	
4.4'-DDT	S23-Jn0045372	NCP	%	104			70-130	Pass	
a-HCH	S23-Jn0045372	NCP	%	103			70-130	Pass	
Aldrin	S23-Jn0045372	NCP	%	96			70-130	Pass	
b-HCH	S23-Jn0045372	NCP	%	96			70-130	Pass	
d-HCH	S23-Jn0045372	NCP	%	103			70-130	Pass	
Dieldrin	S23-Jn0045372	NCP	%	86			70-130	Pass	
Endosulfan I	S23-Jn0045372	NCP	%	119			70-130	Pass	
Endosulfan II	S23-Jn0045372	NCP	%	97			70-130	Pass	
Endosulfan sulphate	S23-Jn0045372	NCP	%	95			70-130	Pass	
Endrin	S23-Jn0045372	NCP	%	114			70-130	Pass	
Endrin aldehyde	S23-Jn0045372	NCP	%	88			70-130	Pass	
Endrin ketone	S23-Jn0045372	NCP	%	102			70-130	Pass	
g-HCH (Lindane)	S23-Jn0045372	NCP	%	98			70-130	Pass	
Heptachlor	S23-Jn0045372	NCP	%	100			70-130	Pass	
Heptachlor epoxide	S23-Jn0045372	NCP	%	105			70-130	Pass	
Hexachlorobenzene	S23-Jn0045372	NCP	%	104			70-130	Pass	
Methoxychlor	S23-Jn0045372	NCP	%	104			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Diazinon	S23-Jn0053326	CP	%	122			70-130	Pass	
Dimethoate	S23-Jn0053326	CP	%	102			70-130	Pass	
Ethion	S23-Jn0053326	CP	%	105			70-130	Pass	
Fenitrothion	S23-Jn0053326	CP	%	94			70-130	Pass	
Methyl parathion	S23-Jn0053326	CP	%	120			70-130	Pass	
Mevinphos	S23-Jn0053326	CP	%	116			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S23-Jn0053329	CP	%	106			75-125	Pass	
Cadmium	S23-Jn0053329	CP	%	114			75-125	Pass	
Chromium	S23-Jn0053329	CP	%	111			75-125	Pass	
Copper	S23-Jn0053329	CP	%	112			75-125	Pass	
Lead	S23-Jn0053329	CP	%	100			75-125	Pass	
Mercury	S23-Jn0053329	CP	%	113			75-125	Pass	
Nickel	S23-Jn0053329	CP	%	108			75-125	Pass	
Zinc	S23-Jn0053329	CP	%	108			75-125	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S23-Jn0053335	CP	%	90			70-130	Pass	
Acenaphthylene	S23-Jn0053335	CP	%	98			70-130	Pass	
Anthracene	S23-Jn0053335	CP	%	83			70-130	Pass	
Benz(a)anthracene	S23-Jn0053335	CP	%	88			70-130	Pass	
Benzo(a)pyrene	S23-Jn0053335	CP	%	92			70-130	Pass	
Benzo(b&j)fluoranthene	S23-Jn0053335	CP	%	82			70-130	Pass	
Benzo(g.h.i)perylene	S23-Jn0053335	CP	%	98			70-130	Pass	
Benzo(k)fluoranthene	S23-Jn0053335	CP	%	105			70-130	Pass	
Chrysene	S23-Jn0053335	CP	%	94			70-130	Pass	
Dibenz(a.h)anthracene	S23-Jn0053335	CP	%	100			70-130	Pass	
Fluoranthene	S23-Jn0053335	CP	%	90			70-130	Pass	
Fluorene	S23-Jn0053335	CP	%	98			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S23-Jn0053335	CP	%	99			70-130	Pass	
Naphthalene	S23-Jn0053335	CP	%	97			70-130	Pass	
Phenanthrene	S23-Jn0053335	CP	%	85			70-130	Pass	
Pyrene	S23-Jn0053335	CP	%	91			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S23-Jn0053339	CP	%	102			75-125	Pass	
Cadmium	S23-Jn0053339	CP	%	109			75-125	Pass	
Chromium	S23-Jn0053339	CP	%	107			75-125	Pass	
Copper	S23-Jn0053339	CP	%	94			75-125	Pass	
Mercury	S23-Jn0053339	CP	%	104			75-125	Pass	
Nickel	S23-Jn0053339	CP	%	100			75-125	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S23-Jn0053340	CP	%	78			70-130	Pass	
Toluene	S23-Jn0053340	CP	%	74			70-130	Pass	
Ethylbenzene	S23-Jn0053340	CP	%	79			70-130	Pass	
m&p-Xylenes	S23-Jn0053340	CP	%	81			70-130	Pass	
o-Xylene	S23-Jn0053340	CP	%	79			70-130	Pass	
Xylenes - Total*	S23-Jn0053340	CP	%	80			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S23-Jn0053340	CP	%	71			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	R23-Jn0019999	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	R23-Jn0019999	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	R23-Jn0019999	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C10-C16	R23-Jn0019999	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	R23-Jn0019999	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	R23-Jn0019999	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S23-Jn0035800	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	S23-Jn0035800	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	S23-Jn0035800	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	N23-Jn0031836	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	S23-Jn0035800	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	S23-Jn0035800	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	S23-Jn0035800	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	S23-Jn0035800	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S23-Jn0053327	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10	S23-Jn0053327	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S23-Jn0053327	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S23-Jn0053327	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S23-Jn0053327	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S23-Jn0053327	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S23-Jn0053327	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	S23-Jn0053327	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S23-Jn0053327	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	S23-Jn0053327	CP	%	19	17	9.6	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S23-Jn0053328	CP	mg/kg	5.4	5.5	1.2	30%	Pass	
Cadmium	S23-Jn0053328	CP	mg/kg	3.4	3.1	11	30%	Pass	
Chromium	S23-Jn0053328	CP	mg/kg	8.5	7.5	13	30%	Pass	
Copper	S23-Jn0053328	CP	mg/kg	78	74	5.9	30%	Pass	
Lead	S23-Jn0053328	CP	mg/kg	190	190	4.6	30%	Pass	
Mercury	S23-Jn0053328	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S23-Jn0053328	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	S23-Jn0053328	CP	mg/kg	490	450	9.4	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S23-Jn0053329	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10	S23-Jn0053329	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S23-Jn0053329	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S23-Jn0053329	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S23-Jn0053329	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S23-Jn0053329	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S23-Jn0053329	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	S23-Jn0053329	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S23-Jn0053329	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S23-Jn0053333	CP	mg/kg	6.3	5.5	14	30%	Pass	
Cadmium	S23-Jn0053333	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S23-Jn0053333	CP	mg/kg	19	16	16	30%	Pass	
Copper	S23-Jn0053333	CP	mg/kg	8.6	6.9	22	30%	Pass	
Lead	S23-Jn0053333	CP	mg/kg	17	17	4.1	30%	Pass	
Mercury	S23-Jn0053333	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S23-Jn0053333	CP	mg/kg	7.9	5.9	29	30%	Pass	
Zinc	S23-Jn0053333	CP	mg/kg	400	320	21	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S23-Jn0053339	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10	S23-Jn0053339	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S23-Jn0053339	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S23-Jn0053339	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S23-Jn0053339	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S23-Jn0053339	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S23-Jn0053339	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	S23-Jn0053339	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S23-Jn0053339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised by:

Andrew Black	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Joseph Edouard	Senior Analyst-Organic
Raymond Siu	Senior Analyst-Volatile
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

Ramboll Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Stephen Maxwell**

Report **1001666-W**
Project name TARAGO DETAILED SITE INVESTIGATION
Project ID 318001679
Received Date Jun 19, 2023

Client Sample ID			**QC300-15.623**
Sample Matrix			**Water**
Eurofins Sample No.			**S23-Jn0053343**
Date Sampled			**Jun 15, 2023**
Test/Reference	LOR	Unit	
Heavy Metals			
Arsenic (filtered)	0.001	mg/L	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001
Lead (filtered)	0.001	mg/L	0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8 filtered	Sydney	Jun 23, 2023	28 Days

- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS

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Order No.:
Report #: 1001666
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 19, 2023 4:40 PM
Due: Jun 26, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: TARAGO DETAILED SITE INVESTIGATION
Project ID: 318001679

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Acid Herbicides	Metals M8 filtered	BTEX	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B7	BTEX
Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	SMC-HA01-0.05	Jun 15, 2023		Soil	S23-Jn0053326	X		X			X	X	X	
2	SMC-HA01-0.25	Jun 15, 2023		Soil	S23-Jn0053327							X	X	
3	SMC-HA02-0.05	Jun 15, 2023		Soil	S23-Jn0053328	X						X	X	
4	SMC-HA02-0.5	Jun 15, 2023		Soil	S23-Jn0053329							X	X	
5	SMC-HA03-0.05	Jun 15, 2023		Soil	S23-Jn0053330	X		X			X	X	X	
6	SMC-HA03-0.25	Jun 15, 2023		Soil	S23-Jn0053331							X	X	
7	SMC-HA04-0.05	Jun 15, 2023		Soil	S23-Jn0053332	X						X	X	

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Due: Jun 26, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

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Project ID: 318001679

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Acid Herbicides	Metals M8 filtered	BTEX	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B7	BTEX
Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
8	SMC-HA04-0.5	Jun 15, 2023		Soil	S23-Jn0053333							X	X	
9	SMC-HA05-0.05	Jun 15, 2023		Soil	S23-Jn0053334	X		X			X	X	X	
10	SMC-HA05-0.25	Jun 15, 2023		Soil	S23-Jn0053335							X	X	
11	SMC-HA06-0.05	Jun 15, 2023		Soil	S23-Jn0053336	X						X	X	
12	SMC-HA06-0.5	Jun 15, 2023		Soil	S23-Jn0053337							X	X	
13	SMC-HA07-0.05	Jun 15, 2023		Soil	S23-Jn0053338	X		X			X	X	X	
14	SMC-HA07-0.25	Jun 15, 2023		Soil	S23-Jn0053339							X	X	
15	SMC-HA08-0.05	Jun 15, 2023		Soil	S23-Jn0053340	X						X	X	
16	SMC-HA08-0.5	Jun 15, 2023		Soil	S23-Jn0053341							X	X	

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Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
17	QC100-15.623	Jun 15, 2023		Soil	S23-Jn0053342			X			X	X	X	
18	QC300-15.623	Jun 15, 2023		Water	S23-Jn0053343				X					
19	TRIP BLANK-150623	Jun 15, 2023		Soil	S23-Jn0053344					X				
20	TRIP SPIKE-150625	Jun 15, 2023		Soil	S23-Jn0053345									X
21	SMC-HA01-0.5	Jun 15, 2023		Soil	S23-Jn0053346		X							
22	SMC-HA02-0.25	Jun 15, 2023		Soil	S23-Jn0053347		X							
23	SMC-HA03-0.5	Jun 15, 2023		Soil	S23-Jn0053348		X							
24	SMC-HA04-0.25	Jun 15, 2023		Soil	S23-Jn0053349		X							
25	SMC-HA05-0.5	Jun 15, 2023		Soil	S23-Jn0053350		X							
26	SMC-HA06-	Jun 15, 2023		Soil	S23-Jn0053351		X							

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Project ID: 318001679

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - WA guidelines	HOLD	Acid Herbicides	Metals M8 filtered	BTEX	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B7	BTEX
Melbourne Laboratory - NATA # 1261 Site # 1254								X	X					
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X
	0.25													
27	SMC-HA07-0.5	Jun 15, 2023		Soil	S23-Jn0053352		X							
28	SMC-HA08-0.25	Jun 15, 2023		Soil	S23-Jn0053353		X							
Test Counts						8	8	5	1	1	5	17	17	1

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	98			80-120	Pass	
Cadmium (filtered)	%	99			80-120	Pass	
Chromium (filtered)	%	99			80-120	Pass	
Copper (filtered)	%	98			80-120	Pass	
Lead (filtered)	%	102			80-120	Pass	
Mercury (filtered)	%	96			80-120	Pass	
Nickel (filtered)	%	94			80-120	Pass	
Zinc (filtered)	%	93			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S23-Jn0054194	NCP	%	99			75-125	Pass	
Cadmium (filtered)	S23-Jn0054194	NCP	%	101			75-125	Pass	
Chromium (filtered)	S23-Jn0054194	NCP	%	101			75-125	Pass	
Copper (filtered)	S23-Jn0054194	NCP	%	96			75-125	Pass	
Lead (filtered)	S23-Jn0054194	NCP	%	106			75-125	Pass	
Mercury (filtered)	S23-Jn0054194	NCP	%	96			75-125	Pass	
Nickel (filtered)	S23-Jn0054194	NCP	%	95			75-125	Pass	
Zinc (filtered)	S23-Jn0054194	NCP	%	97			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S23-Jn0055054	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S23-Jn0055054	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S23-Jn0055054	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S23-Jn0055054	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	S23-Jn0055054	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	R23-Jn0047192	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S23-Jn0055054	NCP	mg/L	0.002	0.002	5.6	30%	Pass	
Zinc (filtered)	S23-Jn0055054	NCP	mg/L	0.010	0.009	5.8	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
Mickael Ros	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

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NATA# 1261 Site# 20794

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Mayfield West NSW 2304
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NATA# 1261
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IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: +64 3 343 5201
IANZ# 1290

Sample Receipt Advice

Company name:	Ramboll Australia Pty Ltd
Contact name:	Stephen Maxwell
Project name:	TARAGO DETAILED SITE INVESTIGATION
Project ID:	318001679
Turnaround time:	5 Day
Date/Time received	Jun 19, 2023 4:40 PM
Eurofins reference	1001666

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✗	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Sample QC200-150623 forwarded to ALS.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com

Results will be delivered electronically via email to Stephen Maxwell - smaxwell@ramboll.com.

Note: A copy of these results will also be delivered to the general Ramboll Australia Pty Ltd email address.

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☑ **Sydney Laboratory** Unit F3 Bld.F 16 Mars Road Lane Cove West NSW 2066 02 9900 8400 EnviroSampleNSW@eurofins.com

☐ **Brisbane Laboratory** Unit 1 21 Smallwood Place Murarrie QLD 4172 07 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory** Unit 2 91 Leach Highway Kewdale WA 6105 08 9251 9600 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory** 6 Monterey Road Dandenong South VIC 3175 03 8564 5000 EnviroSampleVic@eurofins.com

Company	Ramboll	Project №	318001679	Project Manager	Stephen Maxwell
Address	3/100 Pacific Highway, North Sydney 2060, NSW	Project Name	Tarago Detailed Site Investigation	EDD Format (ESdat, EQuIS etc)	EQuIS
Contact Name	Jenny Auld				
Phone №	0421 672 019				
Special Directions	Page 1 of 3				
Purchase Order					
Quote ID №					

Sampler(s)	Jenny Auld / Isobel Marshall
Handed over by	Isobell Marshall
Email for Invoice	jauld@ramboll.com; aslapac-accounts@ramboll.com
Email for Results	jauld@ramboll.com; imarshall@ramboll.com; smaxwell@ramboll.com

Analyses — Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing.

№		Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B7 Suite: TRH, BTEXN, PAH, 8 Metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg)	B14 : OCP, OPP	Herbicides (Phenoxy acetic acid)	8 Metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg)	TRCH C6 – C10 and BTEXN	Asbestos (%w/w 0.001%)	Send to ALS	HOLD
1	SMC_HA01_0.05	15/06/23	S	X	X	X			X		
2	SMC_HA01_0.25	15/06/23	S	X							
3	SMC_HA01_0.5	15/06/23	S								X
4	SMC_HA02_0.05	15/06/23	S	X					X		
5	SMC_HA02_0.25	15/06/23	S								X
6	SMC_HA02_0.5	15/06/23	S	X							
7	SMC_HA03_0.05	15/06/23	S	X	X	X			X		
8	SMC_HA03_0.25	15/06/23	S	X							
9	SMC_HA03_0.5	15/06/23	S								X
10	SMC_HA04_0.05	15/06/23	S	X					X		
	Total Counts			7	2	2			4		3

Containers — Change container type & size if necessary.

№	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Asbestos Bag
1							1	1
2							1	
3							1	
4							1	1
5							1	
6							1	
7							1	1
8							1	
9							1	
10							1	1
							10	4

Required Turnaround Time (TAT) — Default will be 5 days if not ticked.

♦Surcharge will apply

☐ Overnight (reporting by 9am)♦
☐ Same day♦ ☐ 1 day♦
☐ 2 days♦ ☐ 3 days♦
☑ 5 days (Standard)
☐ Other( )

Sample Comments / Dangerous Goods Hazard Warning

Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal — Name: Isobell Marshall — Signature: — Date: 6/16/2023

Laboratory Use Only

Received By	Richards	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	2	Date	16/6	Time	4.40	Temperature	10.5
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date		Time		Report №	100166

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

Sydney Laboratory ☑
Unit F3 Bld.F 16 Mars Road Lane Cove West NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

Brisbane Laboratory ☐
Unit 1 21 Smallwood Place Murarrie QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

Perth Laboratory ☐
Unit 2 91 Leach Highway Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

Melbourne Laboratory ☐
6 Monterey Road Dandenong South VIC 3175
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Ramboll	Project №	318001679	Project Manager	Stephen Maxwell
Address	3/100 Pacific Highway, North Sydney 2060, NSW	Project Name	Tarago Detailed Site Investigation	EDD Format (ESdat, EQuIS etc)	EQuIS
Contact Name	Jenny Auld				
Phone №	0421 672 019				
Special Directions	Page 2 of 3				
Purchase Order					
Quote ID №					

Sampler(s)	Jenny Auld / Isobel Marshall
Handed over by	Isobel Marshall
Email for Invoice	jauld@ramboll.com; asiapac-accounts@ramboll.com
Email for Results	jauld@ramboll.com; imarshall@ramboll.com; smaxwell@ramboll.com

Analyses (Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing.)

№		Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B7 Suite: TRH, BTEXN, PAH, 8 Metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg)	B14 : OCP, OPP	Herbicides (Phenoxy acetic acid)	8 Metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg)	TRGH C6 – C10 and BTEXN	Asbestos (%w/w 0.001%)									Send to ALS	HOLD	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Asbestos Bag	Sample Comments / Dangerous Goods Hazard Warning
1	SMC_HA04_0.25	15/06/23	S																X							1		
2	SMC_HA04_0.5	15/06/23	S	X																						1		
3	SMC_HA05_0.05	15/06/23	S	X	X	X			X																	1	1	
4	SMC_HA05_0.25	15/06/23	S	X																						1		
5	SMC_HA05_0.5	15/06/23	S																X							1		
6	SMC_HA06_0.05	15/06/23	S	X					X																	1	1	
7	SMC_HA06_0.25	15/06/23	S																X							1		
8	SMC_HA06_0.5	15/06/23	S	X																						1		
9	SMC_HA07_0.05	15/06/23	S	X	X	X			X																	1	1	
10	SMC_HA07_0.25	15/06/23	S	X																						1		
	Total Counts			14	4	4			7										6							20	7	

Containers (Change container type & size if necessary.)

Required Turnaround Time (TAT) (Default will be 5 days if not ticked.)

♦Surcharge will apply
- ☐ Overnight (reporting by 9am)♦
- ☐ Same day♦ ☐ 1 day♦
- ☐ 2 days♦ ☐ 3 days♦
- ☑ 5 days (Standard)
- ☐ Other( )

Method of Shipment							
☐ Courier (#)	☑ Hand Delivered	☐ Postal	Name	Isobell Marshall	Signature		Date 6/16/2023	Time

Laboratory Use Only										
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date		Time		Temperature	
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date		Time		Report №	

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

Sydney Laboratory ☑
Unit F3 Bld.F 16 Mars Road Lane Cove West NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

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Melbourne Laboratory ☐
6 Monterey Road Dandenong South VIC 3175
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Ramboll	Project №	318001679	Project Manager	Stephen Maxwell
Address	3/100 Pacific Highway, North Sydney 2060, NSW	Project Name	Tarago Detailed Site Investigation	EDD Format (ESdat, EQuIS etc)	EQuIS
Contact Name	Jenny Auld				
Phone №	0421 672 019				
Special Directions	Page 3 of 3				
Purchase Order					
Quote ID №					

Sampler(s)	Jenny Auld / Isobel Marshall
Handed over by	Isobel Marshall
Email for Invoice	jauld@ramboll.com; asiapac-accounts@ramboll.com
Email for Results	jauld@ramboll.com; imarshall@ramboll.com; smaxwell@ramboll.com

Analyses (Where metals are requested, please specify 'Total' or 'Filtered'. SUITE code must be used to attract SUITE pricing.)

№	Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B7 Suite: TRH, BTEXN, PAH, 8 Metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg)	B14 : OCP, OPP	Herbicides (Phenoxy acetic acid)	8 Metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg)	TRCH C6 - C10 and BTEXN	Asbestos (%w/w 0.001%)	Send to ALS	HOLD
1	SMC_HA07_0.5	15/06/23	S								X
2	SMC_HA08_0.05	15/06/23	S	X					X		
3	SMC_HA08_0.25	15/06/23	S								X
4	SMC_HA08_0.5	15/06/23	S	X							
5	QC100_150623	15/06/23	S	X	X	X					
6	QC200_150623	15/06/23	S	X	X	X				X	
7	QC300_150623	15/06/23	W				X				
8	TRIP SPIKE_150623	15/06/23	S					X			
9	TRIP BLANK_150623	15/06/23	S					X			
10											
	Total Counts			18	6	6	1	2	8	1	8

Containers (Change container type & size if necessary.)

№	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Asbestos Bag	Sample Comments / Dangerous Goods Hazard Warning
1							1		
2							1	1	
3							1		
4							1		
5							1		
6							1		Please send to ALS for same analysis
7							1		
8									
9									
10									
							27	8	

Required Turnaround Time (TAT) — Default will be 5 days if not ticked.

♦Surcharge will apply

- ☐ Overnight (reporting by 9am)♦
- ☐ Same day♦ ☐ 1 day♦
- ☐ 2 days♦ ☐ 3 days♦
- ☑ 5 days (Standard)
- ☐ Other( )

Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal | Name: Isobell Marshall | Signature: | Date: 6/16/2023 | Time:

Laboratory Use Only

Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	Time	Temperature
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	Time	Report №

CERTIFICATE OF ANALYSIS

Work Order	: **ES2320976**	Page	: 1 of 8
Client	: **RAMBOLL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN MAXWELL	Contact	: Customer Services ES
Address	: 100 PACIFIC HIGHWAY NORTH SYDNEY 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 318001679 Tarago Detailed Site Investigation	Date Samples Received	: 23-Jun-2023 13:50
Order number	: ----	Date Analysis Commenced	: 26-Jun-2023
C-O-C number	: ----	Issue Date	: 29-Jun-2023 14:03
Sampler	: Isobel Marshall, JENNY AULD		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	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 Contract 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.
- 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.
- EG005T: Poor precision was obtained for Zinc on sample ES2320977 # 001. Confirmed by re-digestion and reanalysis.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC200-150623	----	----	----	----
			Sampling date / time	15-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2320976-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**13.3**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**11**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	**2**	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**11**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**70**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**274**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**5**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**390**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QC200-150623	----	----	----	----
				Sampling date / time	15-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2320976-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QC200-150623	----	----	----	----
				Sampling date / time	15-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2320976-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**0.6**	----	----	----	----
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QC200-150623	----	----	----	----
				Sampling date / time	15-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2320976-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080: BTEXN - Continued									
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.04	----	----	----	----
2.4-DB	94-82-6	0.02	mg/kg		<0.04	----	----	----	----
Dicamba	1918-00-9	0.02	mg/kg		<0.04	----	----	----	----
Mecoprop	93-65-2	0.02	mg/kg		<0.04	----	----	----	----
MCPA	94-74-6	0.02	mg/kg		<0.04	----	----	----	----
2.4-DP	120-36-5	0.02	mg/kg		<0.04	----	----	----	----
2.4-D	94-75-7	0.02	mg/kg		<0.04	----	----	----	----
Triclopyr	55335-06-3	0.02	mg/kg		<0.04	----	----	----	----
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.04	----	----	----	----
2.4.5-T	93-76-5	0.02	mg/kg		<0.04	----	----	----	----
MCPB	94-81-5	0.02	mg/kg		<0.04	----	----	----	----
Picloram	1918-02-1	0.02	mg/kg		<0.04	----	----	----	----
Clopyralid	1702-17-6	0.02	mg/kg		<0.04	----	----	----	----
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.04	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		69.5	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		60.6	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		80.6	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		80.3	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		72.6	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		81.5	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		81.3	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		83.2	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		104	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		98.7	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		83.3	----	----	----	----
EP202S: Phenoxyacetic Acid Herbicide Surrogate									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QC200-150623	----	----	----	----
				Sampling date / time	15-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2320976-001	--------	--------	--------	--------	
				Result	----	----	----	----	
EP202S: Phenoxyacetic Acid Herbicide Surrogate - Continued									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%	**64.3**	**----**	**----**	**----**	**----**	

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	63	125
Toluene-D8	2037-26-5	67	124
4-Bromofluorobenzene	460-00-4	66	131
EP202S: Phenoxyacetic Acid Herbicide Surrogate			
2.4-Dichlorophenyl Acetic Acid	19719-28-9	45	139

QUALITY CONTROL REPORT

Work Order	: **ES2320976**	Page	: 1 of 10
Client	: **RAMBOLL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN MAXWELL	Contact	: Customer Services ES
Address	: 100 PACIFIC HIGHWAY NORTH SYDNEY 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 318001679 Tarago Detailed Site Investigation	Date Samples Received	: 23-Jun-2023
Order number	: ----	Date Analysis Commenced	: 26-Jun-2023
C-O-C number	: ----	Issue Date	: 29-Jun-2023
Sampler	: Isobel Marshall, JENNY AULD		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 5136895)									
ES2320865-011	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	20	9	72.9	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	6	7	18.4	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	<5	52.2	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	16	29	57.5	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	26	27	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	59	67	13.6	0% - 50%
ES2320977-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	15	13	13.6	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	107	92	14.1	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	88	74	17.4	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	17	9	62.1	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	89	# 122	31.0	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5136908)									
ES2320865-014	Anonymous	EA055: Moisture Content	----	0.1	%	5.7	5.7	0.0	No Limit
ES2321075-001	Anonymous	EA055: Moisture Content	----	0.1	%	20.4	19.7	3.4	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5136897)									
ES2320865-011	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES2320977-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 5134879)									
ES2321132-001	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 5134879) - continued									
ES2321132-001	Anonymous	EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 5134879)									
ES2321132-001	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5134877)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5134877) - continued									
ES2321132-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5134878)									
ES2321132-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5136331)									
ES2320637-008	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES2321126-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5134878)									
ES2321132-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5136331)									
ES2320637-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES2321126-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 5136331)									
ES2320637-008	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080: BTEXN (QC Lot: 5136331) - continued									
ES2320637-008	Anonymous	EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES2321126-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 5136899)									
EB2317766-001	Anonymous	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
ES2321119-007	Anonymous	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (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 Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5136895)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	88.0	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	78.7	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	102	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	91.0	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	87.0	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	86.4	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	82.4	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5136897)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	77.0	70.0	125
EP068A: Organochlorine Pesticides (OC) (QCLot: 5134879)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	83.0	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	83.6	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	83.3	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	87.8	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	77.0	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	80.9	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.8	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	77.3	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.0	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.3	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	83.1	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	83.2	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	85.6	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.7	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	89.3	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.7	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	85.0	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	78.1	62.0	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	80.4	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	78.5	64.0	122

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike	Spike Recovery (%)	Acceptable Limits (%)
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 5134879) - continued								
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	83.8	54.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5134879)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	76.2	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	79.1	62.0	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	85.3	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	86.6	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	85.5	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	83.8	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	85.1	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	84.6	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	82.6	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	86.4	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	78.8	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	85.5	70.0	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	86.7	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	84.9	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.3	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	85.9	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	82.5	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	78.7	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	55.6	41.0	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5134877)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	103	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	99.3	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	89.4	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	97.6	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	99.9	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	95.7	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	103	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	101	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	92.6	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	97.9	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	97.3	68.0	116

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5134877) - continued								
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	98.7	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	88.0	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	84.1	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	82.4	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	81.0	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5134878)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	95.8	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	95.5	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	95.5	71.0	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5136331)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	117	72.2	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5134878)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	98.5	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	93.8	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	98.7	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5136331)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	112	72.4	133
EP080: BTEXN (QCLot: 5136331)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	121	76.0	124
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	114	78.5	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	111	77.4	121
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	112	78.2	121
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	112	81.3	121
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	111	78.8	122
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 5136899)								
EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	0.1 mg/kg	77.3	54.4	128
EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	0.1 mg/kg	78.6	45.5	130
EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	0.1 mg/kg	84.8	51.7	135
EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	0.1 mg/kg	74.6	60.0	130
EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	0.1 mg/kg	76.6	56.8	131
EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	0.1 mg/kg	78.3	50.0	141
EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	0.1 mg/kg	80.3	68.5	131
EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	0.1 mg/kg	84.8	50.8	141

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 5136899) - continued								
EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	0.1 mg/kg	79.5	40.8	126
EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	0.1 mg/kg	76.4	57.4	139
EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	0.1 mg/kg	60.5	38.9	137
EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	0.1 mg/kg	61.1	48.7	129
EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	0.1 mg/kg	60.2	49.4	106
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	0.1 mg/kg	81.3	53.2	128

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**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5136895)							
ES2320865-011	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	95.6	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	103	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	75.8	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	103	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	99.0	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	96.9	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	94.7	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5136897)							
ES2320865-011	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	98.7	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 5134879)							
ES2321132-001	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	104	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	106	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	96.0	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	98.4	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	103	70.0	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	112	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5134879)							
ES2321132-001	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	79.4	70.0	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	94.7	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	89.7	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	94.7	70.0	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	80.1	70.0	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5134877)							
ES2321132-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	97.4	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	112	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5134878)							
ES2321132-001	Anonymous	EP071: C10 - C14 Fraction	----	480 mg/kg	100	73.0	137
		EP071: C15 - C28 Fraction	----	3100 mg/kg	115	53.0	131
		EP071: C29 - C36 Fraction	----	2060 mg/kg	124	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5136331)							
ES2320637-008	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	105	60.4	142
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5134878)							
ES2321132-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	106	73.0	137
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	120	53.0	131
		EP071: >C34 - C40 Fraction	----	890 mg/kg	123	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5136331)							
ES2320637-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	109	61.1	142
EP080: BTEXN (QCLot: 5136331)							
ES2320637-008	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	108	62.1	122
		EP080: Toluene	108-88-3	2.5 mg/kg	106	66.6	119
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	109	67.4	123
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	108	66.4	121
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	110	70.7	121
		EP080: Naphthalene	91-20-3	2.5 mg/kg	99.4	61.1	115
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 5136899)							
EB2317766-001	Anonymous	EP202: Mecoprop	93-65-2	0.1 mg/kg	64.5	60.0	140
		EP202: MCPA	94-74-6	0.1 mg/kg	72.2	57.0	143
		EP202: 2.4-D	94-75-7	0.1 mg/kg	75.7	68.0	139
		EP202: Triclopyr	55335-06-3	0.1 mg/kg	83.7	51.0	145
		EP202: 2.4.5-T	93-76-5	0.1 mg/kg	70.4	57.0	142
		EP202: Picloram	1918-02-1	0.1 mg/kg	61.9	49.0	138
		EP202: Clopyralid	1702-17-6	0.1 mg/kg	60.6	49.0	149

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2320976**	Page	: 1 of 6
Client	: **RAMBOLL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN MAXWELL	Telephone	: +61-2-8784 8555
Project	: 318001679 Tarago Detailed Site Investigation	Date Samples Received	: 23-Jun-2023
Site	: ----	Issue Date	: 29-Jun-2023
Sampler	: Isobel Marshall, JENNY AULD	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **Duplicate outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005(ED093)T: Total Metals by ICP-AES	ES2320977--001	Anonymous	**Zinc**	7440-66-6	31.0 %	0% - 20%	**RPD exceeds LOR based limits**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) QC200-150623	**15-Jun-2023**	**----**	----	**----**	**27-Jun-2023**	29-Jun-2023	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) QC200-150623	**15-Jun-2023**	**27-Jun-2023**	12-Dec-2023	✓	**28-Jun-2023**	12-Dec-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) QC200-150623	**15-Jun-2023**	**27-Jun-2023**	13-Jul-2023	✓	**29-Jun-2023**	13-Jul-2023	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068) QC200-150623	**15-Jun-2023**	**26-Jun-2023**	29-Jun-2023	✓	**28-Jun-2023**	05-Aug-2023	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068) QC200-150623	**15-Jun-2023**	**26-Jun-2023**	29-Jun-2023	✓	**28-Jun-2023**	05-Aug-2023	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) QC200-150623	**15-Jun-2023**	**26-Jun-2023**	29-Jun-2023	✓	**28-Jun-2023**	05-Aug-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071) QC200-150623	**15-Jun-2023**	**26-Jun-2023**	29-Jun-2023	✓	**27-Jun-2023**	05-Aug-2023	✓
Soil Glass Jar - Unpreserved (EP080) QC200-150623	**15-Jun-2023**	**27-Jun-2023**	29-Jun-2023	✓	**28-Jun-2023**	29-Jun-2023	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071) QC200-150623	**15-Jun-2023**	**26-Jun-2023**	29-Jun-2023	✓	**27-Jun-2023**	05-Aug-2023	✓
Soil Glass Jar - Unpreserved (EP080) QC200-150623	**15-Jun-2023**	**27-Jun-2023**	29-Jun-2023	✓	**28-Jun-2023**	29-Jun-2023	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) QC200-150623	**15-Jun-2023**	**27-Jun-2023**	29-Jun-2023	✓	**28-Jun-2023**	29-Jun-2023	✓
EP202A: Phenoxyacetic Acid Herbicides by LCMS							
Soil Glass Jar - Unpreserved (EP202) QC200-150623	**15-Jun-2023**	**28-Jun-2023**	29-Jun-2023	✓	**28-Jun-2023**	07-Aug-2023	✓

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	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**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)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**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)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**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)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	**6.67**	**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 APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM 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.

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.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
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.

APPENDIX 4
HAND AUGER LOGS

BOREHOLE NUMBER HA01

CLIENT UGL Regional Linx **PROJECT NAME** Tarago Station Masters Cottage DSI

PROJECT NUMBER 318001679 **PROJECT LOCATION** Tarago, NSW

DATE STARTED 15-6-23 **COMPLETED** 15-6-23 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR **SLOPE** 90° **BEARING** 90°

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 150mm **LOGGED BY** JA/IM **CHECKED BY** KD

NOTES Soil weight pre asbestos sieving = 6.42 kg

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
HA					FILL	FILL: Gravelly SAND TOPSOIL, dark brown, dry, coarse to medium grained, rootlets, grass on surface, minor quartz gravels (1-2 mm)	SMC_HA01_0.05, Asbestos Bag, QC100, QC200, PID = 0.6	No Observable Contamination
						0.2 mbgl gravels (5-10 mm)	SMC_HA01_0.25, PID = 0.0	
					FILL	FILL: SAND, brown/light brown, dry, medium grained, minor clay content		No Observable Contamination
			0.5				SMC_HA01_0.5, PID = 0.0	
						Borehole HA01 terminated at 0.5m as target depth achieved		

BOREHOLE NUMBER HA02

CLIENT UGL Regional Linx **PROJECT NAME** Tarago Station Masters Cottage DSI

PROJECT NUMBER 318001679 **PROJECT LOCATION** Tarago, NSW

DATE STARTED 15-6-23 **COMPLETED** 15-6-23 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR **SLOPE** 90° **BEARING** 90°

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 150mm **LOGGED BY** JA/IM **CHECKED BY** KD

NOTES Soil weight pre asbestos sieving = 6.66 kg

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
HA					FILL	FILL: Gravelly SAND TOPSOIL, dark brown, dry, coarse to medium grained, rootlets, grass on surface, minor quartz gravels (1-2 mm)	SMC_HA02_0.05, Asbestos Bag, PID = 0.6	No Observable Contamination
							SMC_HA02_0.25, PID = 0.0	
					FILL	FILL: CLAYEY SAND: brown/grey slightly moist, medium to fine grained sands, consistent, loose		No Observable Contamination
			0.5		NAT	SANDY CLAY: grey/brown with orange mottles, moderate to high plasticity, firm to hard, slightly moist to moist	SMC_HA02_0.5, PID = 0.0	No Observable Contamination
						Borehole HA02 terminated at 0.5m as target depth achieved		

BOREHOLE NUMBER HA03

RAMBOLL

CLIENT UGL Regional Linx **PROJECT NAME** Tarago Station Masters Cottage DSI

PROJECT NUMBER 318001679 **PROJECT LOCATION** Tarago, NSW

DATE STARTED 15-6-23 **COMPLETED** 15-6-23 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR **SLOPE** 90° **BEARING** 90°

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 150mm **LOGGED BY** JA/IM **CHECKED BY** KD

NOTES Soil weight pre asbestos sieving = 6.74 kg

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
HA					FILL	FILL: Gravelly SAND TOPSOIL: dark brown, dry, coarse to medium grained, rootlets, grass on surface, minor quartz gravels (1-2 mm)	SMC_HA03_0.05, Asbestos Bag, PID = 0.6	No Observable Contamination
							SMC_HA03_0.25, PID = 0.0	
					FILL	FILL: SAND, brown/light brown, dry, medium grained, minor clay content		No Observable Contamination
			0.5				SMC_HA03_0.5, PID = 0.0	
						Borehole HA03 terminated at 0.5m as target depth achieved		

BOREHOLE NUMBER HA04

CLIENT UGL Regional Linx **PROJECT NAME** Tarago Station Masters Cottage DSI

PROJECT NUMBER 318001679 **PROJECT LOCATION** Tarago, NSW

DATE STARTED 15-6-23 **COMPLETED** 15-6-23 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR **SLOPE** 90° **BEARING** 90°

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 150mm **LOGGED BY** JA/IM **CHECKED BY** KD

NOTES Soil weight pre asbestos sieving = 11.61 kg

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
HA					FILL	FILL: Gravelly SAND TOPSOIL, dark brown, dry, coarse to medium grained, rootlets, grass on surface, minor quartz gravels (1-2 mm)	SMC_HA04_0.05, Asbestos Bag, PID = 0.1	No Observable Contamination
						0.1 mbgl some glass fragments, orange clay content, moist		
					FILL	FILL: CLAYEY SAND, dark brown, coarse grained sands, moist, minor gravels (0.5-2 mm)		No Observable Contamination
					FILL	FILL: SAND, pale brown, coarse-medium grained, slightly moist, loose	SMC_HA04_0.25, PID = 0.0	No Observable Contamination
							SMC_HA04_0.5, PID = 0.0	
			0.5		NAT	SANDY CLAY: brown/grey with orange mottles, minor black gravels (1-2 mm), dry to slightly moist, low to moderate plasticity, soft to firm		No Observable Contamination
						Borehole HA04 terminated at 0.5m as target depth achieved		

BOREHOLE / TEST PIT TARAGO_JA.GPJ GINT STD AUSTRALIA.GDT 18-7-23

BOREHOLE NUMBER HA05

CLIENT UGL Regional Linx **PROJECT NAME** Tarago Station Masters Cottage DSI

PROJECT NUMBER 318001679 **PROJECT LOCATION** Tarago, NSW

DATE STARTED 15-6-23 **COMPLETED** 15-6-23 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR **SLOPE** 90° **BEARING** 90°

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 150mm **LOGGED BY** JA/IM **CHECKED BY** KD

NOTES Soil weight pre asbestos sieving = 4.6 kg

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
HA					FILL	FILL: Gravelly SAND TOPSOIL, dark brown, dry, coarse to medium grained, rootlets, grass on surface, minor quartz gravels (1-2 mm)	SMC_HA05_0.05, Asbestos Bag, PID = 0.0	No Observable Contamination
					FILL	FILL: SAND, brown/light brown, dry, medium grained, minor clay content	SMC_HA05_0.25, PID = 0.0	No Observable Contamination
							SMC_HA05_0.5, PID = 0.0	
			0.5		NAT	CLAYEY SAND: brown/grey with orange mottles, minor black gravels (1-2 mm), dry to slightly moist, medium grained		No Observable Contamination
						Borehole HA05 terminated at 0.5m as target depth achieved		

BOREHOLE NUMBER HA06

CLIENT UGL Regional Linx **PROJECT NAME** Tarago Station Masters Cottage DSI

PROJECT NUMBER 318001679 **PROJECT LOCATION** Tarago, NSW

DATE STARTED 15-6-23 **COMPLETED** 15-6-23 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR **SLOPE** 90° **BEARING** 90°

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 150mm **LOGGED BY** JA/IM **CHECKED BY** KD

NOTES Soil weight pre asbestos sieving = 4.67 kg

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
HA					FILL	FILL: Gravelly SAND TOPSOIL, dark brown, dry, coarse to medium grained, rootlets, grass on surface, minor quartz gravels (1-2 mm)	SMC_HA06_0.05, Asbestos Bag, PID = 0.0	No Observable Contamination
					FILL	FILL: SAND, dark grey, dry, coarse to medium grained, loose	SMC_HA06_0.25, PID = 0.0	No Observable Contamination
						0.3 mbgl becoming light grey		
						0.45 - 0.5 mbgl, hard rock gravels (possibly terracotta?)	SMC_HA06_0.5, PID = 0.0	
			0.5			Borehole HA06 terminated at 0.5m as target depth achieved		

BOREHOLE NUMBER HA07

CLIENT UGL Regional Linx **PROJECT NAME** Tarago Station Masters Cottage DSI

PROJECT NUMBER 318001679 **PROJECT LOCATION** Tarago, NSW

DATE STARTED 15-6-23 **COMPLETED** 15-6-23 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR **SLOPE** 90° **BEARING** 90°

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 150mm **LOGGED BY** JA/IM **CHECKED BY** KD

NOTES Soil weight pre asbestos sieving = 8.34 kg

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
HA					FILL	FILL: Gravelly SAND TOPSOIL, dark brown, dry, coarse to medium grained, rootlets, grass on surface, minor quartz gravels (1-2 mm)	SMC_HA07_0.05, Asbestos Bag, PID = 0.0	No Observable Contamination
					FILL	FILL: Clayey SAND, dark brown, grey, slightly moist, medium grained sands	SMC_HA07_0.25, PID = 0.0	No Observable Contamination
					FILL	FILL: Sandy CLAY, light brown, moist, potentially reworked natural?	SMC_HA07_0.5, PID = 0.0	No Observable Contamination
			0.5			Borehole HA07 terminated at 0.5m as target depth achieved		

BOREHOLE NUMBER HA08

RAMBOLL

CLIENT UGL Regional Linx **PROJECT NAME** Tarago Station Masters Cottage DSI

PROJECT NUMBER 318001679 **PROJECT LOCATION** Tarago, NSW

DATE STARTED 15-6-23 **COMPLETED** 15-6-23 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR **SLOPE** 90° **BEARING** 90°

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 150mm **LOGGED BY** JA/IM **CHECKED BY** KD

NOTES Soil weight pre asbestos sieving = 9.07 kg

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
HA					FILL	FILL: Gravelly SAND TOPSOIL, dark brown, dry, coarse to medium grained, rootlets, grass on surface, minor quartz gravels (1-2 mm)	SMC_HA08_0.05, Asbestos Bag, PID = 0.0	No Observable Contamination
					FILL	FILL: Clayey SAND, dark brown, grey, slightly moist, medium grained sands	SMC_HA08_0.25, PID = 0.0	No Observable Contamination
			0.5		FILL	FILL: Sandy CLAY, light brown, moist, potentially reworked natural?	SMC_HA08_0.5, PID = 0.0	No Observable Contamination
						Borehole HA08 terminated at 0.5m as target depth achieved		

APPENDIX 5
RESULT SUMMARY TABLES

Table 1: Soil Analytical Results - Tarago Station Masters Cottage DSI
Sample Date - 2023-06-15
Location ID: Tarago, NSW

Client: UGL Regional Linx

									BTEXN							Metals								Polycyclic Aromatic Hydrocarbons											
									Benzene	Toluene	Ethylbenzene	ortho-Xylene	Total Xylenes	meta- & para-Xylene	Naphthalene	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(A)pyrene TEQ (half LOR)	Benzo(A)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ (zero)	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene
								LOR	0.1	0.1	0.1	0.1	0.3	0.2	0.5	2	0.4	5	5	5	0.1	5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
								Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
								Action Levels																											
								NEPM - HIL A RESIDENTIAL (2013)[1]								100	20	100	6000	300	40	400	7400							3					
								NEPM - HIL D COMM/INDUSTRIAL (2013)[2]								3000	900	3600	240000	1500	730	6000	400000							40					
								NEPM - HSL SOIL A/B SAND 0-<1M[3]	0.5	160	55				3																					
								NEPM - HSL SOIL D SAND 0-≤1M[4]	3																												
								NEPM - EIL - RESIDENTIAL V.CONS (2013)[5]							170	100		190	95	1100		30	70												
								NEPM - EIL - COMM/INDUST V.CONS (2013)[6]							370	160		310	140	1800		55	110												
								NEPM ESL - URB/RES/OS - COARSE[7]	50	85	70		105														0.7							
								NEPM ESL - COMM/IND - COARSE[8]	75	135	165		180														0.7							
								NEPM - HSL A DIRECT CONTACT[9]	100	14000	4500		12000		1400																				
								NEPM - HSL D DIRECT CONTACT[10]	430	99000	27000		81000		11000																				
Sample Location	**Date Sampled**	**Sample ID**	**Depth Range (m)**	**Soil Type**	**Soil Consistency**	**Sample Type**																													
SMC_HA01	15/06/2023	SMC-HA01-0.05	0 - 0.05	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**13**	**3.3**	**13**	**95**	**330**	< 0.1	**5.6**	**490[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA01-0.25	0.15 - 0.25	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**14**	**2.1**	**30**	**50**	**140**	< 0.1	**9.1**	**530[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
SMC_HA02	15/06/2023	SMC-HA02-0.05	0 - 0.05	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**5.4**	**3.4**	**8.5**	**78**	**190**	< 0.1	< 5	**490[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA02-0.5	0.4 - 0.5	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**9**	< 0.4	**30**	**20**	**30**	< 0.1	**12**	**41**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
SMC_HA03	15/06/2023	SMC-HA03-0.05	0 - 0.05	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**6.8**	**3.1**	**8.7**	**65**	**310**	< 0.1	< 5	**640[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA03-0.25	0.15 - 0.25	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**3**	< 0.4	**8.8**	**7.7**	**37**	< 0.1	< 5	**150[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
SMC_HA04	15/06/2023	SMC-HA04-0.05	0 - 0.05	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**17**	**4.7**	**14**	**160[5,6]**	**690**	**0.1**	**6.2**	**730[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA04-0.5	0.4 - 0.5	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**6.3**	< 0.4	**19**	**8.6**	**17**	< 0.1	**7.9**	**400[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
SMC_HA05	15/06/2023	SMC-HA05-0.05	0 - 0.05	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**36**	**7.8**	**11**	**330[5,6]**	**850**	< 0.1	< 5	**960[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA05-0.25	0.15 - 0.25	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**66**	< 0.4	**11**	**8.5**	**17**	< 0.1	< 5	**200[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
SMC_HA06	15/06/2023	SMC-HA06-0.05	0 - 0.05	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**33**	**12**	**11**	**300[5,6]**	**1300[1,5]**	**0.2**	< 5	**2000[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA06-0.5	0.4 - 0.5	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**2.8**	< 0.4	**5.4**	**5.4**	**22**	< 0.1	< 5	**48**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
SMC_HA07	15/06/2023	SMC-HA07-0.05	0 - 0.05	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**20**	**13**	**11**	**440[5,6]**	**1600[1,2,5]**	**0.2**	< 5	**1400[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA07-0.25	0.15 - 0.25	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**12**	**4.1**	**8.7**	**160[5,6]**	**650**	**0.1**	< 5	**830[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
SMC_HA08	15/06/2023	SMC-HA08-0.05	0 - 0.05	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**7.9**	**1.8**	**16**	**40**	**120**	< 0.1	**6.8**	**360[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA08-0.5	0.4 - 0.5	SAND	COARSE	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.5	**3.5**	**1.9**	**12**	< 5	**17**	< 0.1	< 5	**390[5,6]**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	**1.2**	< 0.5	< 0.5	< 0.5	< 0.5

Legend:

- Not analysed / not calculated

LOR – Limit of Recording

Sample Type: N - Primary, FD - Duplicate, FT - Triplicate

mg/kg = milligrams per kilogram

EIL - V. Cons = very conservative as most sensitive conditions and NEPM criteria has been adopted for the purposes of characterisation

Action Levels:

[1]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Health-based Investigation Levels (HIL) 'A' Residential

[2]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Health-based Investigation Levels (HIL) 'D' Commercial / Industrial

[3]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A/B for Soil Vapour Intrusion - Low-High Density Residential (Sand)

[4]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) D for Soil Vapour Intrusion - Commercial/Industrial (Sand)

[5]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Ecological Investigation Levels (EIL) - Urban residential and public open space.

[6]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Ecological Investigation Levels (EIL) - Commercial/Industrial

[7]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Ecological Screening Levels (ESL) for TPH Fractions F1 - F4, BTEX and Benzo(a)pyrene in soil - Urban, Residential and Public Open Space

[8]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Ecological Screening Levels (ESL) for TPH Fractions F1 - F4, BTEX and Benzo(a)pyrene in soil - C/ I

[9]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A for Direct Contact

[10]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A for Direct Contact

Exceeds two or more action levels - see superscripts for specific action levels

Table 1: Soil Analytical Results - Tarago Station Masters Cottage DSI
Sample Date - 2023-06-15
Location ID: Tarago, NSW

Client: UGL Regional Linx

							Polycyclic Aromatic Hydrocarbons								Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons NEPM 2013							Acid Herbicides						
							Dibenz(a.h)anthracene	Fluoranthene	Fluorene	Indeno(1.2.3.cd)pyrene	Phenanthrene	Pyrene	Total PAH	Benzo(b+j)fluoranthene	C10 - C14 Fraction	C10 - C36 Fraction (sum)	C15 - C28 Fraction	C29 - C36 Fraction	C6 - C9 Fraction	>C10 - C40 Fraction (sum)	>C10 - C16 Fraction (minus Naphthalene)	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	TRH C6-C10	TRH C6-C10 less BTEX (F1)	2.4-D	2.4-DB	2.4.5-T	2.4.5-TP (Silvex)	Ioxynil	Dicamba	2.4-DP
							LOR	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	20	50	50	50	10	50	50	50	100	100	10	10	0.02	0.02	0.02	0.02	0.5	0.02	0.02
							Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
							Action Levels																										
							NEPM - HIL A RESIDENTIAL (2013)[1]						300													900		600				
							NEPM - HIL D COMM/INDUSTRIAL (2013)[2]						4000													9000		5000				
							NEPM - HSL SOIL A/B SAND 0-<1M[3]														110				45								
							NEPM - HSL SOIL D SAND 0-<1M[4]																		260	260							
							NEPM - EIL - RESIDENTIAL V.CONS (2013)[5]																										
							NEPM - EIL - COMM/INDUST V.CONS (2013)[6]																										
							NEPM ESL - URB/RES/OS - COARSE[7]															120	300	2800	180								
							NEPM ESL - COMM/IND - COARSE[8]															170	1700	3300	215								
							NEPM - HSL A DIRECT CONTACT[9]															3300	4500	6300	4400								
							NEPM - HSL D DIRECT CONTACT[10]															20000	27000	38000	26000								
Sample Location	**Date Sampled**	**Sample ID**	**Depth Range (m)**	**Soil Type**	**Soil Consistency**	**Sample Type**																											
SMC_HA01	15/06/2023	SMC-HA01-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA01-0.25	0.15 - 0.25	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
SMC_HA02	15/06/2023	SMC-HA02-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
	15/06/2023	SMC-HA02-0.5	0.4 - 0.5	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
SMC_HA03	15/06/2023	SMC-HA03-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA03-0.25	0.15 - 0.25	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
SMC_HA04	15/06/2023	SMC-HA04-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
	15/06/2023	SMC-HA04-0.5	0.4 - 0.5	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
SMC_HA05	15/06/2023	SMC-HA05-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA05-0.25	0.15 - 0.25	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
SMC_HA06	15/06/2023	SMC-HA06-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
	15/06/2023	SMC-HA06-0.5	0.4 - 0.5	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
SMC_HA07	15/06/2023	SMC-HA07-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	15/06/2023	SMC-HA07-0.25	0.15 - 0.25	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
SMC_HA08	15/06/2023	SMC-HA08-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	< 50	< 50	< 50	< 20	< 100	< 50	< 50	< 100	< 100	< 20	< 20	-	-	-	-	-	-	-
	15/06/2023	SMC-HA08-0.5	0.4 - 0.5	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 20	**100**	< 50	**100**	< 20	**180**	< 50	< 50	< 100	**180**	< 20	< 20	-	-	-	-	-	-	-

Legend:

- Not analysed / not calculated

LOR – Limit of Recording

Sample Type: N - Primary, FD - Duplicate, FT - Triplicate

mg/kg = milligrams per kilogram

EIL - V. Cons = very conservative as most sensitive conditions and NEPM criteria has been adopted for the purposes of characterisation

Action Levels:

[1]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Health-based Investigation Levels (HIL) 'A' Residential

[2]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Health-based Investigation Levels (HIL) 'D' Commercial / Industrial

[3]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A/B for Soil Vapour Intrusion - Low-High Density Residential (Sand)

[4]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) D for Soil Vapour Intrusion - Commercial/Industrial (Sand)

[5]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Ecological Investigation Levels (EIL) - Urban residential and public open space.

[6]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Ecological Investigation Levels (EIL) - Commercial/Industrial

[7]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Ecological Screening Levels (ESL) for TPH Fractions F1 - F4, BTEX and Benzo(a)pyrene in soil - Urban, Residential and Public Open Space

[8]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Ecological Screening Levels (ESL) for TPH Fractions F1 - F4, BTEX and Benzo(a)pyrene in soil - C/ I

[9]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A for Direct Contact

[10]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A for Direct Contact

Exceeds two or more action levels - see superscripts for specific action levels

Table 1: Soil Analytical Results - Tarago Station Masters Cottage DSI
Sample Date - 2023-06-15
Location ID: Tarago, NSW

Client: UGL Regional Linx

							Acid Herbicides					Organochlorine Pesticides																							
							4,6-DINITRO-2-METHYLPHENOL	Dinoseb (2,4-dinitro-6-sec-butylphenol)	MCPA	MCPB	Mecoprop	Chlordane (alpha +gamma)	4.4-DDD	4.4-DDE	4.4-DDT	Aldrin	alpha-BHC	alpha-Endosulfan	beta-BHC	beta-Endosulfan	cis-Chlordane	delta-BHC	Dieldrin	Endosulfan	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC	Heptachlor	Heptachlor epoxide	Hexachlorobenzene (HCB)
						LOR	0.5	0.5	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
						Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
						Action Levels																											
						NEPM - HIL A RESIDENTIAL (2013)[1]			600	600	600													270		10				6		10
						NEPM - HIL D COMM/INDUSTRIAL (2013)[2]			5000	5000	5000													2000		100				50		80
						NEPM - HSL SOIL A/B SAND 0-<1M[3]																											
						NEPM - HSL SOIL D SAND 0-<1M[4]																											
						NEPM - EIL - RESIDENTIAL V.CONS (2013)[5]									180																		
						NEPM - EIL - COMM/INDUST V.CONS (2013)[6]									640																		
						NEPM ESL - URB/RES/OS - COARSE[7]																											
						NEPM ESL - COMM/IND - COARSE[8]																											
						NEPM - HSL A DIRECT CONTACT[9]																											
						NEPM - HSL D DIRECT CONTACT[10]																											
Sample Location	**Date Sampled**	**Sample ID**	**Depth Range (m)**	**Soil Type**	**Soil Consistency**	**Sample Type**																											
SMC_HA01	15/06/2023	SMC-HA01-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	-	< 0.05	< 0.05	**0.07**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	15/06/2023	SMC-HA01-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA02	15/06/2023	SMC-HA02-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA02-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA03	15/06/2023	SMC-HA03-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	15/06/2023	SMC-HA03-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA04	15/06/2023	SMC-HA04-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA04-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA05	15/06/2023	SMC-HA05-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	15/06/2023	SMC-HA05-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA06	15/06/2023	SMC-HA06-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA06-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA07	15/06/2023	SMC-HA07-0.05	0 - 0.05	SAND	COARSE	N	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	15/06/2023	SMC-HA07-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA08	15/06/2023	SMC-HA08-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA08-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Legend:

- Not analysed / not calculated

LOR – Limit of Recording

Sample Type: N - Primary, FD - Duplicate, FT - Triplicate

mg/kg = milligrams per kilogram

EIL - V. Cons = very conservative as most sensitive conditions and NEPM criteria has been adopted for the purposes of characterisation

Action Levels:

[1]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Health-based Investigation Levels (HIL) 'A' Residential

[2]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Health-based Investigation Levels (HIL) 'D' Commercial / Industrial

[3]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A/B for Soil Vapour Intrusion - Low-High Density Residential (Sand)

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[7]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Ecological Screening Levels (ESL) for TPH Fractions F1 - F4, BTEX and Benzo(a)pyrene in soil - Urban, Residential and Public Open Space

[8]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Ecological Screening Levels (ESL) for TPH Fractions F1 - F4, BTEX and Benzo(a)pyrene in soil - C/ I

[9]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A for Direct Contact

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Exceeds two or more action levels - see superscripts for specific action levels

Table 1: Soil Analytical Results - Tarago Station Masters Cottage DSI
Sample Date - 2023-06-15
Location ID: Tarago, NSW

Client: UGL Regional Linx

									Organochlorine Pesticides																						
									Methoxychlor	Total DDT/DDE/DDD	trans-Chlordane	Toxaphene	Aldrin plus Dieldrin	Vic EPA IWRG 621 OCP (Total)*	Vic EPA IWRG 621 Other OCP (Total)*	NALED	Azinphos Methyl	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	EPN	Ethion	Ethoprop	Fenamiphos	Fenitrothion
									Organophosphorus Pesticides																							
LOR									0.05	0.05	0.05	0.5	0.05	0.1	0.1	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	2	0.2	0.2	0.05	0.05	0.05	0.2	0.2	0.05	0.2	0.05	0.2
Units									mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Action Levels																																		
NEPM - HIL A RESIDENTIAL (2013)[1]									300	240		20	6								160												
NEPM - HIL D COMM/INDUSTRIAL (2013)[2]									2500	3600		160	45								2000												
NEPM - HSL SOIL A/B SAND 0-<1M[3]																																		
NEPM - HSL SOIL D SAND 0-<1M[4]																																		
NEPM - EIL - RESIDENTIAL V.CONS (2013)[5]																																		
NEPM - EIL - COMM/INDUST V.CONS (2013)[6]																																		
NEPM ESL - URB/RES/OS - COARSE[7]																																		
NEPM ESL - COMM/IND - COARSE[8]																																		
NEPM - HSL A DIRECT CONTACT[9]																																		
NEPM - HSL D DIRECT CONTACT[10]																																		
Sample Location	**Date Sampled**	**Sample ID**	**Depth Range (m)**	**Soil Type**	**Soil Consistency**	**Sample Type**																												
SMC_HA01	15/06/2023	SMC-HA01-0.05	0 - 0.05	SAND	COARSE	N	< 0.05	< 0.05	-	< 0.5	< 0.05	< 0.1	< 0.1	< 0.2	< 0.2	-	-	< 0.2	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	< 0.2
	15/06/2023	SMC-HA01-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA02	15/06/2023	SMC-HA02-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA02-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA03	15/06/2023	SMC-HA03-0.05	0 - 0.05	SAND	COARSE	N	< 0.05	< 0.05	-	< 0.5	< 0.05	< 0.1	< 0.1	< 0.2	< 0.2	-	-	< 0.2	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	< 0.2
	15/06/2023	SMC-HA03-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA04	15/06/2023	SMC-HA04-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA04-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA05	15/06/2023	SMC-HA05-0.05	0 - 0.05	SAND	COARSE	N	< 0.05	< 0.05	-	< 0.5	< 0.05	< 0.1	< 0.1	< 0.2	< 0.2	-	-	< 0.2	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	< 0.2
	15/06/2023	SMC-HA05-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA06	15/06/2023	SMC-HA06-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA06-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA07	15/06/2023	SMC-HA07-0.05	0 - 0.05	SAND	COARSE	N	< 0.05	< 0.05	-	< 0.5	< 0.05	< 0.1	< 0.1	< 0.2	< 0.2	-	-	< 0.2	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	< 0.2
	15/06/2023	SMC-HA07-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA08	15/06/2023	SMC-HA08-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA08-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Legend:

- Not analysed / not calculated

LOR – Limit of Recording

Sample Type: N - Primary, FD - Duplicate, FT - Triplicate

mg/kg = milligrams per kilogram

EIL - V. Cons = very conservative as most sensitive conditions and NEPM criteria has been adopted for the purposes of characterisation

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[4]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) D for Soil Vapour Intrusion - Commercial/Industrial (Sand)

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Exceeds two or more action levels - see superscripts for specific action levels

Table 1: Soil Analytical Results - Tarago Station Masters Cottage DSI
Sample Date - 2023-06-15
Location ID: Tarago, NSW

Client: UGL Regional Linx

							Organophosphorus Pesticides																
							Fensulfothion	Fenthion	Malathion	Mevinphos (Phosdrin)	Monocrotophos	Parathion	Parathion-methyl	Phorate	Pirimphos-ethyl	Prothiofos	Ronnel	Trichloronate	Omethoate	Pirimiphos-methyl	Pyrazophos	Terbufos	Tetrachlorvinphos	Prothiophos (Tokuthion)	Merphos	Bolstar (Sulprofos)
						LOR	0.2	0.05	0.05	0.2	0.2	0.2	0.2	0.2	0.05	0.05	0.2	0.2	2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
						Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
						Action Levels																	
						NEPM - HIL A RESIDENTIAL (2013)[1]																	
						NEPM - HIL D COMM/INDUSTRIAL (2013)[2]																	
						NEPM - HSL SOIL A/B SAND 0-<1M[3]																	
						NEPM - HSL SOIL D SAND 0-<1M[4]																	
						NEPM - EIL - RESIDENTIAL V.CONS (2013)[5]																	
						NEPM - EIL - COMM/INDUST V.CONS (2013)[6]																	
						NEPM ESL - URB/RES/OS - COARSE[7]																	
						NEPM ESL - COMM/IND - COARSE[8]																	
						NEPM - HSL A DIRECT CONTACT[9]																	
						NEPM - HSL D DIRECT CONTACT[10]																	
Sample Location	**Date Sampled**	**Sample ID**	**Depth Range (m)**	**Soil Type**	**Soil Consistency**	**Sample Type**																	
SMC_HA01	15/06/2023	SMC-HA01-0.05	0 - 0.05	SAND	COARSE	N	< 0.2	< 0.2	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	-	-	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	15/06/2023	SMC-HA01-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA02	15/06/2023	SMC-HA02-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA02-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA03	15/06/2023	SMC-HA03-0.05	0 - 0.05	SAND	COARSE	N	< 0.2	< 0.2	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	-	-	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	15/06/2023	SMC-HA03-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA04	15/06/2023	SMC-HA04-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA04-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA05	15/06/2023	SMC-HA05-0.05	0 - 0.05	SAND	COARSE	N	< 0.2	< 0.2	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	-	-	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	15/06/2023	SMC-HA05-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA06	15/06/2023	SMC-HA06-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA06-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA07	15/06/2023	SMC-HA07-0.05	0 - 0.05	SAND	COARSE	N	< 0.2	< 0.2	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	-	-	< 0.2	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	15/06/2023	SMC-HA07-0.25	0.15 - 0.25	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC_HA08	15/06/2023	SMC-HA08-0.05	0 - 0.05	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/06/2023	SMC-HA08-0.5	0.4 - 0.5	SAND	COARSE	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Legend:

- Not analysed / not calculated

LOR – Limit of Recording

Sample Type: N - Primary, FD - Duplicate, FT - Triplicate

mg/kg = milligrams per kilogram

EIL - V. Cons = very conservative as most sensitive conditions and NEPM criteria has been adopted for the purposes of characterisation

Action Levels:

[1]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Health-based Investigation Levels (HIL) 'A' Residential

[2]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Health-based Investigation Levels (HIL) 'D' Commercial / Industrial

[3]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A/B for Soil Vapour Intrusion - Low-High Density Residential (Sand)

[4]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) D for Soil Vapour Intrusion - Commercial/Industrial (Sand)

[5]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Ecological Investigation Levels (EIL) - Urban residential and public open space.

[6]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Ecological Investigation Levels (EIL) - Commercial/Industrial

[7]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Ecological Screening Levels (ESL) for TPH Fractions F1 - F4, BTEX and Benzo(a)pyrene in soil - Urban, Residential and Public Open Space

[8]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Ecological Screening Levels (ESL) for TPH Fractions F1 - F4, BTEX and Benzo(a)pyrene in soil - C/ I

[9]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A for Direct Contact

[10]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Soil Health Screening Levels (HSL) A for Direct Contact

Exceeds two or more action levels - see superscripts for specific action levels

Table 2: Soil Analytical Results - Asbestos
Sample Date - 2023-06-15
Location ID: Tarago, NSW
Client: UGL Regional Linx

Sample Location	Date Sampled	Sample ID	Depth Range (m)	Soil Type	Soil Consistency	Sample Type	Bulk Sample	Sample Volume #	ACM on Surface	ACM in Bulk Sample	Volume of subsample^	Absestos Fines (AF)	Fibrous Asbestos (FA)	Presence of Respirable Asbestos Fibres?	Presence of other Fibres?	Total AF/FA	Percentage ACM (bonded asbestos)	Percentage FA/AF (friable asbestos)
						LOR	0.01	0.1	--		1	0.0001	0.0001	--	--	0.0001		
						Units	kg	L	--	g	g	g	g	--	--	g	% w/w	% w/w
						Action Levels												
NEPM - HIL D COMM/INDUSTRIAL (2013)[1]									None visible								0.05	0.001
Tarago Station Masters Cottage	15/06/2023	SMC-HA01-0.05	0.0 - 0.05	Fill - Gravelly Sand topsoil	COARSE GRAINED	N	6.42	10.6	ND	ND	358	ND	ND	NA	Y - OF	ND	0.00	0.000
	15/06/2023	SMC-HA02-0.05	0.0 - 0.05	Fill - Gravelly Sand topsoil	COARSE GRAINED	N	6.66	11.0	ND	ND	171	ND	ND	NA	Y - OF	ND	0.00	0.000
	15/06/2023	SMC-HA03-0.05	0.0 - 0.05	Fill - Gravelly Sand topsoil	COARSE GRAINED	N	6.74	11.1	ND	ND	384	ND	ND	NA	Y - OF	ND	0.00	0.000
	15/06/2023	SMC-HA04-0.05	0.0 - 0.05	Fill - Gravelly Sand topsoil	COARSE GRAINED	N	11.61	19.2	ND	ND	493	ND	ND	NA	Y - OF	ND	0.00	0.000
	15/06/2023	SMC-HA05-0.05	0.0 - 0.05	Fill - Gravelly Sand topsoil	COARSE GRAINED	N	4.6	**7.6**	ND	ND	356	ND	ND	NA	Y - OF	ND	0.00	0.000
	15/06/2023	SMC-HA06-0.05	0.0 - 0.05	Fill - Gravelly Sand topsoil	COARSE GRAINED	N	4.67	**7.7**	ND	ND	325	ND	ND	NA	Y - OF	ND	0.00	0.000
	15/06/2023	SMC-HA07-0.05	0.0 - 0.05	Fill - Gravelly Sand topsoil	COARSE GRAINED	N	8.34	13.8	ND	ND	361	ND	ND	NA	Y - OF	ND	0.00	0.000
	15/06/2023	SMC-HA08-0.05	0.0 - 0.05	Fill - Gravelly Sand topsoil	COARSE GRAINED	N	9.07	15.0	ND	ND	478	ND	ND	NA	Y - OF	ND	0.00	0.000

Legend:
- Not analysed / not calculated
ND - Not Detected (laboratory or field)
Sample Type: N - Primary
% = percent
w/w = weight for weight
Y - Yes/ N - No
Types of other fibres: OF - Organic Fibres; SMF - Synthetic Mineral Fibres

LOR – Limit of Recording
Soil Density of 1.65 kg/L has been used for calculations based on the gravelly sand material encountered.
^ Subsample weight refers to the fines which were provided to the laboratory
* Indicates NATA accreditation does not cover the performance of this service
BOLD indicates non-conformance

Action Levels:
[1]National Environmental Protection Council (NEPC) 2013 Amendment of the National Enviromental Protection Measure (NEPM) 1999. Health-based Investigation Levels (HIL) 'D' Commercial / Industrial

Table 3: QAQC Analytical Results - Relative Percent Differences
Sample Date - 2023-06-15
Location ID: Tarago, NSW
Client: UGL Regional Linx

Location:	SMC_HA01	SMC_HA01	SMC_HA01
Sample ID:	SMC-HA01-0.05	QC100-15.623	QC200_150623
Date Sampled:	15/06/2023	15/06/2023	15/06/2023
Sample Type:	**Primary**	**Secondary**	**Tertiary**

Analyte	Detection Limit Pri.	Detection Limit Dup.	Detection Limit Tri.	Units				Primary vs. Duplicate	Primary vs. Triplicate	Category1	Category2
>C10 - C16 Fraction (minus Naphthalene)	50	50	50	mg/kg	<50	<50	<50	0.00%	0.00%	Pass	Pass
>C10 - C40 Fraction (sum)	100	100	50	mg/kg	<100	<100	<50	0.00%	**66.67%**	Pass	Pass-1
2.4-D	0.5	0.5	0.02	mg/kg	<0.5	<0.5	<0.02	0.00%	**184.62%**	Pass	Pass-1
2.4-DB	0.5	0.5	0.02	mg/kg	<0.5	<0.5	<0.02	0.00%	**184.62%**	Pass	Pass-1
2.4-DP	0.5	0.5	0.02	mg/kg	<0.5	<0.5	<0.02	0.00%	**184.62%**	Pass	Pass-1
2.4.5-T	0.5	0.5	0.02	mg/kg	<0.5	<0.5	<0.02	0.00%	**184.62%**	Pass	Pass-1
2.4.5-TP (Silvex)	0.5	0.5	0.02	mg/kg	<0.5	<0.5	<0.02	0.00%	**184.62%**	Pass	Pass-1
4,6-DINITRO-2-METHYLPHENOL	0.5	0.5	-	mg/kg	<0.5	<0.5	-	0.00%	-	Pass	
4.4-DDD	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
4.4-DDE	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
4.4-DDT	0.05	0.05	0.2	mg/kg	<0.05	<0.05	<0.2	0.00%	**120.00%**	Pass	Pass-1
Acenaphthene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Acenaphthylene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Aldrin	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Aldrin plus Dieldrin	0.05	0.05	-	mg/kg	<0.05	<0.05	-	0.00%	-	Pass	
alpha-BHC	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
alpha-Endosulfan	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Anthracene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Arsenic Filtered, T	2	2	5	mg/kg	13	9.3	11	**33.18%**	16.67%	Pass-1	Pass
Azinphos Methyl	0.2	0.2	0.05	mg/kg	<0.2	<0.2	<0.05	0.00%	**120.00%**	Pass	Pass-1
Benz(a)anthracene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Benzene	0.1	0.1	0.2	mg/kg	<0.1	<0.1	<0.2	0.00%	**66.67%**	Pass	Pass-1
Benzo(a)pyrene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Benzo(A)pyrene TEQ (half LOR)	0.5	0.5	0.5	mg/kg	0.6	0.6	0.6	0.00%	0.00%	Pass	Pass
Benzo(A)pyrene TEQ (LOR)	0.5	0.5	0.5	mg/kg	1.2	1.2	1.2	0.00%	0.00%	Pass	Pass
Benzo(A)pyrene TEQ (zero)	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Benzo(b+j)fluoranthene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Benzo(g.h.i)perylene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Benzo(k)fluoranthene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
beta-BHC	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
beta-Endosulfan	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Bolstar (Sulprofos)	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Cadmium Filtered, T	0.4	0.4	1	mg/kg	3.3	2.5	2	27.59%	**49.06%**	Pass	Pass-1
Chlordane (alpha +gamma)	0.1	0.1	0.05	mg/kg	<0.1	<0.1	<0.05	0.00%	**66.67%**	Pass	Pass-1
Chlorfenvinphos	0.2	0.2	0.05	mg/kg	<0.2	<0.2	<0.05	0.00%	**120.00%**	Pass	Pass-1
Chlorpyrifos	0.2	0.2	0.05	mg/kg	<0.2	<0.2	<0.05	0.00%	**120.00%**	Pass	Pass-1
Chlorpyrifos-methyl	0.2	0.2	0.05	mg/kg	<0.2	<0.2	<0.05	0.00%	**120.00%**	Pass	Pass-1
Chromium Filtered, T	5	5	2	mg/kg	13	9	11	**36.36%**	16.67%	Pass-1	Pass
Chrysene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Copper Filtered, T	5	5	5	mg/kg	95	67	70	**34.57%**	**30.30%**	Pass-2	Pass-2
Coumaphos	2	2	-	mg/kg	<2	<2	-	0.00%	-	Pass	
delta-BHC	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Demeton-O	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Demeton-S	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Diazinon	0.2	0.2	0.05	mg/kg	<0.2	<0.2	<0.05	0.00%	**120.00%**	Pass	Pass-1
Dibenz(a.h)anthracene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Dicamba	0.5	0.5	0.02	mg/kg	<0.5	<0.5	<0.02	0.00%	**184.62%**	Pass	Pass-1
Dichlorvos	0.2	0.2	0.05	mg/kg	<0.2	<0.2	<0.05	0.00%	**120.00%**	Pass	Pass-1
Dieldrin	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Dimethoate	0.2	0.2	0.05	mg/kg	<0.2	<0.2	<0.05	0.00%	**120.00%**	Pass	Pass-1
Dinoseb (2,4-dinitro-6-sec-butylphenol)	0.5	0.5	-	mg/kg	<0.5	<0.5	-	0.00%	-	Pass	
Disulfoton	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Endosulfan sulfate	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Endrin	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Endrin aldehyde	0.05	0.05	0.05	mg/kg	0.07	<0.05	<0.05	**33.33%**	**33.33%**	Pass-1	Pass-1
Endrin ketone	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
EPN	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Ethion	0.2	0.2	0.05	mg/kg	<0.2	<0.2	<0.05	0.00%	**120.00%**	Pass	Pass-1

Ethoprop	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Ethylbenzene	0.1	0.1	0.5	mg/kg	<0.1	<0.1	<0.5	0.00%	**133.33%**	Pass	Pass-1
Fenitrothion	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Fensulfothion	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Fenthion	0.2	0.2	0.05	mg/kg	<0.2	<0.2	<0.05	0.00%	**120.00%**	Pass	Pass-1
Fluoranthene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Fluorene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
gamma-BHC	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Heptachlor	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Heptachlor epoxide	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Hexachlorobenzene (HCB)	0.05	0.05	0.05	mg/kg	<0.05	<0.05	<0.05	0.00%	0.00%	Pass	Pass
Indeno(1.2.3.cd)pyrene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Ioxynil	0.5	0.5	-	mg/kg	<0.5	<0.5	-	0.00%	-	Pass	
Lead Filtered, T	5	5	5	mg/kg	330	250	274	27.59%	18.54%	Pass	Pass
Malathion	0.2	0.2	0.05	mg/kg	<0.2	<0.2	<0.05	0.00%	**120.00%**	Pass	Pass-1
MCPA	0.5	0.5	0.02	mg/kg	<0.5	<0.5	<0.02	0.00%	**184.62%**	Pass	Pass-1
MCPB	0.5	0.5	0.02	mg/kg	<0.5	<0.5	<0.02	0.00%	**184.62%**	Pass	Pass-1
Mecoprop	0.5	0.5	0.02	mg/kg	<0.5	<0.5	<0.02	0.00%	**184.62%**	Pass	Pass-1
Mercury Filtered, T	0.1	0.1	0.1	mg/kg	<0.1	<0.1	<0.1	0.00%	0.00%	Pass	Pass
Merphos	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
meta- & para-Xylene	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Methoxychlor	0.05	0.05	0.2	mg/kg	<0.05	<0.05	<0.2	0.00%	**120.00%**	Pass	Pass-1
Mevinphos (Phosdrin)	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Monocrotophos	2	2	0.2	mg/kg	<2	<2	<0.2	0.00%	**163.64%**	Pass	Pass-1
NALED	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Naphthalene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Naphthalene	0.5	0.5	1	mg/kg	<0.5	<0.5	<1	0.00%	**66.67%**	Pass	Pass-1
Nickel Filtered, T	5	5	2	mg/kg	5.6	<5	<5	11.32%	11.32%	Pass	Pass
Omethoate	2	2	-	mg/kg	<2	<2	-	0.00%	-	Pass	
ortho-Xylene	0.1	0.1	0.5	mg/kg	<0.1	<0.1	<0.5	0.00%	**133.33%**	Pass	Pass-1
Parathion	0.2	0.2	0.2	mg/kg	<0.2	<0.2	<0.2	0.00%	0.00%	Pass	Pass
Parathion-methyl	0.2	0.2	0.2	mg/kg	<0.2	<0.2	<0.2	0.00%	0.00%	Pass	Pass
Phenanthrene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Phorate	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Pirimiphos-methyl	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Prothiophos (Tokuthion)	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Pyrazophos	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Pyrene	0.5	0.5	0.5	mg/kg	<0.5	<0.5	<0.5	0.00%	0.00%	Pass	Pass
Ronnel	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Terbufos	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Tetrachlorvinphos	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Toluene	0.1	0.1	0.5	mg/kg	<0.1	<0.1	<0.5	0.00%	**133.33%**	Pass	Pass-1
Total DDT/DDE/DDD	0.05	0.05	-	mg/kg	<0.05	<0.05	-	0.00%	-	Pass	
Total PAH	0.5	0.5	-	mg/kg	<0.5	<0.5	-	0.00%	-	Pass	
Total Xylenes	0.3	0.3	0.5	mg/kg	<0.3	<0.3	<0.5	0.00%	**50.00%**	Pass	Pass-1
Toxaphene	0.5	0.5	-	mg/kg	<0.5	<0.5	-	0.00%	-	Pass	
TPH C10-C14 Fraction	20	20	50	mg/kg	<20	<20	<50	0.00%	**85.71%**	Pass	Pass-1
TPH C15-C28 Fraction	50	50	100	mg/kg	<50	<50	<100	0.00%	**66.67%**	Pass	Pass-1
TPH C29-C36 Fraction	50	50	100	mg/kg	<50	<50	<100	0.00%	**66.67%**	Pass	Pass-1
TPH C6-C9 Fraction	20	20	10	mg/kg	<20	<20	<10	0.00%	**66.67%**	Pass	Pass-1
TRH >C10-C16	50	50	50	mg/kg	<50	<50	<50	0.00%	0.00%	Pass	Pass
TRH >C16-C34	100	100	100	mg/kg	<100	<100	<100	0.00%	0.00%	Pass	Pass
TRH >C34-C40	100	100	100	mg/kg	<100	<100	<100	0.00%	0.00%	Pass	Pass
TRH C10-36 (Total)	50	50	50	mg/kg	<50	<50	<50	0.00%	0.00%	Pass	Pass
TRH C6-C10	20	20	10	mg/kg	<20	<20	<10	0.00%	**66.67%**	Pass	Pass-1
TRH C6-C10 less BTEX (F1)	20	20	10	mg/kg	<20	<20	<10	0.00%	**66.67%**	Pass	Pass-1
Trichloronate	0.2	0.2	-	mg/kg	<0.2	<0.2	-	0.00%	-	Pass	
Vic EPA IWRG 621 OCP (Total)*	0.1	0.1	-	mg/kg	<0.1	<0.1	-	0.00%	-	Pass	
Vic EPA IWRG 621 Other OCP (Total)*	0.1	0.1	-	mg/kg	<0.1	<0.1	-	0.00%	-	Pass	
Zinc Filtered, T	5	5	5	mg/kg	490	380	390	25.29%	22.73%	Pass	Pass

RPD Control Limits
Pass - RPD ≤ 30%
Pass-1 - RPD > 30%, Analysis results < 10 times Detection Limit
Pass-2 - RPD > 30% and RPD ≤ 50%, Analysis results ≥ 10 times Detection Limit and < 20 times Detection Limit
Exceeds RPD Control Limits

Table 4: QAQC Analytical Results - Trip Spike and Trip Blank
Sample Date - 2023-06-15
Location ID: Tarago, NSW
Client: UGL Regional Linx

				BTEXN					
				Benzene	Toluene	Ethylbenzene	ortho-Xylene	Total Xylenes	meta- & para-Xylene
			LOR	0.1	0.1	0.1	0.1	0.3	0.2
			Action Levels						
Sample Location	**Date Sampled**	**Sample ID**	**Sample Type**						
QAQC	15/06/2023	TRIP BLANK-150623	TB	< 0.1 mg/kg	< 0.1 mg/kg	< 0.1 mg/kg	< 0.1 mg/kg	< 0.1 mg/kg	< 0.1 mg/kg
	15/06/2023	TRIP SPIKE-150625	TS	**110%**	**110%**	**110%**	**100%**	**100%**	**100%**

Legend:
- Not analysed / not calculated
LOR – Limit of Recording
Sample Type: TS - Trip Spike, TB - Trip Blank
mg/kg = milligrams per kilogram

Table 5: QAQC Analytical Results - Rinsate
Sample Date - 2023-06-15
Location ID: Tarago, NSW
Client: UGL Regional Linx

				Metals							
				Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
			LOR	0.001	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005
			Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			Action Levels								
Sample Location	**Date Sampled**	**Sample ID**	**Sample Type**								
QAQC	15/06/2023	QC300-15.623	RB	< 0.001	< 0.0002	< 0.001	< 0.001	**0.001**	< 0.0001	< 0.001	< 0.005

Legend:
- Not analysed / not calculated
LOR – Limit of Recording
Sample Type: RB - Rinsate Blank
mg/l = milligrams per litre
Rinsate Blank result detected above laboratory LOR

APPENDIX 6
95%$UCL_{AVERAGE}$ CALCULATIONS

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.107-Sep-23 3:46:46 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead in Surface Soil (mg/kg)

General Statistics

Total Number of Observations	22	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	120	Mean	854.1
Maximum	3800	Median	725
SD	775.2	Std. Error of Mean	165.3
Coefficient of Variation	0.908	Skewness	2.756

Normal GOF Test

Shapiro Wilk Test Statistic	0.723	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.911	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.184	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1138	95% Adjusted-CLT UCL (Chen-1995)	1230
		95% Modified-t UCL (Johnson-1978)	1155

Gamma GOF Test

A-D Test Statistic	0.32	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.108	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.188	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.784	k star (bias corrected MLE)	1.571
Theta hat (MLE)	478.8	Theta star (bias corrected MLE)	543.7
nu hat (MLE)	78.49	nu star (bias corrected)	69.12
MLE Mean (bias corrected)	854.1	MLE Sd (bias corrected)	681.4
		Approximate Chi Square Value (0.05)	50.98
Adjusted Level of Significance	0.0386	Adjusted Chi Square Value	49.82

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1158	95% Adjusted Gamma UCL (use when n<50)	1185

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.911	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.121	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.184	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	4.787	Mean of logged Data	6.444
Maximum of Logged Data	8.243	SD of logged Data	0.813
Assuming Lognormal Distribution			
95% H-UCL	1326	90% Chebyshev (MVUE) UCL	1347
95% Chebyshev (MVUE) UCL	1568	97.5% Chebyshev (MVUE) UCL	1874
99% Chebyshev (MVUE) UCL	2476		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1126	95% Jackknife UCL	1138
95% Standard Bootstrap UCL	1117	95% Bootstrap-t UCL	1327
95% Hall's Bootstrap UCL	2390	95% Percentile Bootstrap UCL	1147
95% BCA Bootstrap UCL	1210		
90% Chebyshev(Mean, Sd) UCL	1350	95% Chebyshev(Mean, Sd) UCL	1575
97.5% Chebyshev(Mean, Sd) UCL	1886	99% Chebyshev(Mean, Sd) UCL	2499
Suggested UCL to Use			
95% Adjusted Gamma UCL	1185		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

APPENDIX 7
SITE-SPECIFIC EIL DATA INPUTS

		SS94	SS95	SS101	SS112	D03_230919	Average
	Units						
Cation exchange capacity	cmol/kg	15	15	10	15	9	12.8
pH (calcium chloride method)	pH Units	5.9	5.4	5.2	4.7	4.9	5.22
Organic carbon content	%	2.2	2.5	0.8	1.3	2.1	1.78
Iron content (aqua regia method)	%	1.1	0.76	0.88	1.4	1.1	1.048
% clay	%	13	13	8.5	18	7.5	12
Measured background concentration							
Copper	mg/kg	-	-	6.9	-	-	-
Nickel	mg/kg	-	-	2.5	-	-	-
Chromium	mg/kg	-	-	7.2	-	-	-
Zinc	mg/kg	-	-	31	-	-	-

Underlined values were reported <LOR and have been halved to allow for comparison of data.

SS101 selected for background due to low concentrations.

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
12.8
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.22
Enter organic carbon content (%OC) (values from 0 to 50%)
1.78
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
6.9
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	35	40
Urban residential and open public spaces	60	110
Commercial and industrial	85	160

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
12.8
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.22
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
31
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	50	80
Urban residential and open public spaces	120	250
Commercial and industrial	160	370