Detailed Site Investigation

16 Lowana Street, Villawood NSW 2163

Prepared For:	Land and Housing Corporation – Department of Planning and Environment
Reference:	23-1551
Date:	19 December 2023

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Controlled Document Distribution & Revision Register

Distribution List:		
Copy No	**Custodian**	**Location**
Original	Con Kariotoglou	ECON Environmental Pty Ltd (Filed)
Soft Copy (PDF, emailed)	Land and Housing Corporation | Department of Planning and Environment	Darren.D'Mello@facs.nsw.gov.au

Note: This register identifies the current custodians of controlled copies of this subject report document.

Document History:		
Document No	**Revision No.**	**Issue Date**
23-1551	A	19.12.2023

Report Author	Technical Reviewer:
	
Con Kariotoglou Managing Director *BSc, Cert IV WHS, AFMIML, MEIANZ, MALGA* *SafeWork NSW Approved Asbestos Assessor, License No. LAA001006*	Cheyne Hudson BEnvSc (Hons) (CenvP)

This report is to be read in its entirety and should not be review in individual section to provide any level of information independently. Each section of the report relates to the rest of the document and as such is to be read in conjunction, including its appendices and attachments.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

EXECUTIVE SUMMARY

ECON Environmental Pty Ltd was engaged by Mr. Darren D'Mello of the Land and Housing Corporation | Department of Planning and Environment to conduct a Detailed Site Investigation within the subject site located at 16 Lowana Street, Villawood NSW 2163 ('the site'), in accordance with the conclusions and recommendations identified with the *ECON Environmental Preliminary Site Investigation, reference 23-1496, dated 29 June 2023.*

The objective of this investigation is to assess the subject sites for soil contamination with the acquisition of soil samples to evaluate its suitability for its intended residential land use, as part of the Development Application for a proposed residential development. Therefore, the soil investigation results within the proposed development site will be assessed against the following **NEPM HIL 'A'** criteria.

In accordance with the NSW EPA "Sampling Design Guidelines" (2022) for this sized investigative site (approx. 973m^2), a total of eight (8) soil samples plus two (2) QA/QC samples are required to be collected to provide general site coverage.

Based on the data and evidence collected during this detailed site investigation, including the review of previous environmental investigations undertaken with the subject site, the findings of this Detailed Site Investigation are as follows:

- On Monday 11 December 2023 a site inspection was conducted by ECON Environmental's representative Con Kariotoglou. At the time of inspection, the following observations were noted:
    - No potential visible environmental areas of concern were identified within the subject site.
- All eight (8) soil samples, plus two (2) QA/QC sample collected (BH1 to BH8) within the subject site on Monday 11 December 2023, were reported by the laboratory to have concentrations **BELOW** the adopted site assessment criteria for HIL A, land use as per the NEPM, 2013.
- Human and ecological exposure to the potential contaminants identified is currently considered as **LOW,** as no soil contamination was identified within the fill material of the subject site during our investigation.
- Based on the results of this investigation it is considered that the risks to human health and the environment associated with potential migration of contamination from the subject site to adjacent neighbouring properties is considered as **LOW** within the context of the proposed use of the site for residential purposes, as no soil contamination was identified during this investigation.

Based on the findings of this Detailed Site Investigation by ECON Environmental, it is our opinion that the subject site located at Lot 634 in DP36612, identified as 16 Lowana Street Villawood NSW 2163, is **SUITABLE** for the proposed residential development and land use.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

TABLE OF CONTENTS

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117

T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

LIST OF FIGURES – APPENDIX A

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117

T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

1. INTRODUCTION

1.1 Background

ECON Environmental Pty Ltd was engaged by Mr. Darren D'Mello of the Land and Housing Corporation | Department of Planning and Environment to conduct a Detailed Site Investigation within the subject site located at 16 Lowana Street, Villawood NSW 2163 ('the site'), in accordance with the conclusions and recommendations identified with the ECON Environmental Preliminary Site Investigation, reference 23-1496, dated 29 June 2023, namely:

Based on the findings of this preliminary site investigation, it is our opinion that the site can be made suitable for the proposed residential development. However, it is recommended that the following matters be addressed as part of the process:

- *Due to the backfilling and/or terra forming of the subject site between 1951-1955 in preparation of the residential development within the surrounding areas, and due to the historical neighbouring business activities to the north (former hydraulic equipment manufacturer), and northwest (former Defence Site (Landfill), which may have historically impacted the subject site, it is our opinion that the fill material beneath the subject site may contain hazardous materials. Therefore, a **Detailed Site Investigation (DSI)** must be prepared by a suitably qualified and experienced environmental consultant to determine the lateral and vertical extent of the potential contaminants within the designated areas of environmental concerns within the subject site.*
- *As part of the Detailed Site Investigation, the **Sampling and Analysis Quality Plan (SAQP)** should ensure samples are collected from a minimum of eight (8) locations within the subject site.*
- *If contaminants are identified within the subject site during the preparation of the Detailed Site Investigation, an appropriate remedial / management strategy is to be developed, culminating in preparation of a **Remedial Action Plan (RAP)** in accordance with EPA guidelines. The RAP must be prepared by a suitable qualified and experienced environmental consultant detailing the remediation and validation processes to be undertaken to ensure the site is made suitable for its proposed development and intended land use.*
- ***A Hazardous Building Materials Assessment** of the building structures within the subject site is required to be undertaken by a suitably licensed and experienced building inspector / hygienist, or equivalent, prior to its demolition or renovations to determine if any hazardous building materials are present within the building structures. A Hazardous Registry is required to be prepared accompanying the Assessment report. The subsequent demolition works must adhere to the requirements of the HAZMAT report and those of SafeWork NSW.*
- *Any waste material from the site, including soils, be pre-classified an accordance with the NSW EPA Waste Classification Guidelines: Part 1 Classifying Waste (2014) by a suitably qualified and experienced person prior to excavation or disposal from the site. If encountered, potentially hazardous materials must be handled by suitably licenced contractors and materials disposed of at an NSW EPA licenced facility appropriate to its **Waste Classification.***

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

- *Should any unidentified or potentially contaminated material be excavated or exposed whilst on site it is recommended that the advice of a trained and experienced contaminated lands consultant be sought. The site foreman should be advised immediately for appropriate action.*

The objective of this detailed site investigation is to assess the subject sites for soil contamination with the acquisition of soil samples to evaluate its suitability for its intended residential land use, as part of the Development Application for a proposed residential development.

The site investigation within the subject site was undertaken on Monday 11 December 2023 by ECON Environmental's representative Con Kariotoglou.

Details of the findings are presented within the body of this report, as well as an assessment of significance with regards to the findings of the investigation.

This report was completed in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites, NSW EPA, May 2020.*

1.2 Proposed Development or Intended Land Use

At the time of writing this report ECON Environmental were not provided with architectural drawings for the project except for a site survey plan, however we understand the existing house shall be demolished and the development will typically comprise construction of single or double storey residential buildings. The development will not include basement levels, in accordance with the proposed plans in Appendix B – Proposed Development Plans.

1.3 Objectives

The objectives of this Detailed Site Investigation are to:

- Identify potential areas where contamination may have occurred from current and historical activities within the subject site,
- Identify potential contaminants associated with potentially contaminating activities,
- Provide soil sampling and analysis to determine the lateral extent and vertical depth of contamination onsite, if identified,
- Assess the suitability of the investigative site for redevelopment based on its current condition and the findings of this investigation, and
- Assess the need for further remediation works and investigations.

1.4 Scope of Works

The scope of works included the following:

- A site inspection of the subject site and review the physical site settings and site conditions based on the site inspection,
- Research and review the information available, including previous environmental investigations,
- Development of a preliminary Conceptual Site Model (CSM) to demonstrate the interactions between potential sources of contamination, exposure pathways and human/ecological receptors identified,
- A targeted soil boring/sampling investigative study – formulating and conducting a sampling plan and borehole investigation,
- Laboratory analysis and results from sample analysis – findings and comparison to regulatory guidelines,
- Field and laboratory Quality Assurance/Quality Control (QA/QC),
- Reporting in accordance with the associated legislations and guidelines, and
- Recommendations for additional investigations should any data gaps be identified or possible strategies for the management of the site, where relevant.

1.5 Legislative Requirements

The legislative framework for the report is based on State Environmental Planning Policy (Resilience and Hazards) 2021, and the following Acts and Regulations:

- Protection of the Environment Operations Act (1997)
- Contaminated Land Management Act (1997)
- Protection of the Environment Operations (General) Regulation 2021

In addition, the following guidelines have been applied where necessary:

- Sampling Design Guidelines (NSW EPA, 1995)
- Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA, 2020).
- National Environmental Protection Measure (NEPC, 2013)
- Waste Classification Guidelines Part 1: Classifying Waste (NSW DECCW, 2014)
- Australian Standard AS 4482.1 Guide to the Sampling and Investigation of Potentially Contaminated Soil. Part 1: Non-volatile and Semi-Volatile Compounds

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

2. SITE IDENTIFICATION

2.1 Site Identity

The subject site is located at 16 Lowana Street, Villawood NSW 2163. Figures 1 and 2 in Appendix A shows an aerial photograph of the subject site relative to its surrounding land.

Table 1: Site Identification	
Current Site Owners	NSW Land and Housing Corporation
Street Address	16 Lowana Street, Villawood NSW 2163
Lot and DP Number	Lot 634 in DP 36612
Approx. Total Site Area	973m^2
Zoning	R3 – Medium Density Residential
Local Government Area	Canterbury Bankstown City Council

2.2 Surrounding Land Use

The site is located within a low density residential setting and bordered by:

- Low Density Residential properties to the north, east and west,
- Lowana Street then Thurina Park directly to the south
- Villawood East Public School, 80m south west of subject site,
- Commercial / Industrial precinct 185m directly north of the subject site.

2.3 Topography

According to https://www.environment.nsw.gov.au/eSpade2Webapp the topography of the surrounding areas includes gently undulating rises on Wianamatta Shale with local relief 10–30 m and slopes generally >5% but occasionally up to 10%. Crests and ridges are broad (200–600 m) and rounded with convex upper slopes grading into concave lower slopes. Outcrops of shale do not occur naturally on the surface. They may occur, however, where soils have been removed.

The topography of the subject site is generally flat with a slight incline south towards Lowana Street.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

2.4 Geology

Wianamatta Group—Ashfield Shale consisting of laminite and dark grey siltstone, Bringelly Shale which consists of shale with occasional calcareous claystone, laminite and infrequent coal, and Minchinbury Sandstone consisting of fine to medium-grained quartz lithic sandstone.

2.5 Surrounding Dominant Soil Material

Friable brownish black loam. This is a friable brownish black loam to clay loam with moderately pedal subangular blocky structure and rough-faced porous ped fabric. This material occurs as topsoil (A horizon). Peds are well defined subangular blocky and range in size from 2–20 mm. Surface condition is friable. Colour is brownish black but can range from dark reddish brown to dark yellowish brown. The pH varies from moderately acid (pH 5.5) to neutral (pH 7.0). Rounded iron indurated fine gravel-sized shale fragments and charcoal fragments are sometimes present. Roots are common.

Hardsetting brown clay loam. This is a brown clay loam to silty clay loam which is hardsetting on exposure or when completely dried out. It has apedal massive to weakly pedal structure and slowly porous earthy fabric. It occurs as an A2 horizon. Peds when present are weakly developed, subangular blocky and are rough faced and porous. They range in size between 20–50 mm. This material is water repellent when extremely dry. Colour is dark brown but can range from dark reddish brown to dark brown. The pH varies from moderately acid (pH 5.0) to slightly acid (pH 6.5). Platy, iron indurated gravel-sized shale fragments are common. Charcoal fragments and roots are rarely present.

Strongly pedal, mottled brown light clay. This is a brown light to medium clay with strongly pedal polyhedral or sub-angular to blocky structure and smooth-faced dense ped fabric. This material usually occurs as subsoil (B horizon). Texture often increases with depth. Peds range in size from 5–20 mm. Colour is brown but may range from reddish brown to brown. Frequent red, yellow or grey mottles occur often becoming more numerous with depth. The pH varies from strongly acid (pH 4.5) to slightly acid (pH 6.5). Fine to coarse gravel-sized shale fragments are common and often occur in stratified bands. Both roots and charcoal fragments are rare.

Light grey plastic mottled clay. This is a plastic light grey silty clay to heavy clay with moderately pedal polyhedral to subangular blocky structure and smooth faced dense ped fabric. This material usually occurs as deep subsoil above shale bedrock (B3 or C horizon). Peds range in size from 2–20 mm. Colour is usually light grey or, less commonly, greyish yellow. Red, yellow or grey mottles are common. The pH varies from strongly acid (pH 4.0) to moderately acid (pH 5.5). Strongly weathered ironstone concretions and rock fragments are common. Gravel-sized shale fragments and roots are occasionally present. Charcoal fragments are rare.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

2.6 Surface and Ground Water Hydrology

The site currently consists of approximately 25% impervious hard surface, and 75% permeable vegetated surface. The site was unoccupied with a main residential building structures with a semi attached granny flat at the rear. A small shed was identified within the back yard.

Stormwater infiltration is anticipated to be medium due to the majority of permeable surfaces. It is anticipated that the un-infiltrated stormwater will sheet south towards Lowana Street stormwater system.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

3. CONCEPTUAL SITE MODEL (CSM)

3.1 Potential Areas of Concern

Based on the historical records and aerial photographs inspected in the preparation of the *ECON Environmental Preliminary Site Investigation, ref: 23-1496, dated 29 June 2023,* the following Table 2 identifies the main Potential Areas of Environmental Concern (PAECs), and their associated potential Contaminants of Concern (COCs) within the subject site using the information gathered through this assessment, previous environmental site assessments and qualitative judgement based on consultant experience.

Table 2: Areas of Environmental Concern

PAEC	Potentially Contaminating Activity	Contaminants of Concern	Likelihood of Contamination
Underlying soils beneath the whole site.	Fill material – The subject site appears to have been historically filled between 1951-1955 to achieve the existing levels. The fill may have been imported from various sources and could contain hazardous materials.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.	Possible
	Pesticides - Use of pesticides may have been used beneath the buildings and/or around the site, and/or may have migrated onto the site from neighbouring historical residential properties.	Heavy metals and OCPs	Possible
Historical former Defence Site (Landfill), 105m northeast of the subject site.	Migration (leaching) of chemicals / hazardous materials offsite from the former Defence Site to the southwest towards Prospect Creek & Georges River, through the subject site.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.	Possible

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Historical former Lucas Industries Australia (Hydraulic Equipment Manufacturers) 146m north of the subject site.	Migration (leaching) of chemicals / oils / petroleum hydrocarbons offsite from the former Manufacturing Site to the subject site.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs) and asbestos.	Possible
Existing Building Structures	Hazardous Building Materials - may be present as a result of historical building and demolition activities. These materials may also be present in the existing buildings / structures on site.	Asbestos, Lead, PCBs	Likely, *as the residential house was built prior to circa 1955.*

3.2 Human Receptors and Sensitive Environments

On-site Human Receptors & Sensitive Environments:

- Demolition / Excavation / Construction workers during the construction process,
- Future occupants & visitors of the subject site.

Off-site Human Receptors & Sensitive Environments:

- Occupants of the Low Density Residential properties to the north, east and west,
- Public users of the Lowana Street then Thurina Park directly to the south
- Staff and students of Villawood East Public School, 80m south west of subject site,
- Occupants of the Commercial / Industrial precinct 185m directly north of the subject site.

4. DATA QUALITY OBJECTIVES

Data quality objectives were established for the site characterisation works, following the decision-making procedures outlined in NEPC (2013):

- Step 1 - Define the problem,
- Step 2 - Identify the decision,
- Step 3 - Identify inputs to the decision,
- Step 4 - Define the study boundaries,
- Step 5 - Develop a decision rule,
- Step 6 - Specify limits on decision errors, and
- Step 7 - Optimise the design for obtaining data.

4.1 STEP 1 - Define the Problem

To determine the potential risks to human health and the environment exist from the potential contamination of soils associated with underlying soils from the historical use of the site, and adjoining potential impacting historical activities surrounding the subject site.

4.2 STEP 2 - Identify the Decision

Based on the decision-making process for assessing urban redevelopment sites, the following decisions must be made:

1. Are there any unacceptable health risks to future onsite receptors?
2. Are there any unacceptable ecological risks posed by the site?
3. Are there any aesthetic issues at the site?
4. Is there any evidence of, or potential for, migration of contaminants from the site?
5. Is a site management strategy required?

4.3 STEP 3 - Identify Inputs to the Decision

The following inputs were used to allow the assessment of the decisions:

1. Historical information,
2. Observations made during site investigations,
3. Soil analytical data from samples collected on site,
4. Adopted site assessment criteria, and
5. Data quality indicators.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

4.4 STEP 4 - Define the Study Boundaries

The study site is located within the combined boundaries of Lot 634 in DP36612, 16 Lowana Street, Villawood NSW 2163. It can be identified as a rectangular shaped lot located north of Lowana Street.

The lateral extent of the investigation is within the entire boundaries of the subject site, see Figure 5, Appendix A. While the vertical extent of the investigation included the surface topsoil material, approx. 0.3m BGL at near surface boundaries to natural soils.

4.5 STEP 5 - Develop a Decision Rule

Soil analytical data were assessed against National Environmental Protection Measure (NEPM) criteria as referenced in Section 8. Statistical analysis of the data will be undertaken if necessary. The following statistical criteria shall be adopted:

1. The upper 95% confidence limit on the average concentration for each analyte (calculated for samples collected from consistent soil horizons, stratigraphy or material types) must be below the adopted criterion,
2. No single analyte shall exceed 250% of the adopted criterion, and
3. The standard deviation of the results must be below 50 % of the criterion.

The acceptable limits for laboratory QA/QC parameters are shown in the table below and are based upon the laboratory reported acceptable limits and those stated within the NEPM 2013 Schedule B3 Guideline & AS 4482.1-2005.

Table 3: Soil QA/QC Parameters

Type of QC Sample	Control Limit
FIELD	
Rinsate Blanks	Analytes <LOR
Intra-Laboratory Duplicates	RPD's < 30 - 50%
Inter-Laboratory Duplicates	RPD's < 30 - 50%
Trip Blanks	Volatiles <LOR
Trip Spike Recovery	>70%
LABORATORY	
Method Blanks	< Laboratory LOR
Matrix Spike	Recovery targets: • Metals: 70% to 130% • Organics: 60% to 140%
Laboratory Duplicate	RPD's <30%
Laboratory Control Samples	Recovery targets: 70% to 130%
Surrogate Spike	Recovery targets: 60% to 140%

The following conditions should be adopted:

- If the control limits are exceeded, then an assessment of the significance of the results should be carried out,
- If major non-conformances from the laboratory or field data are identified, then further sampling and laboratory analysis may be required to provide an adequate sample set for data reliance,
- If the results of the DQI assessment indicate that the data set is reliable, then the data set will be deemed to be acceptable for the purposes of the validation works, and
- If the measured concentrations of soil samples analysed meet their respective validation criteria, then no additional remediation is required.

4.6 STEP 6 - Specify Limits of Decision Errors

The usual null hypothesis for remediation of contamination is that the land has unacceptable risk from residual contamination, and this hypothesis is able to be accepted at a 95% confidence level, giving a 5% risk of a Type I error (site is deemed suitable when it is not).

An assessment of the likelihood of a decision error will be made based on:

- The acceptable limits for inter/intra laboratory duplicate sample comparisons as specified in Step 5 of the DQOs, and
- The acceptable limits for laboratory QA/QC parameters are based upon the laboratory reported acceptable limits and those stated within the NEPM 2013 Schedule B3 Guideline & AS 4482.1-2005.

If the concentration of a particular contaminant of concern exceeds its remediation/validation criteria, then a further assessment is required to address the significance of the result. Statistical analysis (arithmetic mean) based on 95% UCL may be used to assess the significance of the data provided the following conditions are met:

- the 95%ucl of the arithmetic mean must be less than the criterion,
- the standard deviation of the data set is less than 50% of the relevant threshold level, and
- no individual sample result should be greater than 250% of the relevant threshold level.

4.7 STEP 7 - Optimize Design for Obtaining Data

The optimum design for obtaining data in order to achieve the Data Quality Objectives is as follows:

- Review of previous environmental site investigation results,
- Only NATA-accredited environmental testing laboratories will be commissioned to analyse soil and groundwater samples and will implement a quality control plan conforming to the NEPM (Assessment of Site Contamination) Measure Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils and Groundwater.
- Assessment of the Data Quality Indicators to determine if the field procedures and laboratory analytical results are reliable,
- Collection of QA/QC samples at frequencies prescribed in the NEPM Guidelines,
- Field sampling works will be carried out by an experienced and qualified Environmental Scientist in accordance with ECON Environmental protocols, based on National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 Schedules B1, B2, B4, B6 & B9 and other NSW EPA endorsed guidelines.

5. DATA QUALITY INDICATORS

5.1 General

The five Data Quality Indicators (DQIs) comprising completeness; comparability; representativeness; precision and accuracy provide an assessment of the reliability of field procedures and laboratory analytical results in accordance with the Contaminated Land Management - Guidelines for the NSW Site Auditor Scheme (3rd Edition, 2017).

These are addressed in the following sub-sections.

5.2 Completeness

Data Completeness is a measure of the amount of useable data (expressed as %) from a data collection activity. The completeness is equal to the percentage of valid quality assurance and quality control results.

The assessment should address the following:

Table 4: Data Completeness

Field	Laboratory
• All critical locations are sampled • All samples collected from critical grids and depths • Consistency in the use of standard operating procedures, equipment, sampler • Completion and correctness of field documentation.	• All critical samples and analytes are analysed in accordance with the SAQP, *if prepared* • Appropriateness of laboratory methods and PQLs.

The minimum target frequency for each type of QA/QC sample should be carried out in accordance with the following tables:

Table 5: QA/QC Requirements

Field QA/QC Sample	Frequency (Soil)	Frequency (Groundwater)
Intra-Laboratory Duplicate	1 in 20 samples	1 in 20 samples
Inter-Laboratory Duplicate	1 in 20 samples	1 in 20 samples
Field Blanks	1 per day (Rinsate)	1 per day (Rinsate)
Trip Blank	1 per sample batch	1 per sample batch
Trip Spike	1 per sample batch	1 per sample batch

Where any of the above objectives are not achieved for particular samples, steps will be taken to rectify the non-conformance, if possible. Alternatively, data qualifiers detailing the nature of the quality problem will be documented in the report and attached to relevant data in the result summary tables.

The target for overall completeness for each data set is a minimum of 95%. A data completeness of less than 95% may be accepted where it can be justified that the non-conformance does not have a significant effect on the outcome of the results.

5.3 Comparability

Data Comparability is the confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event.

The qualitative assessment should address the following:

Table 6: Data Comparability

Field	Laboratory
• Consistency in the use of standard operating procedures, equipment, sampler • Consistency in the method of sample collection for each media • Quantification of influence by climatic conditions	• Consistency of analytical methods and limits of reporting (LOR) for each analyte • Whether laboratory limits of reporting are set at < 20% of the adopted site criteria value for each analyte • Consistent use of one primary and one secondary laboratory

5.4 Representativeness

Data Representativeness is the confidence (expressed qualitatively) that data are representative of each media present on the site.

The qualitative assessment should address the following:

Table 7: Data Representativeness

Field	Laboratory
• Samples are collected in accordance with the SAQP, *if provided* • Receipt of samples within holding times • Receipt of intact samples • Receipt of adequately preserved samples	• All samples are extracted and analysed within their respective holding times

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

5.5 Representativeness

Data Precision is a quantitative measure of the variability (or reproducibility) of data.

Intra-laboratory or Inter-laboratory Duplicate Samples (B) results are compared with Primary Sample (A) results using Relative Percentage Differences (RPDs) according to the following formula:

$$\%RPD = \left|\frac{A - B}{A + B}\right| \times 200$$

Duplicate sampling rates for this assessment (**for each separate sample batch**) are to be tested for all the same analytes as the primary sample:

Table 8: Data Precision	
Type of QC Sample	Control Limit
Field Intra-Laboratory Duplicate (Blind)	RPD < +/- 50%
Field Inter-Laboratory Duplicate (Split)	RPD < +/- 50%

Where the laboratory has reported results for a particular analyte below the limit of reporting for either the primary sample or a duplicate sample, the RPD is reported as 'Not Calculable' or NC. A discussion should be made as to which sample should be adopted and compared against the relevant assessment criteria. However, no discussion is required where both the primary sample and the duplicate sample for a particular analyte are below the limit of reporting.

5.6 Accuracy

Data Accuracy is a quantitative measure of the closeness of reported data to the true value. Laboratory measured recovery of analytes in lab control samples with known concentrations. Laboratory QA/QC testing is to include:

Table 9: Data Accuracy	
Laboratory QA/QC Sample	Frequency
Method Blank	1 per 20 samples
Matrix Spike	1 per 20 samples
Laboratory Duplicate	Laboratory defined
Laboratory Control	Laboratory defined
Surrogate Spike	All organic samples

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

6. SITE ASSESSMENT CRITERIA

6.1 General

Concentrations of contaminants in soil samples were compared against the National Environmental Protection Council (2013) site assessment criteria presented below and summarised in Appendix G.

- Health Investigation Levels (HIL) for Soil Contaminants – NEPM HIL Residential 'A'
- Soil Health Screening Levels (HSL) for Vapour Intrusion – HIL 'A'
- NEPM 2013 Management Limits for TRH Fractions F1-F4 in Soil - Residential, Parkland and Public Open Space (Fine Grained Soils)
- NEPM 2013 ESLs for TRH fractions F1 – F4, BTEX and benzo(a)pyrene in soil
- Health Screening Levels for Asbestos Contamination in Soil – Residential, Guidelines for the Assessment, Remediation and Management Asbestos-Contaminated sites in Western Australia.

6.2 Soils Investigation and Screening Levels

6.2.1 Health Investigation Levels (HILs)

The NEPM presents Tier 1 Health Investigation Levels (HILs) for a broad range of chemicals such as metals, inorganics, PAHs, phenols, pesticides and other organics. The HILs are applicable to generic land uses such as residential, commercial/industrial or public open space and all soil types, generally within the first 3 metres of soil below ground level. The HILs have been applied to assess human health risks via all relevant pathways of exposure.

Based on the proposed development, soil investigation results within the proposed development site will be assessed against the following criteria:

- ***HIL 'A'*** *- Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.*

6.2.2 Health Screening Levels (HSLs)

The NEPM presents Tier 1 Health Screening Levels (HSLs) for the following petroleum compounds and fractions:

- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX);
- Naphthalene, and
- TPH C6-C10 and TPH >C10-C16 fractions.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | E: info@econenvironmental.com.au | W: www.econenvironmental.com.au

The HSLs are applicable to generic land uses such as residential, commercial/industrial or recreational/public open space and different soil types between the ground surface and soils >4 metres below ground level. The HILs have been applied to assess human health risks via the inhalation and direct contact pathways of exposure.

Point 1 of Table 1A (4), which indicates that HSL D can be used in lieu of HSL B for buildings that comprise car parks or commercial properties on the ground floor.

6.2.3 Interim Soil Vapour Health Investigation Levels (Interim HILs)

The NEPM presents Interim Soil Vapour Health Investigation Levels (Interim HILs) for selected Volatile Organic Chlorinated Compounds (VOCCs).

The Interim Soil Vapour HILs are applicable to generic land uses such as residential, commercial/industrial or recreational/public open space and all soil types within the first metre depth from the ground surface or the first metre depth beneath a sub-slab. The Interim Soil Vapour HILs have been applied to assess human health risks via the inhalation pathways of exposure.

6.2.4 Ecological Investigation Levels (EILs)

The NEPM presents Ecological Investigation Levels (Interim EILs) for As, Cu, CrIII, Ni, Pb, Zn, DDT and naphthalene.

The EILs are applicable to generic land uses such as areas of ecological significance, urban residential areas and public open space, and commercial/industrial land uses. The EILs have been applied to assess risks to terrestrial ecosystems, generally, within the top 2 metres of soil at the final surface/ground level.

Site specific EILs for Copper, Zinc, Nickel and Chromium III can be derived by adding the Ambient Background Concentration (ABC) to the Added Contaminant Limits (ACL), as per the following formula:

$$EIL = ABC + ACL$$

The ABC of a contaminant is the soil concentration in a specified locality that is the sum of the naturally occurring background level and the contaminant levels that have been introduced from diffuse or non-point sources by generating anthropogenic activity not attributed to industrial, commercial, or agricultural activities.

The ACL is the added concentration (above the ABC) of a contaminant above which further appropriate investigation and evaluation of the impact on ecological values is required. ACLs are based on the soil characteristics of pH, CEC and clay content. Different soils types / profiles will have different contaminant EILs rather than a single generic EIL for each contaminant. ACLs apply chromium III (CrIII),

copper (Cu), nickel (Ni) and zinc (Zn) for site-specific EIL determination. The soil properties to be measured for site-specific derivation of ACLs for CrIII, Cu, Ni and Zn are summarised below:

- pH - Cu
- CEC - Cu, Ni, Zn
- % clay - CrIII

Note – the lowest concentration of copper that is derived from the pH or the CEC calculation is to be used for the ACL.

Insufficient data was available to derive ACLs for As, Pb, DDT and naphthalene. As a result, the derived EILs are generic to all soils and are presented as total soil contaminant concentrations in Tables 1(B)4 and 1(B)5.

6.2.5 Ecological Screening Levels (ESLs)

Table 1B (6) of the NEPM presents Ecological Screening Levels (ESLs) for TPH C6-C40 fractions, BTEX and benzo(a)pyrene.

The ESLs are applicable to generic land uses such as areas of ecological significance, urban residential areas and public open space, and commercial/industrial land uses. The ESLs have been applied to assess risks to terrestrial ecosystems, generally, within the top 2 metres of coarse or fine soil at the final surface/ground level.

6.2.6 Petroleum Hydrocarbon Management Limits

Table 1B (7) of the NEPM presents petroleum hydrocarbon management limits for application to TPH fractions C_6-C_{10}, >C_{10}-C_{16}, >C_{16}-C_{34} and >C_{34}-C_{40}. The management limits are applicable for coarse or fine soils in residential, parkland, public open space or commercial/industrial land uses following consideration of relevant ESLs and HSLs.

6.2.7 Asbestos in Soils

Health screening for asbestos in soil, which are based on scenario-specific likely exposure levels, are adopted from the WA DoH Guidelines, and are referred in Table 8 in NEPM Schedule B1.

6.3 Export of Waste

Any soil to be removed from the site shall be classified in accordance with the NSW EPA (2014) "*Waste Classification Guidelines, Part 1: Classifying Waste"* before it can be disposed of off-site.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

7. SOIL SAMPLING AND ANALYSIS PLAN

7.1 General Methodology

In order to meet the Data Quality Objectives, the investigation will comprise fieldwork and sample collection carried out in general accordance with the procedures outlined in the ECON Environmental fieldwork protocols which are based on industry accepted standard practice.

The sampling strategy is based on our current level of understanding of the site conditions and to address Council queries. However, the fieldwork and the soil sampling and analysis program may be subject to change based on the observations made during field work, such as depth of fill material, actual geology beneath the site and visual extent of contamination.

The drilling method adopted should ensure that no pathways of contamination are created between various soil strata encountered.

Each borehole was drilled into the underlying soils using a hand-held auger with an 100mm diameter auger bit.

The boreholes were backfilled with clean spoil or clean sand/gravel. Where a semi-confined or confined layer was encountered, a bentonite seal was used to prevent potential cross-contamination between the overlying and underlying strata.

A description of sub-surface conditions observed during drilling are presented in the field notes included in Appendix D.

The soil samples were collected on Monday 11 December 2023.

7.2 Soil Sampling Density and Sampling Location Rationale

Based on the available information, a targeted soil sampling plan was considered most appropriate to provide sufficient characterisation data of the insitu fill material within the investigative area, which posed a potential risk for containing hazardous substances, hence a targeting sampling plan was undertaken.

In accordance with the NSW EPA "Sampling Design Guidelines" (2022) for this sized investigative site (approx. 973m^2), a total of eight (8) soil samples plus two (2) QA/QC samples are required to be collected to provide general site coverage. Additional sampling points may be incorporated to target specific areas of potential environmental concern identified above.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

7.3 Soil Sampling Depth

The sampling boreholes were advanced through the surface soil material to allow for the collection of at least one soil sample from the insitu soil material, approx. 0.0-0.3m BGL, where indicated. Natural soils were identified within the subject site at a depth of 0.3m BGL.

7.4 Soil Sampling Methodology

During the collection of soil samples, any features such as seepage, discoloration, staining, odours, or other physical indicators of groundwater contamination was noted.

Soil sampling was carried out in general accordance with ECON Environmental Fieldwork Protocols. In summary:

- Soil samples were collected using a hand-held auger using a 100mm diameter auger bit from each soil type or change in lithology. However, additional samples were collected where there was visual evidence of contamination,
- Samples were transferred into clean laboratory supplied containers, and
- In general, each soil sample was divided into two sub-samples. One of the sub-samples was placed into a laboratory-supplied container and a second sub-sample was placed in a separate zip-lock bag for field headspace screening using a PID.

Sampling of asbestos was undertaken as follows:

- A minimum 10L sample from each sample location was recovered,
- Each sample (minimum of 10 L) was screened through a 7mm sieve and the material retained on the sieve examined for any bonded ACM and / or suspect material and forwarded to the laboratory for analysis if any suspected ACM is encountered,
- If visible FA material is present or suspected, the soil was wetted to minimise the release of fibres,
- Identified bonded ACM and FA was weighed for each sample, and
- One wetted 500ml sample from each sampling location was submitted to a NATA accredited laboratory for analysis for AF. Soil asbestos analysis should comply with Australian Standard Method for the Qualitative Identification of asbestos in bulk samples (AS4964–2004).

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

7.5 Soil Laboratory Analysis

The laboratory used for the analysis of all samples was ALS Environmental located at 277-289 Woodpark Road, Smithfield NSW Australia. The laboratory is NATA accredited for the selected analyses. The completed analysis schedule is summarised in Table 10 below providing a diverse range of analytes with the full laboratory certificates in Appendix G:

Table 10: Analytical Schedule.

Sample ID	Location	Analytes
Soil Samples BH1 to BH8 (11.12.2023)	Insitu soil material within the entire subject site.	• Heavy Metals • TRH, BTEX, PAH, PCBs • OC/OP Pesticides, Phenols • Asbestos

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

8. QUALITY ASSURANCE / QUALIY CONTROL

8.1 Site Procedures

The following field quality assurance and quality control measures were implemented:

1. All sample jars and sample bags were clearly labelled prior to site visit,
2. All soil samples were collected by hand (after using a hand-held auger with a 100mm drill),
3. Disposable gloves were worn throughout the process and changed between the collection of each soil sample,
4. All sampled jars and bags were immediately placed in an ice-block chilled esky,
5. All samples were clearly labelled and sealed for couriering,
6. The ALS Environmental chain-of-custody form was completed and emailed to the lab as well as a hard copy placed with the samples,
7. All samples were kept in the office of ECON Environmental Pty Ltd until collected by courier,
8. Ice-bricks were interchanged prior to couriering.

8.2 Field QA/QC

8.2.1 General

The frequency required for each field quality assurance / quality control (QA/QC) sample is presented in the table below.

Table 11: QA/QC Sampling Frequency

	Intra-Lab Duplicates	Inter-Lab Duplicates	Rinsates	Trip Blanks	Trip Spikes
Sampling Frequency	1 in 20 primary samples	1 in 20 primary samples	1 / Day	1 / Day	1 / Day

8.2.2 Field Duplicates

Duplicates of primary samples were collected to enable the assessment of variability in analyte concentrations between samples collected from the same sampling point. The tables below list the duplicate soil and groundwater samples collected with their corresponding primary samples.

Table 12: Soil Field Duplicate Samples

Primary Sample ID	Sample Depth (m BGL)	Blind Duplicate ID	Split Duplicate ID	Date Sampled
BH1	0.2-0.3m	D1	-	11.12.2023

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

8.2.3 Sample Handling, Storage and Transport

The following sampling handling, storage and transport procedures were adopted to ensure sample integrity:

- Samples were collected in laboratory supplied containers. A list of sample preservation methods and the types of sample containers used are attached in Appendix I,
- Soil and groundwater sample containers were placed immediately into a chilled cooler box and dispatched to their respective analytical laboratories on the same day. If this was not possible, samples were temporarily held overnight in the ECON Environmental office refrigerator at a temperature of no greater than 4 ºC and dispatched the following day,
- A Chain of Custody form (COC) was completed for all samples collected and included with the samples for transport to their respective laboratories for chemical analysis. Copies of COCs are included in Appendix F.
- All glass bottles were individually bubble wrapped for protection and insulated containers/coolers were used for sample shipment.
- Disposable nitrile gloves were used for OH&S purposes and were changed between every sample location.

8.2.4 Decontamination Procedures

The decontamination of non-dedicated sampling equipment was achieved by washing with phosphate-free detergent and tap water, followed by a final rinse with distilled water. Decontamination was conducted after the collection of soil samples at each sample location. A clean pair of disposable gloves was used when handling each soil sample.

The drilling augers were decontaminated between sampling locations by physically removing soil material between boreholes, washing the augers with Decon 90 and rinsing them with water.

8.3 Laboratory QA/QC

8.3.1 Laboratories Used

The following NATA-accredited laboratories were commissioned to carry out laboratory analysis of soil, groundwater and soil vapour samples collected:

- Primary Laboratory – ALS Laboratories (Sydney)
- Secondary Laboratory – ALS Laboratories (Newcastle) to conduct asbestos analysis on selected soil samples.

These laboratories also operate Quality Systems that are designed to comply with ISO/IEC 17025.

All primary samples, blind duplicates, rinsate samples, trip blank/spikes were dispatched to the primary laboratory.

Laboratory Certificates of Analysis are included in Appendix G.

8.3.2 Holding Times

The holding times for chemicals analysed are presented in Appendix G and were based on USEPA methods, Standard Methods for the Examination of Water and Wastewater (APHA).

8.3.3 Test Methods and Practical Quantitation Limits

The test methods adopted by ALS Laboratories – Sydney & Newcastle are listed in Appendix F and Practical Quantitation Limits (PQLs) adopted are specified within the Laboratory Certificates of Analysis included in Appendix F.

The methods used by the laboratories generally comply with those listed in the NEPM and the ANZG, "Australian and New Zealand Guidelines for Fresh and Marine Water Quality" (2018). Alternate methods used by the laboratories (i.e. not identified in the NEPM and ANZECC guidelines) have been validated by the laboratories, as recommended in the NEPM and ANZECC guidelines, and endorsed by NATA.

8.4 QA/QC Data Evaluation

A full evaluation of the Data Quality Indicators (DQIs) for both fieldwork and laboratory procedures are presented in Appendix G. These were assessed with reference to Appendix V of the NEPM and Contaminated Land Management - Guidelines for the NSW Site Auditor Scheme (3rd Edition, 2017). In summary, the findings of the QA/QC evaluation indicated the following:

- Data Completeness – The data set is considered to be adequately complete. However, the following minor non-conformances were identified:
    - Trip blanks and trip spikes were not collected during the soil investigation. However, given that Heavy Metals, TPH C6-C10 fraction and BTEX concentrations were not detected in any of the samples during the detailed site investigation, this was not considered to affect the outcome of the results.
- Data Comparability – The data set is considered to be adequately comparable.
- Data Representativeness – The data set is considered to be adequately representative.
- Data Precision – The data set is considered to be adequately precise.
- Data Accuracy – The data set is considered to be adequately accurate.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

As shown in Appendix F – Summary of Results, the RPDs for all the analytes were within their respective control limits. Therefore, the data set is considered to be adequately precise.

The sampling methods (including sample preservation, transport and decontamination procedures) and laboratory methods followed during this investigation works were consistent with ECON Environmental protocols and were found to meet the DQOs for this project.

It is therefore considered that the data is sufficiently reliable and that the results can be used for the purpose of this project.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

9. FIELD OBSERVATIONS

9.1 Site Inspection

A site inspection was carried out on Monday 11 December 2023 by ECON Environmental's representative Con Kariotoglou, which involved a visual assessment of the entire site and surrounding areas to identify areas of potential environmental concern within the subject site. At the time of the inspection, the following observations were noted:

- The site was unoccupied and consisted of a single-storey brown brick residential house, with terracotta roof tiles, and a concrete hardstand driveway from Lowana Street to the house.
- A detached granny flat was observed at the rear of the residential house.
- A small metal shed was observed within the northwestern portion of the site.
- Loose building and vegetation debris was observed scattered throughout the property.
- The majority of the site was covered by overgrown grass with two large trees within the northeastern boundary of the site.
- The ground surface falls approximately 1 metre to the north.
- The residential house may contain hazardous building materials (Asbestos sheeting), for example, within exterior eaves which may require further investigations.
- No hydrocarbon staining was observed on surface topsoils or within any of the borehole locations,
- No hydrocarbon odours were encountered within any of the borehole locations,
- No visible fragments of ACM were detected on surface soils.

9.2 Surface and Subsurface Conditions

Based on surface and sub-surface conditions observed during the intrusive investigation, the surface and sub-surface profile across the site is summarised in the table below.

Table 13: Summary of Geological Observations

Sample Nos.	Location	Geological Unit	Lithological Description	Depth (m BGL)
BH1-BH8	Entire Site	Fill	Silty Clay, light to dark brown, dry, with minor inclusions of rocks and gravel.	0.0-0.3m into the underlying soils. Natural soils were encountered at a depth of 0.3m BGL.

10. LABORATORY RESULTS

10.1 General

A comparison of soil laboratory results against their respective assessment criteria (as specified in Section 6) are presented in the summary tables in Appendix F. Certificates of laboratory analysis are attached in Appendix G. A discussion of the results is presented in the following sub-sections.

10.2 Soil Results

10.2.1 Heavy Metals

10.2.1.1 Health Investigation Levels (HILs)

As indicated in Table B, the concentrations of the discrete heavy metals were **BELOW** the Health Investigation Level (HIL) for a residential development, that being the HIL 'A'.

10.2.1.2 Ecological Investigation Levels (EILs)

As indicated in Table B, the arsenic concentrations were **BELOW** the Ecological Investigation Level (EIL) for urban residential and public open space.

10.2.2 TRH, BTEX, Naphthalene &/or Benzo(a)pyrene

10.2.2.1 Health Screening Levels (HSLs)

As indicated in Table C, the F1 (C_6-C_{10}), F2 (>C_{10}-C_{16}), benzene, toluene, ethyl benzene, xylenes and naphthalene concentrations were **BELOW** the HSL 'A' & HSL 'B' for a sandy loam soil profile with a source depth of "0m to <1m" and "1m-2m".

10.2.2.2 Ecological Screening Levels (ESLs)

As indicated in Table D, the F1 (C_6-C_{10}), F2 (>C_{10}-C_{16}), F3 (C_{16}-C_{34}), F4 (C_{34}-C_{40}), benzene, toluene, ethyl benzene, xylenes and benzo(a)pyrene concentrations were **BELOW** the ESL for a fine-grained soil texture in an "residential" environment.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

10.2.2.3 Management Limits

As indicated in Table E, the F1 (C_6-C_{10}), F2 (>C_{10}-C_{16}), F3 (C_{16}-C_{34}), F4 (C_{34}-C_{40}), benzene, toluene, ethyl benzene, xylenes and benzo(a)pyrene concentrations were **BELOW** the Management Limits for a fine-grained soil texture in an "residential" environment.

10.2.3 PAH, OCP, PCB, Phenols

10.2.3.1 Health Investigation Levels (HILs)

As indicated in Table F, the concentrations of the benzo(a)pyrene (as TEQ), Total PAH, OCP, PCB, Phenols were **BELOW** the Health Investigation Level (HIL 'A') for a residential development.

10.2.3.2 Ecological Investigation Levels (EILs)

As indicated in Table F, the concentrations of naphthalene and DDT/DDE/DDD were **BELOW** the Ecological Investigation Level (EIL) for a residential development.

10.2.3.3 Ecological Screening Levels (ESLs)

As indicated in Table F, the concentrations of the benzo(a)pyrene were **BELOW** the Health Investigation Level (HIL 'A') for a residential development.

10.2.4 Asbestos

As indicated in Table G, the concentrations of Asbestos were **BELOW** the Health Investigation Level (HIL 'A') for a residential development.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

11. REFINED CONCEPTUAL SITE MODEL

11.1 Conceptual Site Model

The refined Conceptual Site Model (CSM) presented in the table below provides a representation of the potential risks associated with the linkages between the following elements:

- Potential contamination sources and their associated contaminants of concern identified in Section 3. Only potential areas of concern with a significance rating of low to high were included,
- Potential human receptors that may be impacted by site contamination are current and future end-users, construction workers and the general public within the immediate vicinity,
- Potential environmental receptors identified in Section 3,
- Potential exposure pathways, and
- Whether each source-pathway-receptor pollution linkage are complete, limited or not present, based on current and future site conditions.

Table 14: Conceptual Site Model

Potential Sources	Potential Receptor	Potential Exposure Pathways	Complete Linkages	Risk	Justification
Contaminated soil from historical use of the site as well as historical business activities surrounding the subject site.	Site users or the general public	Dermal contact, inhalation or ingestion of exposed impacted soils	Limited (current)	Low	No soil contamination was identified within the fill material of the subject site.
			No (future)	Negligible	No soil contamination was identified within the fill material of the subject site.
	The aquatic ecosystems	Migration of impacted soils into groundwater and surface water run-off	Yes (current)	Low	No soil contamination was identified within the fill material of the subject site.
			No (future)	Negligible	No soil contamination was identified within the fill material of the subject site.
	Underlying Aquifer	Leaching and migration of contaminants through groundwater infiltration	Limited (Current)	Low	No soil contamination was identified within the fill material of the subject site.
			No (Future)	Negligible	No soil contamination was identified within the fill material of the subject site.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

12. CONCLUSION AND RECOMMENDATIONS

Based on the data and evidence collected during this detailed site investigation, including the review of previous environmental investigations undertaken with the subject site, the findings of this Detailed Site Investigation are as follows:

12.1 Site Observations

On Monday 11 December 2023 a site inspection was conducted by ECON Environmental's representative Con Kariotoglou. At the time of inspection, the following observations were noted:

- No potential visible environmental areas of concern were identified within the subject site.

12.2 Soil Laboratory Results

All eight (8) soil samples, plus two (2) QA/QC sample collected (BH1 to BH8) within the subject site on Monday 11 December 2023, were reported by the laboratory to have concentrations **BELOW** the adopted site assessment criteria for HIL A, land use as per the NEPM, 2013.

12.3 Potential Risks to Onsite and Offsite Receptors

Human and ecological exposure to the potential contaminants identified is currently considered as **LOW,** as no soil contamination was identified within the fill material of the subject site during our investigation.

12.4 Potential for Migration of Contaminants

Based on the results of this investigation it is considered that the risks to human health and the environment associated with potential migration of contamination from the subject site to adjacent neighbouring properties is considered as **LOW** within the context of the proposed use of the site for residential purposes, as no soil contamination was identified during this investigation.

12.5 Recommendations

Based on the results of this Detailed Site Investigation by ECON Environmental, it is our opinion that the subject site located at Lot 634 in DP36612, identified as 16 Lowana Street Villawood NSW 2163, is **SUITABLE** for the proposed residential development and land use.

13. LIMITATION STATEMENT

ECON Environmental Pty Ltd has undertaken the following report in accordance with the scope of works set out between ECON Environmental Pty Ltd and the client. ECON Environmental Pty Ltd derived the data in this report primarily from the site and soil assessment conducted on the date of site inspection. The impacts of future events may require future investigation of the site and subsequent data analysis, together with a re-evaluation of the conclusions and recommendations of this report.

In preparing this report, ECON Environmental Pty Ltd has relied upon, and assumed accurate, certain site information provided by the client and other persons. Except as otherwise stated in the report, we have not attempted to verify the accuracy or completeness of any such information. ECON Environmental Pty Ltd accepts no liability or responsibility whatsoever for or in respect to any use or reliance upon this report by any third party.

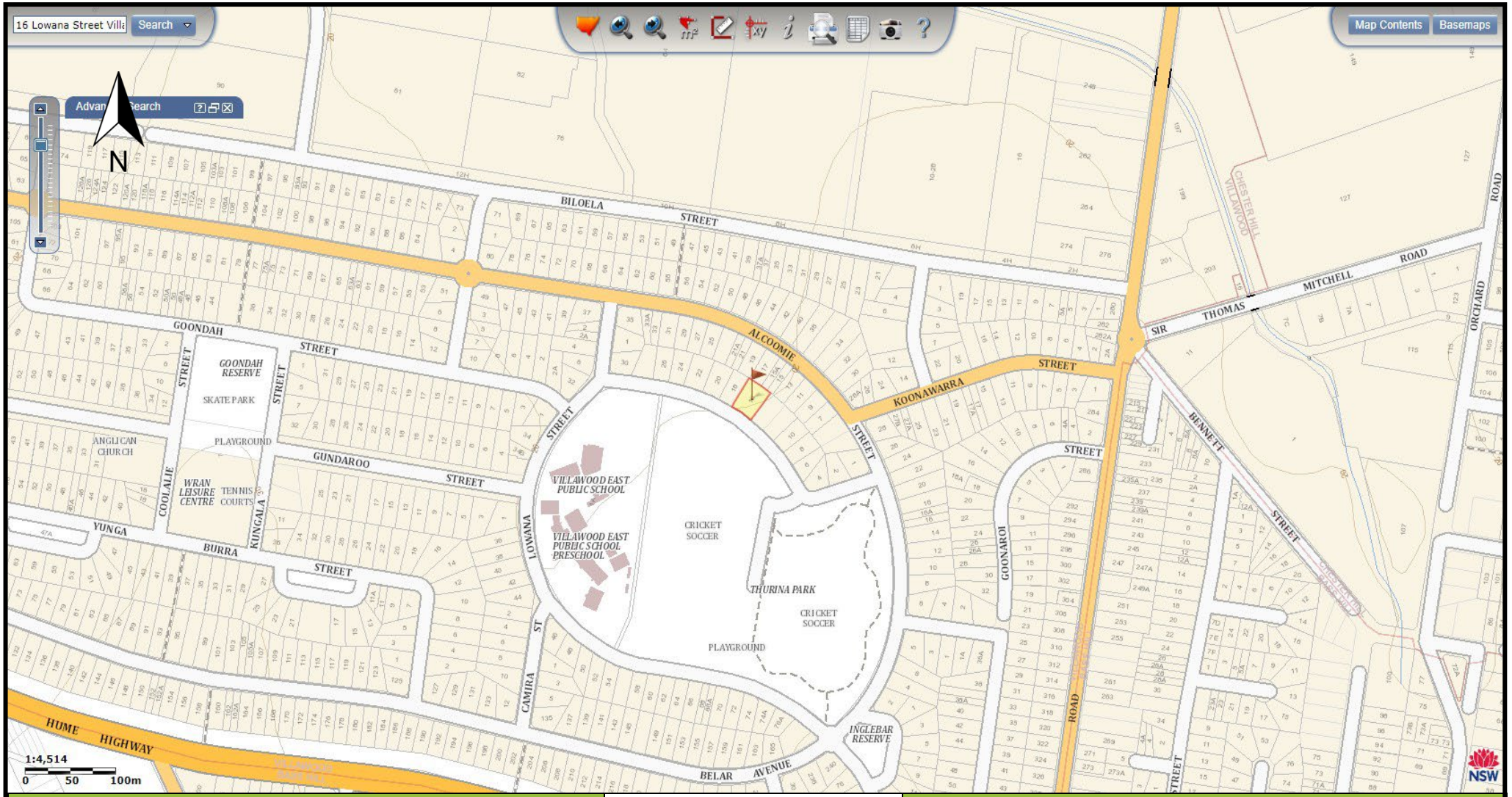
The information contained within this report have been prepared exclusively for the client. ECON Environmental Pty Ltd have prepared the report to address the risk associated with scale of the works. The report has been prepared with a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry in Australia. No other warranty, expressed or implied, is made or intended. This report is to be read in its entirety including attachments and appendices and should not read in individual sections.

A third party should not rely upon the information prior to making an assessment that the scope of work conducted meets their specific needs. ECON Environmental Pty Ltd cannot be held liable for third party reliance on this document.

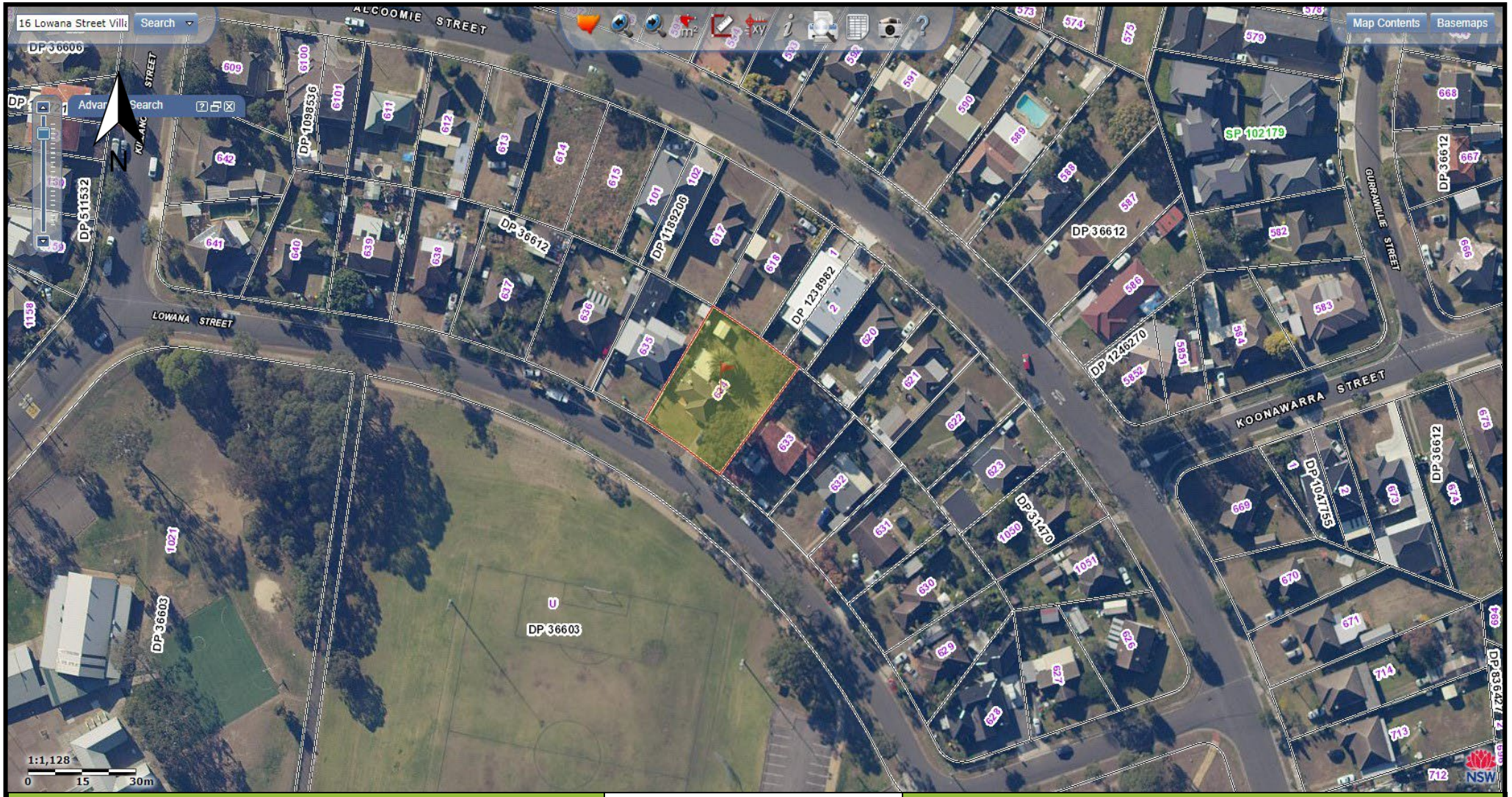
ECON Environmental Pty Ltd professional opinions are based upon its professional judgment, experience, training and results from analytical data. In some cases, further testing and analysis may be required, thus producing different results and/or opinions. ECON Environmental Pty Ltd has limited its investigation to the scope agreed upon with its client.

APPENDIX A: SITE PLANS

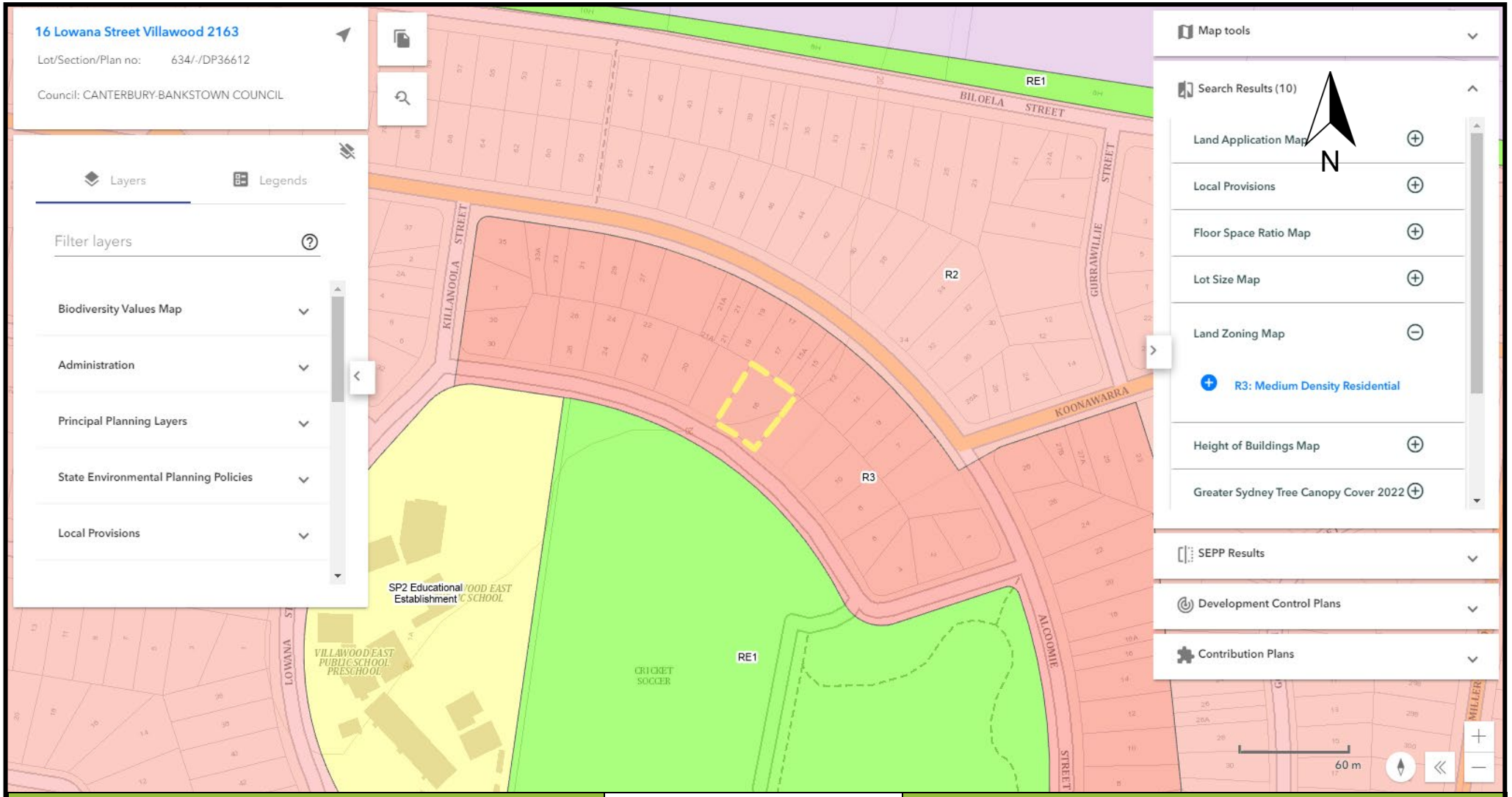
ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au



PROJECT DETAILS			DRAWING DETAILS: SITE LOCALITY			
Project Title	Detailed Site Investigation		Figure No.	1	Rev No.	0
Project No.	23-1551		Scale	As above	Size	A4
Client	Land and Housing Corporation – Department of Planning and Environment		Drawn by	CK	Date	19.12.2023
Site Address	16 Lowana Street, Villawood NSW 2163		Approved by	CK	Date	19.12.2023



PROJECT DETAILS			DRAWING DETAILS: SITE AERIAL			
Project Title	Detailed Site Investigation		Figure No.	2	Rev No.	0
Project No.	23-1551		Scale	As above	Size	A4
Client	Land and Housing Corporation – Department of Planning and Environment		Drawn by	CK	Date	19.12.2023
Site Address	16 Lowana Street, Villawood NSW 2163		Approved by	CK	Date	19.12.2023



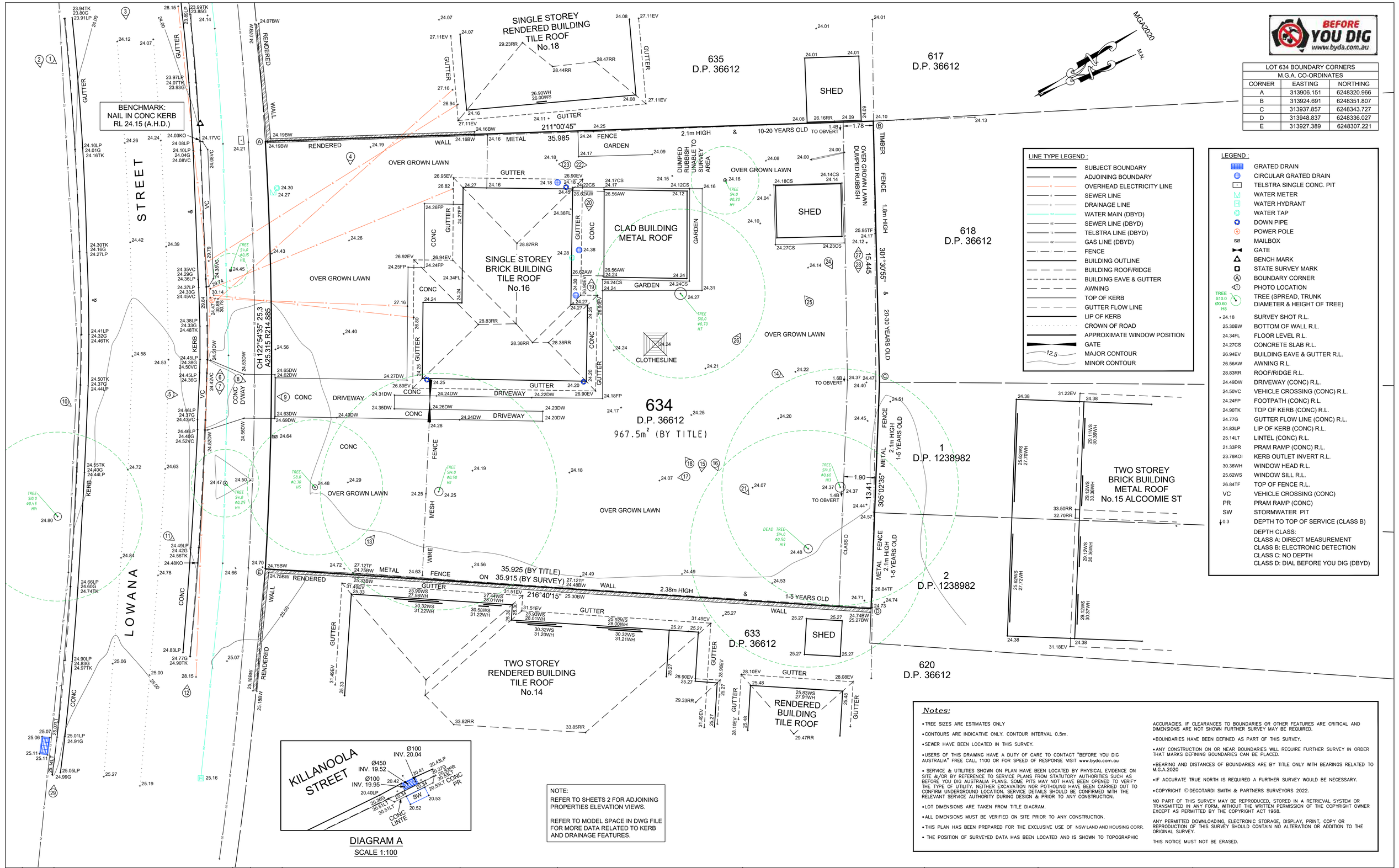
PROJECT DETAILS			DRAWING DETAILS: ZONING MAP			
Project Title	Detailed Site Investigation		Figure No.	3	Rev No.	0
Project No.	23-1551		Scale	As above	Size	A4
Client	Land and Housing Corporation – Department of Planning and Environment		Drawn by	CK	Date	19.12.2023
Site Address	16 Lowana Street, Villawood NSW 2163		Approved by	CK	Date	19.12.2023

PROJECT DETAILS			DRAWING DETAILS: TOPOGRAPHIC MAP			
Project Title	Detailed Site Investigation		Figure No.	4	Rev No.	0
Project No.	23-1551		Scale	As above	Size	A4
Client	Land and Housing Corporation – Department of Planning and Environment		Drawn by	CK	Date	19.12.2023
Site Address	16 Lowana Street, Villawood NSW 2163		Approved by	CK	Date	19.12.2023

PROJECT DETAILS			DRAWING DETAILS: POTENTIAL AREAS OF CONCERN			
Project Title	Detailed Site Investigation		Figure No.	5	Rev No.	0
Project No.	23-1496		Scale	As above	Size	A4
Client	Land and Housing Corporation – Department of Planning and Environment		Drawn by	CK	Date	19.12.2023
Site Address	16 Lowana Street, Villawood NSW 2163		Approved by	CK	Date	19.12.2023

APPENDIX B: DEVELOPMENT PLANS

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au



BEFORE YOU DIG www.byda.com.au

LOT 634 BOUNDARY CORNERS M.G.A. CO-ORDINATES		
CORNER	EASTING	NORTHING
A	313906.151	6248320.966
B	313924.691	6248351.807
C	313937.857	6248343.727
D	313948.837	6248336.027
E	313927.389	6248307.221

LINE TYPE LEGEND :

- SUBJECT BOUNDARY
- ADJOINING BOUNDARY
- OVERHEAD ELECTRICITY LINE
- SEWER LINE
- DRAINAGE LINE
- WATER MAIN (DBYD)
- SEWER LINE (DBYD)
- TELSTRA LINE (DBYD)
- GAS LINE (DBYD)
- FENCE
- BUILDING OUTLINE
- BUILDING ROOF/RIDGE
- BUILDING EAVE & GUTTER
- AWNING
- TOP OF KERB
- GUTTER FLOW LINE
- LIP OF KERB
- CROWN OF ROAD
- APPROXIMATE WINDOW POSITION
- GATE
- MAJOR CONTOUR
- MINOR CONTOUR

LEGEND :

- GRATED DRAIN
- CIRCULAR GRATED DRAIN
- TELSTRA SINGLE CONC. PIT
- WATER METER
- WATER HYDRANT
- WATER TAP
- DOWN PIPE
- POWER POLE
- MAILBOX
- GATE
- BENCH MARK
- STATE SURVEY MARK
- BOUNDARY CORNER
- PHOTO LOCATION
- TREE (SPREAD, TRUNK DIAMETER & HEIGHT OF TREE)
- 24.18 SURVEY SHOT R.L.
- 25.30BW BOTTOM OF WALL R.L.
- 24.34FL FLOOR LEVEL R.L.
- 24.27CS CONCRETE SLAB R.L.
- 26.94EV BUILDING EAVE & GUTTER R.L.
- 26.56AW AWNING R.L.
- 28.83RR ROOF/RIDGE R.L.
- 24.49DW DRIVEWAY (CONC) R.L.
- 24.50VC VEHICLE CROSSING (CONC) R.L.
- 24.24FP FOOTPATH (CONC) R.L.
- 24.90TK TOP OF KERB (CONC) R.L.
- 24.77G GUTTER FLOW LINE (CONC) R.L.
- 24.83LP LIP OF KERB (CONC) R.L.
- 25.14LT LINTEL (CONC) R.L.
- 21.33PR PRAM RAMP (CONC) R.L.
- 23.78KOI KERB OUTLET INVERT R.L.
- 30.36WH WINDOW HEAD R.L.
- 25.62WS WINDOW SILL R.L.
- 26.84TF TOP OF FENCE R.L.
- VC VEHICLE CROSSING (CONC)
- PR PRAM RAMP (CONC)
- SW STORMWATER PIT
- 0.3 DEPTH TO TOP OF SERVICE (CLASS B)

DEPTH CLASS:
CLASS A: DIRECT MEASUREMENT
CLASS B: ELECTRONIC DETECTION
CLASS C: NO DEPTH
CLASS D: DIAL BEFORE YOU DIG (DBYD)

NOTE:
REFER TO SHEETS 2 FOR ADJOINING PROPERTIES ELEVATION VIEWS.

REFER TO MODEL SPACE IN DWG FILE FOR MORE DATA RELATED TO KERB AND DRAINAGE FEATURES.

Notes:

- TREE SIZES ARE ESTIMATES ONLY
- CONTOURS ARE INDICATIVE ONLY. CONTOUR INTERVAL 0.5m.
- SEWER HAVE BEEN LOCATED IN THIS SURVEY.
- USERS OF THIS DRAWING HAVE A DUTY OF CARE TO CONTACT "BEFORE YOU DIG AUSTRALIA" FREE CALL 1100 OR FOR SPEED OF RESPONSE VISIT www.byda.com.au
- SERVICE & UTILITIES SHOWN ON PLAN HAVE BEEN LOCATED BY PHYSICAL EVIDENCE ON SITE &/OR BY REFERENCE TO SERVICE PLANS FROM STATUTORY AUTHORITIES SUCH AS BEFORE YOU DIG AUSTRALIA PLANS. SOME PITS MAY NOT HAVE BEEN OPENED TO VERIFY THE TYPE OF UTILITY. NEITHER EXCAVATION NOR POTHOLING HAVE BEEN CARRIED OUT TO CONFIRM UNDERGROUND LOCATION. SERVICE DETAILS SHOULD BE CONFIRMED WITH THE RELEVANT SERVICE AUTHORITY DURING DESIGN & PRIOR TO ANY CONSTRUCTION.
- LOT DIMENSIONS ARE TAKEN FROM TITLE DIAGRAM.
- ALL DIMENSIONS MUST BE VERIFIED ON SITE PRIOR TO ANY CONSTRUCTION.
- THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF NSW LAND AND HOUSING CORP.
- THE POSITION OF SURVEYED DATA HAS BEEN LOCATED AND IS SHOWN TO TOPOGRAPHIC ACCURACIES. IF CLEARANCES TO BOUNDARIES OR OTHER FEATURES ARE CRITICAL AND DIMENSIONS ARE NOT SHOWN FURTHER SURVEY MAY BE REQUIRED.
- BOUNDARIES HAVE BEEN DEFINED AS PART OF THIS SURVEY.
- ANY CONSTRUCTION ON OR NEAR BOUNDARIES WILL REQUIRE FURTHER SURVEY IN ORDER THAT MARKS DEFINING BOUNDARIES CAN BE PLACED.
- BEARING AND DISTANCES OF BOUNDARIES ARE BY TITLE ONLY WITH BEARINGS RELATED TO M.G.A.2020
- IF ACCURATE TRUE NORTH IS REQUIRED A FURTHER SURVEY WOULD BE NECESSARY.
-

No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT
1	24/10/22	FINAL ISSUE			

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL: -
DATUM: A.H.D.
ORIGIN OF DATUM: P.M.3357
R.L. 22.800 SCIMS
100 YEAR FLOOD RL:
RECOMMENDED MINIMUM FLOOR RL:
SOURCE OF FLOOD INFO:

LEGEND OF COMMONLY USED SYMBOLS

WATER, SEWER, ELECTRICITY, TELECOM, GAS, DRAINAGE, BENCH MARK, SURVEY CONTROL MARK, PM SSM

REDUCTION RATIO 1 : 100 @ A1

0 1 2 3 4 5 6 7 8 9 10

LAND TITLE INFORMATION

LOTS: 634
PLAN NOs : D.P.36612
OTHER:
AREA: 967.5m² (BY TITLE)

DATE OF SURVEY: 14 / 10 / 2022
SURVEY CONSULTANT:

Degotardi Smith & Partners
CONSULTING SURVEYORS ESTABLISHED 1957
1/9-11 Bridge Street | Pymble | NSW 2073 | Australia
t. (+61) 2 9440 1100 | f. (+61) 2 9440 1055
e. surveys@degotardi.com.au | w. www.degotardi.com.au

SURVEYORS REF : 36224A01.DWG

Registered Surveyor PAUL GARRETT

NSW GOVERNMENT Planning, Industry & Environment
HOUSING AND PROPERTY GROUP - Land & Housing Corporation

DRAWING TITLE
DETAIL & LEVEL SURVEY
-

LOCATION
VILLAWOOD

STREET ADDRESS
16 LOWANA STREET

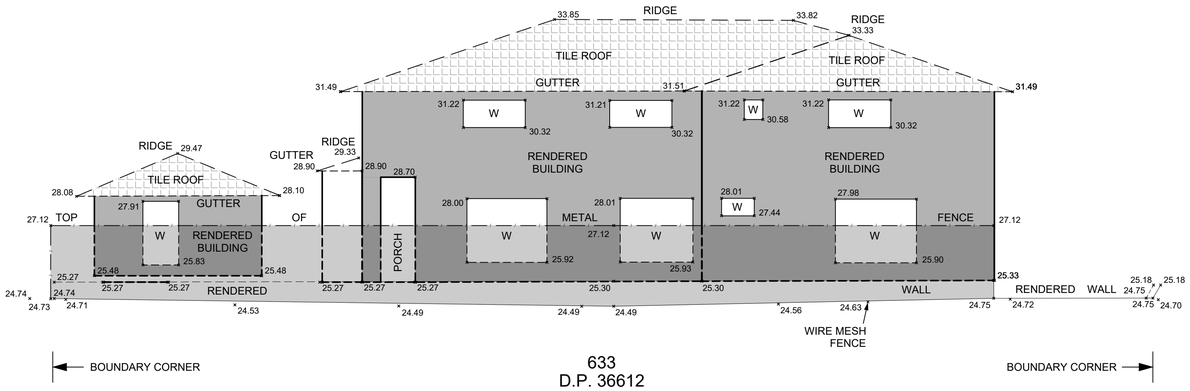
TYPE
S

SITE LAYOUT JOB
/ /

SHT. 1
OF 2

NOTES:

W DENOTES WINDOW

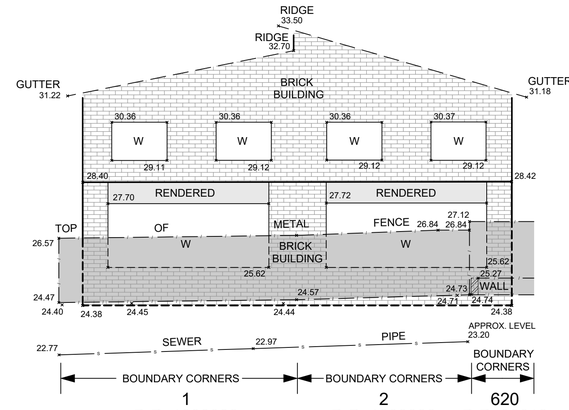


DATUM R.L. 20.000

BUILDING No.14
NORTH WEST ELEVATION VIEW
SCALE 1:100

NOTES:

W DENOTES WINDOW

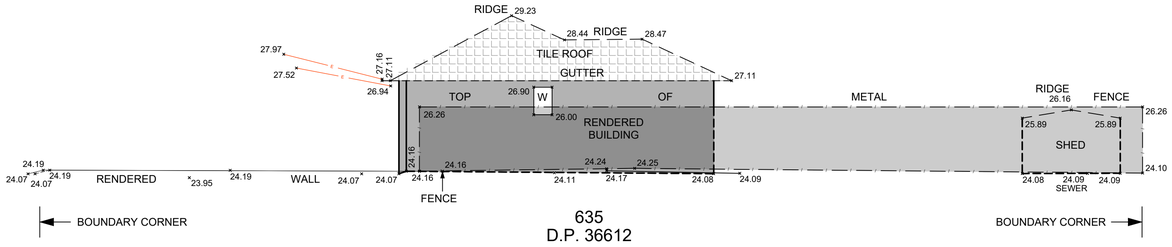


DATUM R.L. 20.000

BUILDING No.15
ALCOOMIE ST SOUTH WEST ELEVATION VIEW
SCALE 1:100

NOTES:

W DENOTES WINDOW



DATUM R.L. 20.000

BUILDING No.18
SOUTH EAST ELEVATION VIEW
SCALE 1:100

LOT 634 BOUNDARY CORNERS		
M.G.A. CO-ORDINATES		
CORNER	EASTING	NORTHING
A	313906.151	6248320.966
B	313924.691	6248351.807
C	313937.857	6248343.727
D	313948.837	6248336.027
E	313927.389	6248307.221

Notes:

- TREE SIZES ARE ESTIMATES ONLY
- CONTOURS ARE INDICATIVE ONLY. CONTOUR INTERVAL 0.5m.
- SEWER HAVE BEEN LOCATED IN THIS SURVEY.
- USERS OF THIS DRAWING HAVE A DUTY OF CARE TO CONTACT "BEFORE YOU DIG AUSTRALIA" FREE CALL 1100 OR FOR SPEED OF RESPONSE VISIT www.byda.com.au
- SERVICE & UTILITIES SHOWN ON PLAN HAVE BEEN LOCATED BY PHYSICAL EVIDENCE ON SITE &/OR BY REFERENCE TO SERVICE PLANS FROM STATUTORY AUTHORITIES SUCH AS BEFORE YOU DIG AUSTRALIA PLANS. SOME PITS MAY NOT HAVE BEEN OPENED TO VERIFY THE TYPE OF UTILITY. NEITHER EXCAVATION NOR POTHOLING HAVE BEEN CARRIED OUT TO CONFIRM UNDERGROUND LOCATION. SERVICE DETAILS SHOULD BE CONFIRMED WITH THE RELEVANT SERVICE AUTHORITY DURING DESIGN & PRIOR TO ANY CONSTRUCTION.
- LOT DIMENSIONS ARE TAKEN FROM TITLE DIAGRAM.
- ALL DIMENSIONS MUST BE VERIFIED ON SITE PRIOR TO ANY CONSTRUCTION.
- THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF NSW LAND AND HOUSING CORP.
- THE POSITION OF SURVEYED DATA HAS BEEN LOCATED AND IS SHOWN TO TOPOGRAPHIC ACCURACIES. IF CLEARANCES TO BOUNDARIES OR OTHER FEATURES ARE CRITICAL AND DIMENSIONS ARE NOT SHOWN FURTHER SURVEY MAY BE REQUIRED.
- BOUNDARIES HAVE BEEN DEFINED AS PART OF THIS SURVEY.
- ANY CONSTRUCTION ON OR NEAR BOUNDARIES WILL REQUIRE FURTHER SURVEY IN ORDER THAT MARKS DEFINING BOUNDARIES CAN BE PLACED.
- BEARING AND DISTANCES OF BOUNDARIES ARE BY TITLE ONLY WITH BEARINGS RELATED TO M.G.A.2020
- IF ACCURATE TRUE NORTH IS REQUIRED A FURTHER SURVEY WOULD BE NECESSARY.
-

No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT
1	24/10/22	FINAL ISSUE			

FILE	FILE SIZE (MB)	CHECKED BY

CONTOUR INTERVAL: -

DATUM: A.H.D.

ORIGIN OF DATUM: P.M.3357

R.L. 22.800 SCIMS

100 YEAR FLOOD RL:

RECOMMENDED MINIMUM FLOOR RL:

SOURCE OF FLOOD INFO:

LEGEND OF COMMONLY USED SYMBOLS

WATER, SEWER, ELECTRICITY, TELECOM, GAS, DRAINAGE – Common, – Main

BENCH MARK SURVEY CONTROL MARK PM SSM

REDUCTION RATIO 1 : 100 @ A1

0 1 2 3 4 5 6 7 8 9 10

LAND TITLE INFORMATION

LOTS: 634

PLAN NOs : D.P.36612

OTHER:

AREA: 967.5m² (BY TITLE)

DATE OF SURVEY: 14 / 10 / 2022

SURVEY CONSULTANT:

Degotardi Smith & Partners
CONSULTING SURVEYORS ESTABLISHED 1957
13b/11 Bridge Street | Pymble | NSW 2073 | Australia
t. (+61) 2 9440 1100 | f. (+61) 2 9440 1055
e. surveys@degotardi.com.au | w. www.degotardi.com.au

SURVEYORS REF : 36224A01.DWG

Registered Surveyor PAUL GARRETT

NSW GOVERNMENT Planning, Industry & Environment
HOUSING AND PROPERTY GROUP - Land & Housing Corporation

DRAWING TITLE

DETAIL & LEVEL SURVEY

-

LOCATION

VILLAWOOD

STREET ADDRESS

16 LOWANA STREET

TYPE

S

SITE	LAYOUT	JOB	SHT. 2
	/	/	OF 2

APPENDIX C: SITE PHOTOGRAPHS

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Photo 1: Showing borehole BH1 sampling location, 11.12.2023.

Photo 2: Showing borehole BH1 sampling location, looking northeast, 11.12.2023.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Photo 3: Showing borehole BH2 sampling location, 11.12.2023.

Photo 4: Showing borehole BH2 sampling location, looking northwest, 11.12.2023.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Photo 5: Showing borehole BH3 sampling location, 11.12.2023.

Photo 6: Showing borehole BH3 sampling location, looking southwest, 11.12.2023.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Photo 7: Showing borehole BH4 sampling location, 11.12.2023.

Photo 8: Showing borehole BH4 sampling location, looking west, 11.12.2023.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Photo 9: Showing borehole BH5 sampling location, 11.12.2023.

Photo 10: Showing borehole BH5 sampling location, looking south, 11.12.2023.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | E: info@econenvironmental.com.au | W: www.econenvironmental.com.au

Photo 11: Showing borehole BH6 sampling location, 11.12.2023.

Photo 12: Showing borehole BH6 sampling location, looking north, 11.12.2023.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Photo 13: Showing borehole BH7 sampling location, 11.12.2023.

Photo 14: Showing borehole BH7 sampling location, looking north, 11.12.2023.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Photo 15: Showing borehole BH8 sampling location, 11.12.2023.

Photo 16: Showing borehole BH8 sampling location, looking west, 11.12.2023.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Photo 17: Showing eastern portion of subject site. Looking north, 11.12.2023.

Photo 18: Showing main residence, looking north, 11.12.2023.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Photo 19: Showing backyard of subject site, looking northwest, 11.12.2023.

Photo 20: Showing front yard of subject site, looking west, 11.12.2023.

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

APPENDIX D: FIELDNOTES

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

Site Assessment
Daily Worksheet Record

ECON ENVIRONMENTAL

PROJECT NAME: DSI	**PROJECT NO:** 23-1557
CLIENT: Land & Housing Corp.	**DATE:** 11-12-23
SITE ADDRESS: 16 Lowana St Villawood	
SITE CONTACT: Darien D'Mello	**PHONE:** 0468318684
ECON REPRESENTATIVE: Eon Koniotaglou	
TITLE: Environmental Consultant	**PHONE:** 0452654962
FIELD NOTES:	

Start Time 10am.	Finish Time 12.30pm
Weather Sunny	Rainfall (mm) NIL
Wind Direction S	Wind Speed 9km/hr
Humidity 71%	Temperature 29.1°C.

Environmental and Safety Concerns

Odours Present NIL	Staining Present NIL
USTs Present NIL	ACM Present NIL
Chemicals Present NIL	Other Hazards Present NIL

Actions

Site Safety Induction N/A	Stormwater Control N/A
Dust Suppression N/A	Traffic Control N/A
Machinery onsite N/A	Equipment onsite Esky, PPE.

Other Comments: Hand Auger, Sample jars/bags ice blocks

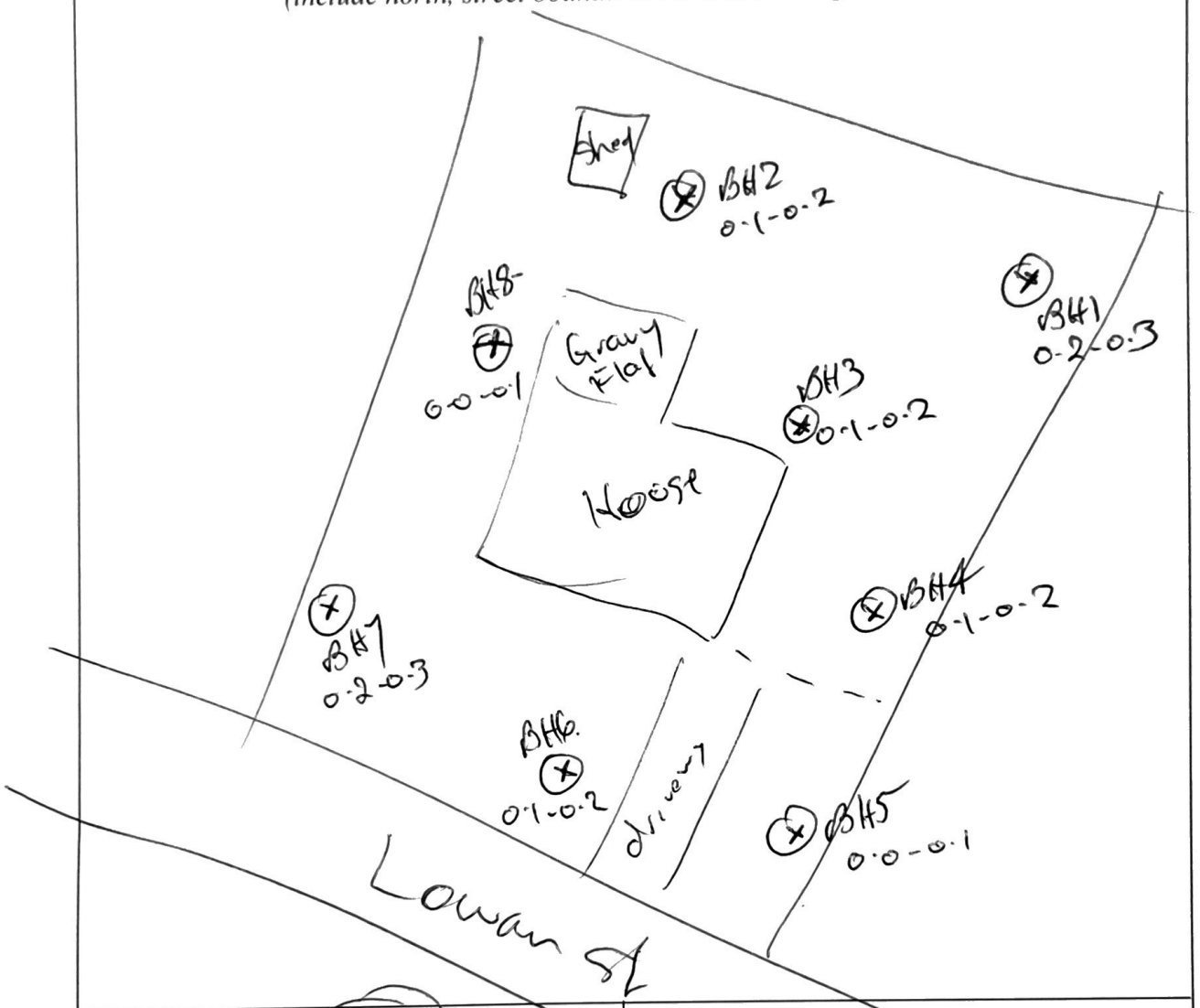
Description of Site Activities

ECON ENVIRONMENTAL

N

SKETCH OF SITE PLAN

(include north, street boundaries & surrounding land uses)



SOIL PROFILE

FILL

Silty Clay loam. with inclusions of rock & gravel. brown to dark brown

LEGEND / NOTES

Borehole sample location

Soil Sampling

ECON ENVIRONMENTAL

SOIL ASSESSMENT AND SAMPLING

Sample No. (show on site plan)	**Depth** (m)	**Material Description** Fill / Natural	**PID** (ppm)
(D1) BH1	0.2-0.3	(FILL) Silty Clay loam,	
BH2	0.1-0.2	brown to dark brown.	
BH3	0.1-0.2	with inclusions	
BH4	0.1-0.2	of rocks & gravel.	
BH5	0-0.1		
BH6	0.1-0.2	Natural - Silty Clay	
BH7	0.2-0.3	@ 0.3m BGL,	
BH8	0-0.1	orange brown.	

* No odours detected
* No oil staining detected
* No ACM detected

APPENDIX E: SITE ASSESSMENT CRITERIA

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

6 Tabulated investigation and screening levels

ROUNDING APPLIED TO INVESTIGATION AND SCREENING LEVELS

Tables 1A (HILs and interim HILs)

Rounded to 1 or 2 significant figures (see Schedule B7 Appendix C for details)

Tables 1A (HSLs) and 1B (EILs and ESLs) rounding rules

< 1	**to nearest 0.1**
1–<10	**to nearest whole number**
1–< 100	**to nearest 5**
100–<1,000	**to nearest 10**
1,000–<10,000	**to nearest 100**
≥10,000	**to nearest 1,000**

Numbers ending in '5' are rounded up, for example:

0.05 rounded to 0.1

1.5 rounded to 2

115 rounded to 120

Table 1A(1) Health investigation levels for soil contaminants

Chemical	Health-based investigation levels (mg/kg)			
	Residential[1] A	Residential[1] B	Recreational[1] C	Commercial/ industrial[1] D
Metals and Inorganics				
Arsenic[2]	100	500	300	3 000
Beryllium	60	90	90	500
Boron	4500	40 000	20 000	300 000
Cadmium	20	150	90	900
Chromium (VI)	100	500	300	3600
Cobalt	100	600	300	4000
Copper	6000	30 000	17 000	240 000
Lead[3]	300	1200	600	1 500
Manganese	3800	14 000	19 000	60 000
Mercury (inorganic)[5]	40	120	80	730
Methyl mercury[4]	10	30	13	180
Nickel	400	1200	1200	6 000
Selenium	200	1400	700	10 000
Zinc	7400	60 000	30 000	400 000
Cyanide (free)	250	300	240	1 500
Polycyclic Aromatic Hydrocarbons (PAHs)				
Carcinogenic PAHs (as BaP TEQ)[6]	3	4	3	40
Total PAHs[7]	300	400	300	4000
Phenols				
Phenol	3000	45 000	40 000	240 000
Pentachlorophenol	100	130	120	660
Cresols	400	4 700	4 000	25 000
Organochlorine Pesticides				
DDT+DDE+DDD	240	600	400	3600
Aldrin and dieldrin	6	10	10	45
Chlordane	50	90	70	530
Endosulfan	270	400	340	2000
Endrin	10	20	20	100
Heptachlor	6	10	10	50
HCB	10	15	10	80
Methoxychlor	300	500	400	2500
Mirex	10	20	20	100
Toxaphene	20	30	30	160
Herbicides				
2,4,5-T	600	900	800	5000
2,4-D	900	1600	1300	9000
MCPA	600	900	800	5000

Chemical	Health-based investigation levels (mg/kg)			
	Residential[1] A	Residential[1] B	Recreational[1] C	Commercial/ industrial[1] D
MCPB	600	900	800	5000
Mecoprop	600	900	800	5000
Picloram	4500	6600	5700	35000
Other Pesticides				
Atrazine	320	470	400	2500
Chlorpyrifos	160	340	250	2000
Bifenthrin	600	840	730	4500
Other Organics				
PCBs[8]	1	1	1	7
PBDE Flame Retardants (Br1–Br9)	1	2	2	10

Notes:

(1) Generic land uses are described in detail in Schedule B7 Section 3

HIL A – Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.

HIL B – Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.

HIL C – Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space where the potential for exposure is lower and where a site-specific assessment may be more appropriate.

HIL D – Commercial/industrial, includes premises such as shops, offices, factories and industrial sites.

(2) Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability may be important and should be considered where appropriate (refer Schedule B7).

(3) Lead: HIL is based on blood lead models (IEUBK for HILs A, B and C and adult lead model for HIL D where 50% oral bioavailability has been considered. Site-specific bioavailability may be important and should be considered where appropriate.

(4) Methyl mercury: assessment of methyl mercury should only occur where there is evidence of its potential source. It may be associated with inorganic mercury and anaerobic microorganism activity in aquatic environments. In addition the reliability and quality of sampling/analysis should be considered.

(5) Elemental mercury: HIL does not address elemental mercury. A site-specific assessment should be considered if elemental mercury is present, or suspected to be present,

(6) Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their TEFs (potency relative to B(a)P) adopted by CCME 2008 (refer Schedule B7). The B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF, given below, and summing these products.

PAH species	TEF	PAH species	TEF
Benzo(a)anthracene	0.1	Benzo(g,h,i)perylene	0.01
Benzo(a)pyrene	1	Chrysene	0.01
Benzo(b+j)fluoranthene	0.1	Dibenz(a,h)anthracene	1
Benzo(k)fluoranthene	0.1	Indeno(1,2,3-c,d)pyrene	0.1

Where the B(a)P occurs in bitumen fragments it is relatively immobile and does not represent a significant health risk.

(7) Total PAHs: HIL is based on the sum of the 16 PAHs most commonly reported for contaminated sites (WHO 1998). The application of the total PAH HIL should consider the presence of carcinogenic PAHs and naphthalene (the most volatile PAH). Carcinogenic PAHs reported in the total PAHs should meet the B(a)P TEQ HIL. Naphthalene reported in the total PAHs should meet the relevant HSL.

(8) PCBs: HIL relates to non-dioxin-like PCBs only. Where a PCB source is known, or suspected, to be present at a site, a site-specific assessment of exposure to all PCBs (including dioxin-like PCBs) should be undertaken.

Table 1A(2) Interim soil vapour health investigation levels for volatile organic chlorinated compounds

Chemical	Interim soil vapour HIL (mg/m^3)			
	Residential[1] A	Residential[1] B	Recreational[1] C	Commercial / Industrial[1] D
TCE	0.02	0.02	0.4	0.08
1,1,1-TCA	60	60	1200	230
PCE	2	2	40	8
cis-1,2-dichloroethene	0.08	0.08	2	0.3
Vinyl chloride	0.03	0.03	0.5	0.1

Notes:

1. Land use settings are equivalent to those described in Table 1A(1) Footnote 1 and Schedule B7, though secondary school buildings should be assessed using residential 'A/B' for vapour intrusion purposes.
2. Interim HILs for VOCCs are conservative soil vapour concentrations that can be adopted for the purpose of screening sites where further investigation is required on a site-specific basis. They are based on the potential for vapour intrusion using an indoor air-to-soil vapour attenuation factor of 0.1 and an outdoor air-to-soil vapour attenuation factor of 0.05.
3. Application of the interim HILs is based on a measurement of shallow (to 1 m depth) soil vapour (or deeper where the values are to be applied to a future building with a basement) or sub-slab soil vapour.
4. The applicability of the interim HILs needs to be further considered when used for other building types such as homes with a crawl-space and no slab, which may require site-specific assessment.
5. Use of the interim HILs requires comparison with data that has been collected using appropriate methods and meets appropriate data quality requirements.
6. Oral and dermal exposure should be considered on a site-specific basis where direct contact exposure is likely to occur.

Table 1A(3) Soil HSLs for vapour intrusion (mg/kg)

	HSL A & HSL B Low – high density residential				HSL C recreational / open space				HSL D Commercial / Industrial				
CHEMICAL	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4m**	**4 m+**	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**	**Soil saturation concentration (Csat)**
SAND													
Toluene	160	220	310	540	NL	NL	NL	NL	NL	NL	NL	NL	560
Ethylbenzene	55	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	64
Xylenes	40	60	95	170	NL	NL	NL	NL	230	NL	NL	NL	300
Naphthalene	3	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	9
Benzene	0.5	0.5	0.5	0.5	NL	NL	NL	NL	3	3	3	3	360
F1[9]	45	70	110	200	NL	NL	NL	NL	260	370	630	NL	950
F2[10]	110	240	440	NL	NL	NL	NL	NL	NL	NL	NL	NL	560
SILT													
Toluene	390	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	640
Ethylbenzene	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	69
Xylenes	95	210	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	330

	HSL A & HSL B Low – high density residential				HSL C recreational / open space				HSL D Commercial / Industrial				
Naphthalene	4	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	10
Benzene	0.6	0.7	1	2	NL	NL	NL	NL	4	4	6	10	440
F1[9]	40	65	100	190	NL	NL	NL	NL	250	360	590	NL	910
F2[10]	230	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	570
CLAY													
Toluene	480	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	630
Ethylbenzene	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	68
Xylenes	110	310	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	330
Naphthalene	5	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	10
Benzene	0.7	1	2	3	NL	NL	NL	NL	4	6	9	20	430
F1[9]	50	90	150	290	NL	NL	NL	NL	310	480	NL	NL	850
F2[10]	280	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	560

Notes:

(1) Land use settings are equivalent to those described in Table 1A(1) Footnote 1 and Schedule B7. HSLs for vapour intrusion for high density residential assume residential occupation of the ground floor. If communal car parks or commercial properties occupy the ground floor, HSL D should be used,

(2) The key limitations of the HSLs should be referred to prior to application and are presented in Friebel and Nadebaum (2011b and 2011d).

(3) Detailed assumptions in the derivation of the HSLs and information on how to apply the HSLs are presented in Friebel and Nadebaum (2011a and 2011b).

(4) Soil HSLs for vapour inhalation incorporate an adjustment factor of 10 applied to the vapour phase partitioning to reflect the differences observed between theoretical estimates of soil vapour partitioning and field measurements. Refer Friebel & Nadebaum (2011a) for further information.

(5) 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’.

(6) The HSLs for TPH C_6-C_{10} in sandy soil are based on a finite source that depletes in less than seven years, and therefore consideration has been given to use of sub-chronic toxicity values. The >C_8-C_{10} aliphatic toxicity has been adjusted to represent sub-chronic exposure, resulting in higher HSLs than if based on chronic toxicity. For further information refer to Section 8.2 and Appendix J in Friebel and Nadebaum (2011a).

(7) The figures in the above table may be multiplied by a factor to account for biodegradation of vapour. A factor of 10 may apply for source depths from 2 m to <4 m or a factor of 100 for source depths of 4 m and deeper. To apply the attenuation factor for vapour degradation, a number of conditions must be satisfied. Firstly the maximum length of the shorter side of the concrete slab and surrounding pavement cannot exceed 15 m, as this would prevent oxygen penetrating to the centre of the slab. Secondly, measurement of oxygen in the subsurface is required to determine the potential for biodegradation. Oxygen must be confirmed to be present at >5% to use these factors.

(8) 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.

(9) To obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction.

(10) To obtain F2 subtract naphthalene from the >C_{10}-C_{16} fraction.

Table 1A(4) Groundwater HSLs for vapour intrusion (mg/L)

	HSL A & HSL B Low – high density residential			HSL C recreational / open space			HSL D Commercial / industrial			
CHEMICAL	**2 m to <4 m**	**4 m to <8 m**	**8 m+**	**2 m to <4 m**	**4 m to <8 m**	**8 m+**	**2 m to <4 m**	**4 m to <8 m**	**8 m+**	**Solubility limit**
SAND										
Toluene	NL	NL	NL	NL	NL	NL	NL	NL	NL	61
Ethylbenzene	NL	NL	NL	NL	NL	NL	NL	NL	NL	3.9
Xylenes	NL	NL	NL	NL	NL	NL	NL	NL	NL	21
Naphthalene	NL	NL	NL	NL	NL	NL	NL	NL	NL	0.17
Benzene	0.8	0.8	0.9	NL	NL	NL	5	5	5	59
F1[7]	1	1	1	NL	NL	NL	6	6	7	9.0
F2[8]	1	1	1	NL	NL	NL	NL	NL	NL	3.0
SILT										
Toluene	NL	NL	NL	NL	NL	NL	NL	NL	NL	61
Ethylbenzene	NL	NL	NL	NL	NL	NL	NL	NL	NL	3.9
Xylenes	NL	NL	NL	NL	NL	NL	NL	NL	NL	21
Naphthalene	NL	NL	NL	NL	NL	NL	NL	NL	NL	0.17

	HSL A & HSL B Low – high density residential			HSL C recreational / open space			HSL D Commercial / industrial			
Benzene	4	5	5	NL	NL	NL	30	30	30	59
F1[7]	6	6	6	NL	NL	NL	NL	NL	NL	9.0
F2[8]	NL	NL	NL	NL	NL	NL	NL	NL	NL	3.0
CLAY										
Toluene	NL	NL	NL	NL	NL	NL	NL	NL	NL	61
Ethylbenzene	NL	NL	NL	NL	NL	NL	NL	NL	NL	3.9
Xylenes	NL	NL	NL	NL	NL	NL	NL	NL	NL	21
Naphthalene	NL	NL	NL	NL	NL	NL	NL	NL	NL	0.17
Benzene	5	5	5	NL	NL	NL	30	30	35	59
F1[7]	NL	NL	NL	NL	NL	NL	NL	NL	NL	9.0
F2[8]	NL	NL	NL	NL	NL	NL	NL	NL	NL	3.0

Notes:

(1) Land use settings are equivalent to those described in Table 1A(1) Footnote 1 and Schedule B7. HSLs for vapour intrusion for high density residential assume residential occupation of the ground floor. If communal car parks or commercial properties occupy the ground floor, HSL D should be used,

(2) The key limitations of the HSLs are presented in Friebel and Nadebaum (2011d) and should be referred to prior to application.

(3) Detailed assumptions in the derivation of the HSLs and information on the application of the HSLs are presented in Friebel and Nadebaum (2011a and 2011b).

(4) The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour that is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, 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'.

(5) The figures in the above table may be multiplied by a factor to account for biodegradation of vapour. A factor of 10 may apply for source depths from 2 m to <4 m or a factor of 100 for source depths of 4 m and deeper. To apply the attenuation factor for vapour degradation, a number of conditions must be satisfied. Firstly, the maximum length of the shorter side of the concrete slab and surrounding pavement cannot exceed 15 m, as this would prevent oxygen penetrating to the centre of the slab. Secondly, measurement of oxygen in the subsurface is required to determine the potential for biodegradation. Oxygen must be confirmed to be present at >5% to use these factors.

(6) 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.

(7) To obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction.

(8) To obtain F2 subtract naphthalene from the >C_{10}-C_{16} fraction.

Table 1A(5) Soil vapour HSLs for vapour intrusion (mg/m³)

	HSL A & HSL B Low – high density residential					HSL C recreational / open space					HSL D Commercial / Industrial				
CHEMICAL	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m to <8 m**	**8 m+**	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m to <8 m**	**8 m+**	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m to <8 m**	**8 m+**
SAND															
Toluene	1300	3800	7300	15 000	29 000	NL	NL	NL	NL	NL	4800	16 000	39 000	84 000	NL
Ethylbenzene	330	1100	2200	4300	8700	NL	NL	NL	NL	NL	1300	4600	11 000	25 000	53 000
Xylenes	220	750	1500	3000	6100	NL	NL	NL	NL	NL	840	3,200	8000	18 000	37 000
Naphthalene	0.8	3	6	10	25	410	NL	NL	NL	NL	3	15	35	75	150
Benzene	1	3	6	10	20	360	2400	4700	9500	19 000	4	10	30	65	130
F1[8]	180	640	1,300	2600	5300	86 000	NL	NL	NL	NL	680	2800	7000	15 000	32 000
F2[9]	130	560	1200	2400	4800	NL	NL	NL	NL	NL	500	2400	NL	NL	NL
SILT															
Toluene	1400	14 000	32 000	69 000	140 000	NL	NL	NL	NL	NL	5700	63 000	NL	NL	NL
Ethylbenzene	380	4200	9700	21 000	43 000	NL	NL	NL	NL	NL	1500	19 000	54 000	NL	NL
Xylenes	260	2900	6800	15 000	30 000	NL	NL	NL	NL	NL	1000	13 000	38 000	NL	NL
Naphthalene	0.9	10	25	60	120	NL	NL	NL	NL	NL	4	50	150	350	750
Benzene	1	10	25	55	110	1800	12 000	24 000	48 000	97 000	4	50	140	320	670
F1[8]	210	2600	6000	13 000	26 000	NL	NL	NL	NL	NL	850	11 000	33 000	77 000	160 000

	HSL A & HSL B Low – high density residential					HSL C recreational / open space					HSL D Commercial / Industrial				
F2[9]	160	2300	5400	NL	NL	NL	NL	NL	NL	NL	670	NL	NL	NL	NL
CLAY															
Toluene	1600	23 000	53 000	110 000	NL	NL	NL	NL	NL	NL	6500	100 000	NL	NL	NL
Ethylbenzene	420	6800	16 000	35 000	NL	NL	NL	NL	NL	NL	1800	31 000	NL	NL	NL
Xylenes	280	4800	11 000	24 000	50 000	NL	NL	NL	NL	NL	1200	21 000	NL	NL	NL
Naphthalene	1	20	45	95	200	NL	NL	NL	NL	NL	4	85	240	560	1200
Benzene	1	15	40	90	180	3000	20 000	40 000	81 000	160 000	5	80	230	530	1100
F1[8]	230	4200	9900	21 000	44 000	NL	NL	NL	NL	NL	1000	19 000	55 000	130 000	270 000
F2[9]	180	3,800	NL	NL	NL	NL	NL	NL	NL	NL	800	NL	NL	NL	NL

1. Land use settings are equivalent to those described in Table 1A(1) Footnote 1 and Schedule B7. HSLs for vapour intrusion for high density residential assume residential occupation of the ground floor. If communal car parks or commercial properties occupy the ground floor, HSL D should be used,
2. The key limitations of the HSLs should be referred to prior to application and are presented in Friebel and Nadebaum (2011b and 2011d).
3. Detailed assumptions in the derivation of the HSLs and information on how to apply the HSLs are presented in Friebel and Nadebaum (2011a and 2011b).
4. The maximum possible soil vapour concentrations have been calculated based on vapour pressures of the pure chemicals. Where soil vapour HSLs exceed these values a soil-specific 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'.
5. Soil vapour HSLs should be compared with measurements taken as laterally close as possible to the soil or groundwater sources of vapour (i.e. within or above vapour sources). Consideration is required of where the sample is taken, the current condition of the site and the likely future condition of the site. Shallow gas measurements in open space (less than 1 m below ground surface) may be subject to influences of weather conditions and moisture.
6. The figures in the above table may be multiplied by a factor to account for biodegradation of vapour. A factor of 10 may apply for source depths from 2 m to <4 m or a factor of 100 for source depths of 4 m and deeper. To apply the attenuation factor for vapour degradation, a number of conditions must be satisfied. Firstly, the maximum length of the shorter side of the concrete slab and surrounding pavement cannot exceed 15 m, as this would prevent oxygen penetrating to the centre of the slab. Secondly, measurement of oxygen in the subsurface is required to determine the potential for biodegradation. Oxygen must be confirmed to be present at >5% to use these factors.
7. 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.
8. To obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction.

9. To obtain F2 subtract naphthalene from the $>C_{10}$-C_{16} fraction.

Table 1B(1) Soil-specific added contaminant limits for aged zinc in soil

Zn added contaminant limits (ACL, mg added contaminant/kg)						
Areas of ecological significance						
pH[a]	***CEC[b] ($cmol_c/kg$)***					
	5	***10***	***20***	***30***	***40***	***60***
4.0	15	20	20	20	20	20
4.5	20	25	25	25	25	25
5.0	30	40	40	40	40	40
5.5	40	60	60	60	60	60
6.0	50	90	90	90	90	90
6.5	50	90	130	130	130	130
7.0	50	90	150	190	190	190
7.5	50	90	150	210	260	280
Urban residential/public open space[1]						
pH[a]	***CEC[b] ($cmol_c/kg$)***					
	5	***10***	***20***	***30***	***40***	***60***
4.0	70	85	85	85	85	85
4.5	100	120	120	120	120	120
5.0	130	180	180	180	180	180
5.5	180	270	270	270	270	270
6.0	230	400	400	400	400	400
6.5	230	400	590	590	590	590
7.0	230	400	700	880	880	880
7.5	230	400	700	960	1200	1300
Commercial/industrial						
pH[a]	***CEC[b] ($cmol_c/kg$)***					
	5	***10***	***20***	***30***	***40***	***60***
4.0	110	130	130	130	130	130
4.5	150	190	190	190	190	190
5.0	210	290	290	290	290	290
5.5	280	420	420	420	420	420
6.0	360	620	620	620	620	620
6.5	360	620	920	920	920	920
7.0	360	620	1100	1400	1400	1400
7.5	360	620	1100	1500	1900	2000

1. Urban residential/public open space is broadly equivalent to the HIL A, HIL B and HIL C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.
2. Aged values apply to contamination present in soil for at least two years. For fresh contamination refer to Schedule B5c.
3. The EIL is calculated from summing the ACL and the ABC.

a = pH measured using the $CaCl_2$ method (Rayment & Higginson 1992).

b = CEC measured using the silver thiourea method (Chabra et al. 1972).

Table 1B(2) Soil-specific added contaminant limits for aged copper in soils

Cu added contaminant limits (ACL, mg added contaminant/kg)					
Areas of ecological significance					
CEC ($cmol_c/kg$)[a] based					
5	***10***	***20***	***30***	***40***	***60***
30	65	70	70	75	80
pH[b] based					
4.5	***5.5***	***6***	***6.5***	***7.5***	***8.0***
20	45	65	90	190	270
Urban residential/public open space[1]					
CEC ($cmol_c/kg$)[a] based					
5	***10***	***20***	***30***	***40***	***60***
95	190	210	220	220	230
pH[b] based					
4.5	***5.5***	***6***	***6.5***	***7.5***	***8.0***
60	130	190	280	560	800
Commercial/industrial					
CEC ($cmol_c/kg$)[a] based					
5	***10***	***20***	***30***	***40***	***60***
140	280	300	320	330	340
pH[b] based					
4.5	***5.5***	***6***	***6.5***	***7.5***	***8.0***
85	190	280	400	830	1200

Notes:

1. Urban residential/public open space is broadly equivalent to the HIL A, HIL B and HIL C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.
2. The lower of the CEC or the pH-based ACLs for the land use and soil conditions is the ACL to be used.
3. Aged values apply to contamination present in soil for at least two years. For fresh contamination refer to Schedule B5c.
4. The EIL is calculated from summing the ACL and the ABC.

a = CEC measured using the silver thiourea method (Chabra et al. 1972).

b = pH measured using the $CaCl_2$ method (Rayment & Higginson 1992).

Table 1B(3) Soil-specific added contaminant limits for aged chromium III and nickel in soil

CHEMICAL	Clay content (% clay)	Added contaminant limits (mg added contaminant/kg) for various land uses		
		Areas of ecological significance	Urban residential and public open space	Commercial and industrial
Chromium III	*1*	60	190	310
	2.5	80	250	420
	5	100	320	530
	≥10	130	400	660
Nickel	CEC[a] ($cmol_c/kg$)	Areas of ecological significance	Urban residential and public open space[1]	Commercial and industrial
	5	5	30	55
	10	30	170	290
	20	45	270	460
	30	60	350	600
	40	70	420	730
	60	95	560	960

Notes:

1. Urban residential/public open space is broadly equivalent to the HIL A, HIL B and HIL C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.
2. Aged values apply to contamination present in soil for at least two years. For fresh contamination refer to Schedule B5c.
3. The EIL is calculated from summing the ACL and the ABC.

a = CEC measured using the silver thiourea method (Chabra et al. 1972).

Table 1B(4) Generic added contaminant limits for lead in soils irrespective of their physicochemical properties

	Pb added contaminant limit (ACL, mg added contaminant/kg) for various land uses		
CHEMICAL	Areas of ecological significance	Urban residential and public open space[1]	Commercial and industrial
Lead	470	1100	1800

Notes:

1. Urban residential/public open space is broadly equivalent to the HIL A, HIL B and HIL C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.
2. Aged values are applicable to lead contamination present in soil for at least two years. For fresh contamination refer to Schedule B5c.
3. The EIL is calculated from summing the ACL and the ABC.

Table 1B(5) Generic EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties

	Ecological Investigation Levels (mg total contaminant/kg)		
CHEMICAL	**Areas of ecological significance**	**Urban residential and public open space[1]**	**Commercial and industrial**
Arsenic[2]	40	100	160
DDT[3]	3	180	640
Naphthalene[3]	10	170	370

Notes:

1. Urban residential/public open space is broadly equivalent to the HIL-A, HIL-B and HIL-C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.
2. Aged values are applicable to arsenic contamination present in soil for at least two years. For fresh contamination refer to Schedule B5c.
3. Insufficient data was available to calculate aged values for DDT and naphthalene, consequently the values for fresh contamination should be used.
4. Insufficient data was available to calculate ACLs for As, DDT and naphthalene. The EIL should be taken directly from Table 1B(5).

Table 1B(6) ESLs for TPH fractions F1 – F4, BTEX and benzo(a)pyrene in soil

CHEMICAL	Soil texture	ESLs (mg/kg dry soil)		
		Areas of ecological significance	Urban residential and public open space	Commercial and industrial
F1 C_6-C_{10}	*Coarse/ Fine*	125*	180*	215*
F2 >C_{10}-C_{16}		25*	120*	170*
F3 >C_{16}-C_{34}	*Coarse*	-	300	1700
	Fine	-	1300	2500
F4 >C_{34}-C_{40}	*Coarse*	-	2800	3300
	Fine	-	5600	6600
Benzene	*Coarse*	10	50	75
	Fine	10	65	95
Toluene	*Coarse*	10	85	135
	Fine	65	105	135
Ethylbenzene	*Coarse*	1.5	70	165
	Fine	40	125	185
Xylenes	*Coarse*	10	105	180
	Fine	1.6	45	95
Benzo(a)pyrene	*Coarse*	0.7	0.7	0.7
	Fine	0.7	0.7	0.7

Notes:

(1) ESLs are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability.

(2) '-' indicates that insufficient data was available to derive a value.

(3) To obtain F1, subtract the sum of BTEX concentrations from C_6-C_{10} fraction and subtract naphthalene from >C_{10}-C_{16} to obtain F2.

Table 1 B(7) Management Limits for TPH fractions F1–F4 in soil

TPH fraction	Soil texture	Management Limits[1] (mg/kg dry soil)	
		Residential, parkland and public open space	Commercial and industrial
F1[2] C_6- C_{10}	*Coarse*	700	700
	Fine	800	800
F2[2] >C_{10}-C_{16}	*Coarse*	1000	1000
	Fine	1000	1000
F3 >C_{16}-C_{34}	*Coarse*	2500	3500
	Fine	3500	5000
F4 >C_{34}-C_{40}	*Coarse*	10 000	10 000
	Fine	10 000	10 000

[1] Management limits are applied after consideration of relevant ESLs and HSLs

[2] 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.

Table 1C Groundwater Investigation Levels (GILs)

Substance		Groundwater Investigation Levels		
		Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
		(µg/L)	(µg/L)	(mg/L)
Metals and Metalloids				
Aluminium, Al pH>6.5		55	-	-
Antimony		-	-	0.003
Arsenic		24 as As(III) 13 as As(V)	-	0.01
Barium		-	-	2
Beryllium		-	-	0.06
Boron		370[C]	-	4
Cadmium	H	0.2	0.7[D]	0.002
Chromium, Cr (III)	H	-	27	-
Chromium, Cr (VI)		1[C]	4.4	0.05
Cobalt		-	1	-
Copper	H	1.4	1.3	2
Iron, (Total)		-	-	-
Lead	H	3.4	4.4	0.01
Manganese		1900[C]	-	0.5
Mercury (Total)		0.06[D]	0.1[D]	0.001
Molybdenum		-	-	0.05
Nickel	H	11	7	0.02
Selenium (Total)		5[D]	-	0.01
Silver		0.05	1.4	0.1
Tributyl tin (as Sn)		-	0.006[C]	-
Tributyl tin oxide		-	-	0.001
Uranium		-	-	0.017
Vanadium		-	100	-
Zinc	H	8[C]	15[C]	-
Non-metallic Inorganics				
Ammonia[E] (as NH_3-N at pH 8)		900[C]	910	-
Bromate		-	-	0.02
Chloride		-	-	-
Cyanide (as un-ionised Cn)		7	4	0.08
Fluoride		-	-	1.5
Hydrogen sulphide (un-ionised H_2S measured as S)		1	-	-
Iodide		-	-	0.5

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
Nitrate (as NO_3)	refer to guideline	refer to guideline	50
Nitrite (as NO_2)	refer to guideline	refer to guideline	3
Nitrogen	refer to guideline	refer to guideline	-
Phosphorus	refer to guideline	refer to guideline	-
Sulphate (as SO_4)	-	-	500
Organic alchohols/other organics			
Ethanol	1400	-	-
Ethylenediamine tetra-acetic acid (EDTA)	-	-	0.25
Formaldehyde	-	-	0.5
Nitrilotriacetic acid	-	-	0.2
Anilines			
Aniline	8	-	-
2,4-Dichloroaniline	7	-	-
3,4-Dichloroaniline	3	150	-
Chlorinated Alkanes			
Dichloromethane	-	-	0.004
Trichloromethane (chloroform)	-	-	0.003
Trihalomethanes (total)	-	-	0.25
Tetrachloromethane (carbon tetrachloride)	-	-	0.003
1,2-Dichloroethane	-	-	0.003
1,1,2-Trichloroethane	6500	1900	-
Hexachloroethane	290[D]	-	-
Chlorinated Alkenes			
Chloroethene (vinyl chloride)	-	-	0.0003
1,1-Dichloroethene	-	-	0.03
1,2-Dichoroethene	-	-	0.06
Tetrachloroethene (PCE) (Perchloroethene)	-	-	0.05
Chlorinated Benzenes			
Chlorobenzene	-	-	0.3
1,2- Dichlorobenzene	160	-	1.5
1,3- Dichlorobenzene	260	-	-

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
1,4- Dichlorobenzene	60	-	0.04
1,2,3- Trichlorobenzene	3[D]	-	0.03 for individual or total trichlorobenzenes
1,2,4- Trichlorobenzene	85[D]	20[D]	
1,3,5-Trichlorobenzene	-	-	
Polychlorinated Biphenyls (PCBs)			
Aroclor 1242	0.3[D]	-	-
Aroclor 1254	0.01[D]	-	-
Other Chlorinated Compounds			
Epichlorohydrin	-	-	0.1
Hexachlorobutadiene	-	-	0.0007
Monochloramine	-	-	3
Monocyclic Aromatic Hydrocarbons			
Benzene	950	500[C]	0.001
Toluene	-	-	0.8
Ethylbenzene	-	-	0.3
Xylenes	350 (as o-xylene) 200 (as p-xylene)	-	0.6
Styrene (Vinyl benzene)	-	-	0.03
Polycyclic Aromatic Hydrocarbons (PAHs)			
Naphthalene	16	50[C]	-
Benzo[a]pyrene	-	-	0.00001
Phenols			
Phenol	320	400	-
2-Chlorophenol	340[C]	-	0.3
4-Chlorophenol	220	-	-
2,4-Dichlorophenol	120	-	0.2
2,4,6-Trichlorophenol	3[D]	-	0.02
2,3,4,6-Tetrachlorophenol	10[D]	-	-
Pentachlorophenol	3.6[D]	11[D]	0.01
2,4-Dinitrophenol	45	-	-
Phthalates			
Dimethylphthalate	3700	-	-
Diethylphthalate	1000	-	-
Dibutylphthalate	10[D]	-	-
Di(2-ethylhexyl) phthalate	-	-	0.01

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
Pesticides			
Acephate	-	-	0.008
Aldicarb	-	-	0.004
Aldrin plus Dieldrin	-	-	0.0003
Ametryn	-	-	0.07
Amitraz	-	-	0.009
Amitrole	-	-	0.0009
Asulam	-	-	0.07
Atrazine	13	-	0.02
Azinphos-methyl	-	-	0.03
Benomyl	-	-	0.09
Bentazone	-	-	0.4
Bioresmethrin	-	-	0.1
Bromacil	-	-	0.4
Bromoxynil	-	-	0.01
Captan	-	-	0.4
Carbaryl	-	-	0.03
Carbendazim (Thiophanate-methyl)	-	-	0.09
Carbofuran	0.06	-	0.01
Carboxin	-	-	0.3
Carfentrazone-ethyl	-	-	0.1
Chlorantraniliprole	-	-	6
Chlordane	0.03[D]	-	0.002
Chlorfenvinphos	-	-	0.002
Chlorothalonil	-	-	0.05
Chlorpyrifos	0.01[D]	0.009[D]	0.01
Chlorsulfuron	-	-	0.2
Clopyralid	-	-	2
Cyfluthrin, Beta-cyfluthrin	-	-	0.05
Cypermethrin isomers	-	-	0.2
Cyprodinil	-	-	0.09
1,3-Dichloropropene	-	-	0.1
2,2-DPA	-	-	0.5
2,4-D [2,4-dichlorophenoxy acetic acid]	280	-	0.03
DDT	0.006[D]	-	0.009
Deltramethrin	-	-	0.04

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
Diazinon	0.01	-	0.004
Dicamba	-	-	0.1
Dichloroprop	-	-	0.1
Dichlorvos	-	-	0.005
Dicofol	-	-	0.004
Diclofop-methyl	-	-	0.005
Dieldrin plus Aldrin	-	-	0.0003
Diflubenzuron	-	-	0.07
Dimethoate	0.15	-	0.007
Diquat	1.4	-	0.007
Disulfoton	-	-	0.004
Diuron	-	-	0.02
Endosulfan	0.03[D]	0.005[D]	0.02
Endothal	-	-	0.1
Endrin	0.01[D]	0.004[D]	-
EPTC	-	-	0.3
Esfenvalerate	-	-	0.03
Ethion	-	-	0.004
Ethoprophos	-	-	0.001
Etridiazole	-	-	0.1
Fenamiphos	-	-	0.0005
Fenarimol	-	-	0.04
Fenitrothion	0.2	-	0.007
Fenthion	-	-	0.007
Fenvalerate	-	-	0.06
Fipronil	-	-	0.0007
Flamprop-methyl	-	-	0.004
Fluometuron	-	-	0.07
Fluproponate	-	-	0.009
Glyphosate	370	-	1
Haloxyfop	-	-	0.001
Heptachlor	0.01[D]	-	-
Heptachlor epoxide	-	-	0.0003
Hexazinone	-	-	0.4
Imazapyr	-	-	9
Iprodione	-	-	0.1
Lindane (γ-HCH)	0.2	-	0.01

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
Malathion	0.05	-	0.07
Mancozeb (as ETU, ethylene thiourea)	-	-	0.009
MCPA	-	-	0.04
Metaldehyde	-	-	0.02
Metham (as methylisothiocyanate, MITC)	-	-	0.001
Methidathion	-	-	0.006
Methiocarb	-	-	0.007
Methomyl	3.5		0.02
Methyl bromide	-	-	0.001
Metiram (as ETU, ethylene thiourea)	-	-	0.009
Metolachlor/s–Metolachlor	-	-	0.30
Metribuzin	-	-	0.07
Metsulfuron-methyl	-	-	0.04
Mevinphos	-	-	0.006
Molinate	3.4	-	0.004
Napropamide	-	-	0.4
Nicarbazin	-	-	1
Norflurazon	-	-	0.05
Omethoate	-	-	0.001
Oryzalin	-	-	0.4
Oxamyl	-	-	0.007
Paraquat	-	-	0.02
Parathion	0.004[C]	-	0.02
Parathion methyl	-	-	0.0007
Pebulate	-	-	0.03
Pendimethalin	-	-	0.4
Pentachlorophenol	-	-	0.01
Permethrin	-	-	0.2
Picloram	-	-	0.30
Piperonyl butoxide	-	-	0.6
Pirimicarb	-	-	0.007
Pirimiphos methyl	-	-	0.09
Polihexanide	-	-	0.7
Profenofos	-	-	0.0003

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)
Propachlor	-	-	0.07
Propanil	-	-	0.7
Propargite	-	-	0.007
Proparzine	-	-	0.05
Propiconazole	-	-	0.1
Propyzamide	-	-	0.07
Pyrasulfatole	-	-	0.04
Pyrazophos	-	-	0.02
Pyroxsulam	-	-	4
Quintozene	-	-	0.03
Simazine	3.2	-	0.02
Spirotetramat	-	-	0.2
Sulprofos	-	-	0.01
2,4,5-T	36	-	0.1
Tebuthiuron	2.2	-	-
Temephos	-	0.05[D]	0.4
Terbacil	-	-	0.2
Terbufos	-	-	0.0009
Terbuthylazine	-	-	0.01
Terbutryn	-	-	0.4
Thiobencarb	2.8	-	0.04
Thiometon	-	-	0.004
Thiram	0.01	-	0.007
Toltrazuril	-	-	0.004
Toxafene	0.1 [D]	-	-
Triadimefon	-	-	0.09
Trichlorfon	-	-	0.007
Triclopyr	-	-	0.02
Trifluralin	2.6[D]	-	0.09
Vernolate	-	-	0.04
Surfactants			
Linear alkylbenzene sulfonates (LAS)	280	-	-
Alcohol ethoxylated sulfate (AES)	650	-	-
Alcohol ethoxylated surfactants (AE)	140	-	-

Substance	Groundwater Investigation Levels		
	Fresh Waters[A]	Marine Waters[A]	Drinking Water[B]
	(µg/L)	(µg/L)	(mg/L)

A Investigation levels apply to typical slightly-moderately disturbed systems. See ANZECC & ARMCANZ (2000) for guidance on applying these levels to different ecosystem conditions.

B Investigation levels are taken from the health values of the Australian Drinking Water Guidelines (NHMRC 2011).

C Figure may not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for further guidance.

D Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer to ANZECC & ARMCANZ (2000) for further guidance.

E For changes in GIL with pH refer to ANZECC & ARMCANZ (2000) for further guidance.

H Values have been calculated using a hardness of 30 mg/L $CaCO_3$ refer to ANZECC & ARMCANZ (2000) for further guidance on recalculating for site-specific hardness.

APPENDIX F: SUMMARY OF RESULTS

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

TABLE A
SCHEDULE OF LABORATORY TESTING

Analyte / Analyte Group Sample	Depth (m)	TYPE	SAMPLING DATE	DUPLICATE	MET-8	TPH & BTEX	PAH	OCP	PCB	PHENOLS	ASBESTOS
BH1	0.2-0.3	F	11.12.2023	D1	✔	✔	✔	✔	✔	✔	✔
BH2	0.1-0.2	F	11.12.2023		✔	✔	✔	✔	✔	✔	✔
BH3	0.1-0.2	F	11.12.2023		✔	✔	✔	✔	✔	✔	✔
BH4	0.1-0.2	F	11.12.2023		✔	✔	✔	✔	✔	✔	✔
BH5	0.0-0.1	F	11.12.2023		✔	✔	✔	✔	✔	✔	✔
BH6	0.1-0.2	F	11.12.2023		✔	✔	✔	✔	✔	✔	✔
BH7	0.2-0.3	F	11.12.2023		✔	✔	✔	✔	✔	✔	✔
BH8	0.0-0.1	F	11.12.2023		✔	✔	✔	✔	✔	✔	✔

Notes

MET-8:	arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc
OCP :	Organochlorine Pesticides
OPP :	Organophosphorus Pesticides
PCB :	Polychlorinated Biphenyls
VOC:	Volatile Organic Compounds
PAH:	Polycyclic Aromatic Hydrocarbons
TPH:	Total Petroleum Hydrcarbons
BTEX:	Benzene, Toluene, Ethyl Benzene, Xylene
F,T,N:	Fill, Topsoil, Natural

TABLE B

HEAVY METALS TEST RESULTS FOR HILs & ESLs

Analyte / Sample Location	Sample Date	Depth (m)	HEAVY METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM (VI)	COPPER	MERCURY	NICKEL	LEAD [g]	ZINC
BH1	11.12.2023	0.2-0.3	8	<1	18	20	<0.1	9	56	114
BH2	11.12.2023	0.1-0.2	18	<1	37	14	<0.1	5	26	39
BH3	11.12.2023	0.1-0.2	<5	<1	8	9	<0.1	5	37	70
BH4	11.12.2023	0.1-0.2	<5	<1	12	15	<0.1	7	81	96
BH5	11.12.2023	0.0-0.1	11	<1	28	17	<0.1	7	56	90
BH6	11.12.2023	0.1-0.2	<5	<1	12	30	<0.1	8	56	72
BH7	11.12.2023	0.2-0.3	8	<1	20	18	<0.1	8	38	178
BH8	11.12.2023	0.0-0.1	7	<1	18	29	<0.1	10	90	196
Practical Quantitation Limits (PQL)			5	1	2	5	0.1	2	5	5
NATIONAL ENVIRONMENT PROTECTION MEASURE (2013)										
Health Investigation Levels (HIL) - Table 1A (1)										
HIL A [a]			100	20	100	6000	40[e] / 10[f]	400	300	7400
HIL B [b]			500	150	500	30,000	120[e] / 30[f]	1200	1200	60,000
HIL C [c]			300	90	300	17,000	80[e] / 13[f]	1200	600	30,000
HIL D [d]			3000	900	3600	240,000	730[e] / 180[f]	6000	1500	400,000
Ecological Investigation Levels (EIL) - Table 1B (5)										
Areas of ecological significance			40[h]							
Urban residential and public open space [i]			100[h]							
Commercial and industrial			160[h]							

Notes

a: Residential with garden/accessible soil (home grown poduce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.

b: Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high rise buildings and apartments.

c: Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space where the potential for exposure is lower and where a site-specific assessment may be more appropriate

d: Commercial/industrial, includes premises such as shops, offices, factories and industrial sites

e: Elemental mercury: HIL does not address elemental mercury. A site-specific assessment should be considered if elemental mercury is present, or suspected to be present,

f: Methyl mercury: assessment of methyl mercury should only occur where there is evidence of its potential source. It may be associated with inorganic mercury and anaerobic microorganism activity in aquatic environments. In addition the reliability and quality of sampling/analysis should be considered.

g: Lead: HIL is based on blood lead models (IEUBK for HILs A, B and C and adult lead model for HIL D where 50% oral bioavailability has been considered. Site-specific bioavailability may be important and should be considered where appropriate.

h: Aged values are applicable to arsenic contamination present in soil for at least two years. For fresh contamination refer to Schedule B5c.

i: Urban residential / public open space is broadly equivalent to the HIL-A, HIL-B and HIL-C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.

TABLE C
TOTAL RECOVERABLE HYDROCARBONS (TRH), BTEX AND NAPHTHALENE TEST RESULTS FOR HSLs IN CLAY

Analyte / Sample Location	Sample Date	Depth (m)	TRH (mg/kg) F1 [a]	TRH (mg/kg) F2 [b]	BTEX (mg/kg) BENZENE	BTEX (mg/kg) TOLUENE	BTEX (mg/kg) ETHYL BENZENE	BTEX (mg/kg) TOTAL XYLENES	PAH (mg/kg) NAPHTHALENE
BH1	11.12.2023	0.2-0.3	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5
BH2	11.12.2023	0.1-0.2	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5
BH3	11.12.2023	0.1-0.2	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5
BH4	11.12.2023	0.1-0.2	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5
BH5	11.12.2023	0.0-0.1	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5
BH6	11.12.2023	0.1-0.2	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5
BH7	11.12.2023	0.2-0.3	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5
BH8	11.12.2023	0.0-0.1	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5
Practical Quantitation Limits (PQL)			10	50	0.2	0.5	0.5	0.5	0.5
NATIONAL ENVIRONMENT PROTECTION MEASURE (2013)									
Health Screening Levels (HSL) - Table 1A (3)									
HSL A & HSL B: Low-high density residential									
Source depth - 0m to <1m			50	280	0.7	480	NL	110	5
Source depth - 1m to <2m			90	NL	1	NL	NL	310	NL
Source depth - 2m to <4m			150	NL	2	NL	NL	NL	NL
Source depth - 4m +			290	NL	3	NL	NL	NL	NL
HSL C: recreational / open space									
Source depth - 0m to <1m			NL	NL	NL	NL	NL	NL	NL
Source depth - 1m to <2m			NL	NL	NL	NL	NL	NL	NL
Source depth - 2m to <4m			NL	NL	NL	NL	NL	NL	NL
Source depth - 4m +			NL	NL	NL	NL	NL	NL	NL
HSL D: Commercial / Industrial									
Source depth - 0m to <1m			310	NL	4	NL	NL	NL	NL
Source depth - 1m to <2m			480	NL	6	NL	NL	NL	NL
Source depth - 2m to <4m			NL	NL	9	NL	NL	NL	NL
Source depth - 4m +			NL	NL	20	NL	NL	NL	NL

Notes
a: To obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction.
b: To obtain F2 subtract naphthalene from the >C_{10}-C_{16} fraction.
NL: Not Limiting

TABLE D
TOTAL RECOVERABLE HYDROCARBONS (TRH), BTEX AND BENZO(a)PYRENE TEST RESULTS
ESLs FOR FINE GRAINED SOIL TEXTURE

Analyte / Sample Location	Sample Date	Depth (m)	TRH (mg/kg)				BTEX (mg/kg)				PAH (mg/kg)
			F1 (C_6-C_{10}) [a]	F2 (>C_{10}-C_{16}) [b]	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{40})	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	BENZO(a)PYRENE
BH1	11.12.2023	0.2-0.3	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
BH2	11.12.2023	0.1-0.2	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
BH3	11.12.2023	0.1-0.2	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
BH4	11.12.2023	0.1-0.2	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
BH5	11.12.2023	0.0-0.1	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
BH6	11.12.2023	0.1-0.2	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
BH7	11.12.2023	0.2-0.3	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
BH8	11.12.2023	0.0-0.1	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
Practical Quantitation Limits (PQL)			10	50	100	100	0.2	0.5	0.5	5	0.5
NATIONAL ENVIRONMENT PROTECTION MEASURE (2013)											
Ecological Screening Levels (ESL) - Table 1B (6)											
Areas of ecological significance			125*	25*	-	-	10	65	40	1.6	0.7
Urban residential and public open space			180*	120*	1300	5600	65	105	125	45	0.7
Commercial and industrial			215*	170*	2500	6600	95	135	185	95	0.7

Notes
a: To obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction.
b: To obtain F2 subtract naphthalene from the >C_{10}-C_{16} fraction.
*: ESLs are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability.
"-": "-" indicates that insufficient data was available to derive a value.

TABLE E
TOTAL RECOVERABLE HYDROCARBONS (TRH) TEST RESULTS
MANAGEMENT LIMITS FOR FINE GRAINED SOIL TEXTURE

Analyte / Sample Location	Date Sampled	Depth (m)	TRH (mg/kg) F1 (C_6-C_{10}) [a]	F2 (>C_{10}-C_{16}) [a]	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{40})
BH1	11.12.2023	0.2-0.3	<10	<50	<100	<100
BH2	11.12.2023	0.1-0.2	<10	<50	<100	<100
BH3	11.12.2023	0.1-0.2	<10	<50	<100	<100
BH4	11.12.2023	0.1-0.2	<10	<50	<100	<100
BH5	11.12.2023	0.0-0.1	<10	<50	<100	<100
BH6	11.12.2023	0.1-0.2	<10	<50	<100	<100
BH7	11.12.2023	0.2-0.3	<10	<50	<100	<100
BH8	11.12.2023	0.0-0.1	<10	<50	<100	<100
Practical Quantitation Limits (PQL)			10	50	100	100
NATIONAL ENVIRONMENT PROTECTION MEASURE (2013)						
Management Limits - Table 1B (7)						
Residential parkland and public open space			800	1000	3500	10,000
Commercial and industrial			800	1000	5000	10,000

Notes
a: 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.
b: Management limits are applied after consideration of relevant ESLs and HSLs.

TABLE F

POLYCYCLIC AROMATIC HYDROCARBONS (PAH), ORGANOCHLORINE PESTICIDES (OCP), POLYCHLORINATED BIPHENYLS (PCB) AND PHENOLS TEST RESULTS FOR HILs, EILs & ESLs

Analyte / Sample Location	Sample Date	Depth (m)	PAH (mg/kg)				Organochlorine Pesticides (mg/kg)									Phenols (mg/kg)	
			Carcinogenic PAHs (as BaP TEQ) [e]	TOTAL PAHs [f]	BENZO(a)PYRENE	NAPHTHALENE	DDT + DDE + DDD	ALDRIN & DIELDRIN	CHLORDANE	ENDOSULFAN	ENDRIN	HEPTACHLOR	HCB	METHOXYCHLOR	PCB [i]	PHENOL	PENTACHLOROPHENOL
BH1	11.12.2023	0.2-0.3	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
BH2	11.12.2023	0.1-0.2	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
BH3	11.12.2023	0.1-0.2	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
BH4	11.12.2023	0.1-0.2	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
BH5	11.12.2023	0.0-0.1	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
BH6	11.12.2023	0.1-0.2	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
BH7	11.12.2023	0.2-0.3	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
BH8	11.12.2023	0.0-0.1	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
Practical Quantitation Limits (PQL)			0.5	0.5	0.5	0.5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.1	0.5	2
NATIONAL ENVIRONMENT PROTECTION MEASURE (2013)																	
Health Investigation Levels (HIL) - Table 1A (1)																	
HIL A [a]			3	300			240	6	50	270	10	6	10	300	1	3000	100
HIL B [b]			4	400			600	10	90	400	20	10	15	500	1	45,000	130
HIL C [c]			3	300			400	10	70	340	20	10	10	400	1	40,000	120
HIL D [d]			40	4000			3600	45	530	2000	100	50	80	2500	7	240,000	660
Ecological Investigation Levels (EIL) - Table 1B (5)																	
Areas of ecological significance						10 [g]	3 [g, k]										
Urban residential and public open space [h]						170 [g]	180 [g, k]										
Commercial and industrial						370 [g]	640 [g, k]										
Ecological Screening Levels (ESL) - Table 1B (6)																	
Areas of ecological significance					0.7 [i]												
Urban residential and public open space					0.7 [i]												
Commercial and industrial					0.7 [i]												

Notes

a: Residential with garden/accessible soil (home grown poduce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.

b: Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high rise buildings and apartments.

c: Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space where the potential for exposure is lower and where a site-specific assessment may be more appropriate.

d: Commercial/industrial, includes premises such as shops, offices, factories and industrial sites

e: Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their TEFs (potency relative to B(a)P) adopted by CCME 2008 (refer Schedule B7). The B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF, given below, and summing these products.

PAH species	TEF	PAH species	TEF
Benzo(a)anthracen	0.1	Benzo(g,h,i)perylene	0.01
Benzo(a)pyrene	1	Chrysene	0.01
Benzo(b+j)fluoranthe	0.1	Dibenz(a,h)anthracene	1
Benzo(k)fluoranthe	0.1	Indeno(1,2,3-c,d)pyrene	0.1

Where the B(a)P occurs in bitumen fragments it is relatively immobile and does not represent a significant health risk.

f: Total PAHs: HIL is based on the sum of the 16 PAHs most commonly reported for contaminated sites (WHO 1998). The application of the total PAH HIL should consider the presence of carcinogenic PAHs and naphthalene (the most volatile PAH). Carcinogenic PAHs reported in the total PAHs should meet the B(a)P TEQ HIL. Naphthalene reported in the total PAHs should meet

g: Insufficient data was available to calculate aged values for DDT and naphthalene, consequently the values for fresh contamination should be used.

h: Urban residential / public open space is broadly equivalent to the HIL-A, HIL-B and HIL-C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.

i: For coarse and fine grained texture soils.

j: PCBs: HIL relates to non-dioxin-like PCBs only. Where a PCB source is known, or suspected, to be present at a site, a site-specific assessment of exposure to all PCBs (including dioxin-like PCBs) should be undertaken.

k: For DDT only.

TABLE G
ASBESTOS TEST RESULTS

Analyte / Sample Location	Sample Date	Depth (m)	Field Observations*	Laboratory Results Asbestos Type Present / Absent	Laboratory Results Asbestos %w/w
BH1	11.12.2023	0.2-0.3	No visible ACM fragments observed	No Asbestos detected	<0.001%
BH2	11.12.2023	0.1-0.2	No visible ACM fragments observed	No Asbestos detected	<0.001%
BH3	11.12.2023	0.1-0.2	No visible ACM fragments observed	No Asbestos detected	<0.001%
BH4	11.12.2023	0.1-0.2	No visible ACM fragments observed	No Asbestos detected	<0.001%
BH5	11.12.2023	0.0-0.1	No visible ACM fragments observed	No Asbestos detected	<0.001%
BH6	11.12.2023	0.1-0.2	No visible ACM fragments observed	No Asbestos detected	<0.001%
BH7	11.12.2023	0.2-0.3	No visible ACM fragments observed	No Asbestos detected	<0.001%
BH8	11.12.2023	0.0-0.1	No visible ACM fragments observed	No Asbestos detected	<0.001%
D1 (BH1)	11.12.2023	0.2-0.3	No visible ACM fragments observed	No Asbestos detected	<0.001%
WA Guidelines for the Assessment, Remediation and Management of Asbestos - Contaminated Sites in Western Australia - May 2009					
National Environment Protection (Assessment of Site Contamination) Measure 2013 Schedule B1					
%w/w asbestos for FA and AF					0.001%
%w/w asbestos for ACM - Residential use, childcare centres, preschools etc.					0.01%
%w/w asbestos for ACM - Residential, minimal soil access (fully sealed surfaces)					0.04%
%w/w asbestos for ACM - Parks, public open spaces, playing fields etc.					0.02%
%w/w asbestos for ACM - Commercial / Industrial					0.05%

Note:

ACM = Asbestos Containing Materials >7mm x 7mm (visible by eye)

FA = Friable and Fibrous Asbestos Materials >7mm x 7mm (visible by eye)

AF = Asbestos Fines <7mm x 7mm ACM including free fibres (visible by microscope only)

* Field Observations: All fibro-cement fragments observed are assumed to contain Asbestos until otherwise tested and recorded as such.

NT = Not Tested

No Asbestos detected'* - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.*

TABLE H
DUPLICATE SAMPLE

ANALYTE	BH1 0.2-0.3m mg/kg	DUPLICATE D1 mg/kg	RELATIVE PERCENTAGE DIFFERENCE %
HEAVY METALS			
Arsenic	8	8	0
Cadmium	<1	<1	0
Chromium	18	18	0
Copper	20	20	0
Nickel	9	8	12
Lead	56	60	7
Zinc	114	124	8
Mercury	<0.1	<0.1	0
TOTAL PETROLEUM HYDROCARBONS (TPH)			
C6 - C9	<10	<10	0
C10 - C14	<50	<50	0
C15 - C28	<100	<100	0
C29-C36	<100	<100	0
BTEX			
Benzene	<0.2	<0.2	0
Toluene	<0.5	<0.5	0
Ethyl Benzene	<0.5	<0.5	0
Total Xylenes	<0.5	<0.5	0
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
BENZO(a)PYRENE	<0.5	<0.5	0
Total PAH	<0.5	<0.5	0
ORGANOCHLORINE PESTICIDES (OCP)			
Heptachlor	<0.05	<0.05	0
Aldrin	<0.05	<0.05	0
Dieldrin	<0.05	<0.05	0
DDD	<0.05	<0.05	0
DDE	<0.05	<0.05	0
DDT	<0.2	<0.2	0
Chlordane (trans & cis)	<0.05	<0.05	0
POLYCHLORINATED BIPHENYLS (PCB)			
Total PCB	<0.1	<0.1	0
PHENOLS			
Total Phenols	<0.5	<0.5	0

No Asbestos detected**' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining.
Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.

TABLE I

RINSATE SAMPLE

ANALYTE	RINSATE R1 (mg/L) 11.12.2023	Practical Quantitation Limits (PQL)
HEAVY METALS		
Arsenic	<0.001	0.001
Cadmium	<0.0001	0.0001
Chromium	<0.001	0.001
Copper	<0.001	0.001
Nickel	<0.001	0.001
Lead	<0.001	0.001
Zinc	<0.005	0.005
Mercury	<0.0001	0.0001

APPENDIX G: LABORATORY CERTIFICATES

ECON Environmental Pty Ltd | ABN 25 641 106 783 | 1 St Aidans Avenue Oatlands NSW 2117
T: 1800 00 ECON | **E:** info@econenvironmental.com.au | **W:** www.econenvironmental.com.au

CERTIFICATE OF ANALYSIS

Work Order	: **ES2342906**	Page	: 1 of 16
Client	: **ECON Environmental Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: info econenvironmental	Contact	: Customer Services ES
Address	: 1 St Aidans Avenue Oatlands 2117	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: VILLAWOOD	Date Samples Received	: 11-Dec-2023 11:55
Order number	: 23-1551	Date Analysis Commenced	: 13-Dec-2023
C-O-C number	: ----	Issue Date	: 18-Dec-2023 15:58
Sampler	: Con Kariotoglou		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 10		
No. of samples analysed	: 10		

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
- Descriptive 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
Brendan Schrader	Laboratory Technician	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic 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.

- 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.
- EA200N: Asbestos weights and percentages are not covered under the Scope of NATA Accreditation.
  Weights of Asbestos are based on extracted bulk asbestos, fibre bundles, and/or ACM and do not include respirable fibres (if present)
  The Asbestos (Fines and Fibrous) weight is calculated from the extracted Fibrous Asbestos and Asbestos Fines as an equivalent weight of 100% Asbestos
  Percentages for Asbestos content in ACM are based on the 2013 NEPM default values.
  All calculations of percentage Asbestos under this method are approximate and should be used as a guide only.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200N: ALS laboratory procedures and methods used for the identification and quantitation of asbestos are consistent with AS4964-2004 and the requirements of the 2013 NEPM for Assessment of Site Contamination
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH1 0.2-0.3	BH2 0.1-0.2	BH3 0.1-0.2	BH4 0.1-0.2	BH5 0-0.1
			Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342906-001	ES2342906-002	ES2342906-003	ES2342906-004	ES2342906-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	21.1	11.6	5.7	12.7	11.2
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Asbestos (Trace)	1332-21-4	-	-	No	No	No	No	No
Sample weight (dry)	----	0.01	g	533	685	741	559	647
Synthetic Mineral Fibre	----	-	--	No	No	No	No	No
Organic Fibre	----	-	--	No	No	No	No	No
APPROVED IDENTIFIER:	----	-	--	B.SCHRADER	B.SCHRADER	B.SCHRADER	B.SCHRADER	B.SCHRADER
EA200N: Asbestos Quantification (non-NATA)								
ø Asbestos (Fines and Fibrous <7mm)	1332-21-4	0.0004	g	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
ø Asbestos (Fines and Fibrous FA+AF)	----	0.001	% (w/w)	<0.001	<0.001	<0.001	<0.001	<0.001
ø Weight Used for % Calculation	----	0.0001	kg	0.533	0.685	0.741	0.559	0.647
ø Fibrous Asbestos >7mm	----	0.0004	g	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	8	18	<5	<5	11
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	18	37	8	12	28
Copper	7440-50-8	5	mg/kg	20	14	9	15	17
Lead	7439-92-1	5	mg/kg	56	26	37	81	56
Nickel	7440-02-0	2	mg/kg	9	5	5	7	7
Zinc	7440-66-6	5	mg/kg	114	39	70	96	90
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH1 0.2-0.3	BH2 0.1-0.2	BH3 0.1-0.2	BH4 0.1-0.2	BH5 0-0.1
				Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342906-001	ES2342906-002	ES2342906-003	ES2342906-004	ES2342906-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ **Total Chlordane (sum)**	----	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH1 0.2-0.3	BH2 0.1-0.2	BH3 0.1-0.2	BH4 0.1-0.2	BH5 0-0.1
				Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342906-001	ES2342906-002	ES2342906-003	ES2342906-004	ES2342906-005
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH1 0.2-0.3	BH2 0.1-0.2	BH3 0.1-0.2	BH4 0.1-0.2	BH5 0-0.1
			Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342906-001	ES2342906-002	ES2342906-003	ES2342906-004	ES2342906-005
				Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued								
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH1 0.2-0.3	BH2 0.1-0.2	BH3 0.1-0.2	BH4 0.1-0.2	BH5 0-0.1
				Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342906-001	ES2342906-002	ES2342906-003	ES2342906-004	ES2342906-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**85.9**	**91.6**	**98.1**	**90.5**	**106**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**108**	**109**	**119**	**112**	**123**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH1 0.2-0.3	BH2 0.1-0.2	BH3 0.1-0.2	BH4 0.1-0.2	BH5 0-0.1
			Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342906-001	ES2342906-002	ES2342906-003	ES2342906-004	ES2342906-005
				Result	Result	Result	Result	Result
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	119	112	122	115	139
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	86.9	84.7	86.4	82.2	82.5
2-Chlorophenol-D4	93951-73-6	0.5	%	87.2	91.4	93.4	84.7	90.6
2.4.6-Tribromophenol	118-79-6	0.5	%	53.2	51.1	48.8	59.3	58.2
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	95.2	96.1	95.7	90.4	91.9
Anthracene-d10	1719-06-8	0.5	%	98.7	83.4	94.6	94.0	83.5
4-Terphenyl-d14	1718-51-0	0.5	%	109	107	94.1	95.2	88.6
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	76.9	86.4	85.4	87.6	88.0
Toluene-D8	2037-26-5	0.2	%	83.5	92.9	92.0	93.0	94.4
4-Bromofluorobenzene	460-00-4	0.2	%	92.1	98.2	97.2	100	96.2

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH6 0.1-0.2	BH7 0.2-0.3	BH8 0-0.1	D1	----
			Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	----
Compound	CAS Number	LOR	Unit	ES2342906-006	ES2342906-007	ES2342906-008	ES2342906-009	--------
				Result	Result	Result	Result	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.1	12.2	12.4	21.1	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	----
Asbestos Type	1332-21-4	-	--	-	-	-	-	----
Asbestos (Trace)	1332-21-4	-	-	No	No	No	No	----
Sample weight (dry)	----	0.01	g	694	548	691	602	----
Synthetic Mineral Fibre	----	-	--	No	No	No	No	----
Organic Fibre	----	-	--	No	No	No	No	----
APPROVED IDENTIFIER:	----	-	--	B.SCHRADER	B.SCHRADER	B.SCHRADER	B.SCHRADER	----
EA200N: Asbestos Quantification (non-NATA)								
ø Asbestos (Fines and Fibrous <7mm)	1332-21-4	0.0004	g	<0.0004	<0.0004	<0.0004	<0.0004	----
ø Asbestos (Fines and Fibrous FA+AF)	----	0.001	% (w/w)	<0.001	<0.001	<0.001	<0.001	----
ø Weight Used for % Calculation	----	0.0001	kg	0.694	0.548	0.691	0.602	----
ø Fibrous Asbestos >7mm	----	0.0004	g	<0.0004	<0.0004	<0.0004	<0.0004	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	8	7	8	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	12	20	18	18	----
Copper	7440-50-8	5	mg/kg	30	18	29	20	----
Lead	7439-92-1	5	mg/kg	56	38	90	60	----
Nickel	7440-02-0	2	mg/kg	8	8	10	8	----
Zinc	7440-66-6	5	mg/kg	72	178	196	124	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EP068A: Organochlorine Pesticides (OC)								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH6 0.1-0.2	BH7 0.2-0.3	BH8 0-0.1	D1	----
				Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	----
Compound	CAS Number	LOR	Unit		ES2342906-006	ES2342906-007	ES2342906-008	ES2342906-009	--------
					Result	Result	Result	Result	----
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
^ **Total Chlordane (sum)**	----	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
EP068B: Organophosphorus Pesticides (OP)									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH6 0.1-0.2	BH7 0.2-0.3	BH8 0-0.1	D1	----
				Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	----
Compound	CAS Number	LOR	Unit		ES2342906-006	ES2342906-007	ES2342906-008	ES2342906-009	--------
					Result	Result	Result	Result	----
EP068B: Organophosphorus Pesticides (OP) - Continued									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	----
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH6 0.1-0.2	BH7 0.2-0.3	BH8 0-0.1	D1	----
				Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	----
Compound	CAS Number	LOR	Unit		ES2342906-006	ES2342906-007	ES2342906-008	ES2342906-009	--------
					Result	Result	Result	Result	----
EP075(SIM)A: Phenolic Compounds - Continued									
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH6 0.1-0.2	BH7 0.2-0.3	BH8 0-0.1	D1	----
				Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	----
Compound	CAS Number	LOR	Unit		ES2342906-006	ES2342906-007	ES2342906-008	ES2342906-009	--------
					Result	Result	Result	Result	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**80.2**	**83.1**	**81.8**	**74.1**	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**98.8**	**101**	**104**	**90.3**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH6 0.1-0.2	BH7 0.2-0.3	BH8 0-0.1	D1	----
				Sampling date / time	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	11-Dec-2023 00:00	----
Compound	CAS Number	LOR	Unit		ES2342906-006	ES2342906-007	ES2342906-008	ES2342906-009	--------
					Result	Result	Result	Result	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		100	111	106	90.4	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		80.2	87.4	89.8	92.4	----
2-Chlorophenol-D4	93951-73-6	0.5	%		88.0	88.8	88.6	86.8	----
2.4.6-Tribromophenol	118-79-6	0.5	%		55.9	57.8	55.1	58.7	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		89.4	93.4	86.3	90.7	----
Anthracene-d10	1719-06-8	0.5	%		91.2	93.7	86.6	88.8	----
4-Terphenyl-d14	1718-51-0	0.5	%		91.2	92.8	87.2	96.4	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		88.0	82.3	91.3	87.0	----
Toluene-D8	2037-26-5	0.2	%		86.5	79.6	92.5	88.5	----
4-Bromofluorobenzene	460-00-4	0.2	%		94.8	88.6	99.7	93.1	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	R1	----	----	----	----
				Sampling date / time	11-Dec-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2342906-010	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Sample ID - Sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	BH1 0.2-0.3 - 11-Dec-2023 00:00	A soil sample.
EA200: Description	BH2 0.1-0.2 - 11-Dec-2023 00:00	A soil sample.
EA200: Description	BH3 0.1-0.2 - 11-Dec-2023 00:00	A soil sample.
EA200: Description	BH4 0.1-0.2 - 11-Dec-2023 00:00	A soil sample.
EA200: Description	BH5 0-0.1 - 11-Dec-2023 00:00	A soil sample.
EA200: Description	BH6 0.1-0.2 - 11-Dec-2023 00:00	A soil sample.
EA200: Description	BH7 0.2-0.3 - 11-Dec-2023 00:00	A soil sample.
EA200: Description	BH8 0-0.1 - 11-Dec-2023 00:00	A soil sample.
EA200: Description	D1 - 11-Dec-2023 00:00	A soil sample.

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
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

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOIL) EA200N: Asbestos Quantification (non-NATA)

(SOIL) EA200: AS 4964 - 2004 Identification of Asbestos in Soils

QUALITY CONTROL REPORT

Work Order	: **ES2342906**	Page	: 1 of 14
Client	: **ECON Environmental Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: info econenvironmental	Contact	: Customer Services ES
Address	: 1 St Aidans Avenue Oatlands 2117	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: VILLAWOOD	Date Samples Received	: 11-Dec-2023
Order number	: 23-1551	Date Analysis Commenced	: 13-Dec-2023
C-O-C number	: ----	Issue Date	: 18-Dec-2023
Sampler	: Con Kariotoglou		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 10		
No. of samples analysed	: 10		

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
Brendan Schrader	Laboratory Technician	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic 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
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

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: 5491927)									
ES2342825-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	24	27	14.4	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	13	15	12.3	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	6	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	20	39	63.9	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	37	26	34.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	50	51	0.0	0% - 50%
ES2342849-007	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	16	14	11.4	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	7	6	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	8	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	25	26	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	15	19	23.8	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	90	103	13.0	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5491932)									
ES2342825-003	Anonymous	EA055: Moisture Content	----	0.1 (1.0)*	%	14.9	14.4	3.1	0% - 50%
ES2342906-003	BH3 0.1-0.2	EA055: Moisture Content	----	0.1 (1.0)*	%	5.7	6.0	5.1	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5491926)									
ES2342825-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.3	0.8	94.7	No Limit
ES2342849-007	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	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 (%)*
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 5485301)									
ES2342906-007	BH7 0.2-0.3	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES2342906-001	BH1 0.2-0.3	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 5485299)									
ES2342906-007	BH7 0.2-0.3	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
		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
ES2342906-001	BH1 0.2-0.3	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
		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

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: 5485299) - continued									
ES2342906-001	BH1 0.2-0.3	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: 5485299)									
ES2342906-007	BH7 0.2-0.3	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
ES2342906-001	BH1 0.2-0.3	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

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 5485299) - continued									
ES2342906-001	BH1 0.2-0.3	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)A: Phenolic Compounds (QC Lot: 5485300)									
ES2342906-007	BH7 0.2-0.3	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.0	No Limit
ES2342906-001	BH1 0.2-0.3	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5485300)									
ES2342906-007	BH7 0.2-0.3	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

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: 5485300) - continued									
ES2342906-007	BH7 0.2-0.3	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
ES2342906-001	BH1 0.2-0.3	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: 5485298)									

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5485298) - continued									
ES2342906-007	BH7 0.2-0.3	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
ES2342906-001	BH1 0.2-0.3	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: 5491660)									
ES2342849-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES2342906-005	BH5 0-0.1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5485298)									
ES2342906-007	BH7 0.2-0.3	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
ES2342906-001	BH1 0.2-0.3	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: 5491660)									
ES2342849-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES2342906-005	BH5 0-0.1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 5491660)									
ES2342849-001	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
ES2342906-005	BH5 0-0.1	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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020T: Total Metals by ICP-MS (QC Lot: 5491151)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 5491151) - continued									
ES2342845-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.009	0.010	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.009	0.009	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.005	0.006	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.031	0.030	4.4	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.098	0.097	0.0	0% - 50%
ES2342916-007	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.1 µg/L	0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<1 µg/L	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<1 µg/L	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	3 µg/L	0.002	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<1 µg/L	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	68 µg/L	0.073	6.1	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	52 µg/L	0.053	0.0	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5494994)									
ES2342846-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2342916-005	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.1 µg/L	<0.0001	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: 5491927)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	112	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	101	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	129	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	110	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	119	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	110	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	102	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5491926)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	116	70.0	125
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 5485301)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	97.8	62.0	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 5485299)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	99.9	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	101	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	83.6	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	86.2	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	87.0	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.2	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	86.3	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	89.8	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	89.9	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.6	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	89.3	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	89.9	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	89.1	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.3	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.4	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.8	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	92.0	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.4	62.0	124

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: 5485299) - continued								
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	89.4	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	91.0	64.0	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	88.5	54.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5485299)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	89.3	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.4	62.0	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	92.4	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	102	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	88.3	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	88.8	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	86.2	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	94.2	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	85.8	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	89.2	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	83.3	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	89.6	70.0	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	97.8	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	100	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	92.3	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	90.3	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	89.4	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.7	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	89.4	41.0	123
EP075(SIM)A: Phenolic Compounds (QCLot: 5485300)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	88.9	71.0	125
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	94.0	72.0	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	95.5	71.0	123
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	95.5	67.0	127
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	85.6	54.0	114
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	96.4	68.0	126
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	90.0	66.0	120
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	95.7	70.0	120
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	93.1	70.0	116
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	92.7	54.0	114

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
EP075(SIM)A: Phenolic Compounds (QCLot: 5485300) - continued								
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	75.8	60.0	114
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	38.9	10.0	80.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5485300)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	93.6	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	102	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	108	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	100	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	96.3	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	90.2	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	91.2	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	97.4	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	97.4	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	106	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	104	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	92.3	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	97.3	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	84.0	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	92.4	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	87.7	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5485298)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	102	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	96.4	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	90.6	71.0	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5491660)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	106	72.2	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5485298)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	102	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	92.5	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	84.1	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5491660)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	101	72.4	133
EP080: BTEXN (QCLot: 5491660)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	88.6	76.0	124

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
EP080: BTEXN (QCLot: 5491660) - continued								
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	89.6	78.5	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	88.4	77.4	121
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	88.1	78.2	121
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	87.7	81.3	121
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	90.7	78.8	122

Sub-Matrix: **WATER**

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
EG020T: Total Metals by ICP-MS (QCLot: 5491151)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	103	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	102	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	104	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	103	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	102	79.0	117
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5494994)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	91.9	77.0	111

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: 5491927)							
ES2342825-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	108	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	96.6	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	102	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	103	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	99.9	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	96.5	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	101	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5491926)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5491926) - continued							
ES2342825-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	96.0	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 5485301)							
ES2342906-001	BH1 0.2-0.3	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	118	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 5485299)							
ES2342906-001	BH1 0.2-0.3	EP068: gamma-BHC	58-89-9	0.5 mg/kg	113	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	111	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	115	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	109	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	100	70.0	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	73.3	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5485299)							
ES2342906-001	BH1 0.2-0.3	EP068: Diazinon	333-41-5	0.5 mg/kg	116	70.0	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	107	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	109	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	112	70.0	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	104	70.0	130
EP075(SIM)A: Phenolic Compounds (QCLot: 5485300)							
ES2342906-001	BH1 0.2-0.3	EP075(SIM): Phenol	108-95-2	10 mg/kg	95.0	70.0	130
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	91.1	70.0	130
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	88.9	60.0	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	90.8	70.0	130
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	84.4	20.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5485300)							
ES2342906-001	BH1 0.2-0.3	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	91.5	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	102	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5485298)							
ES2342906-001	BH1 0.2-0.3	EP071: C10 - C14 Fraction	----	480 mg/kg	114	73.0	137
		EP071: C15 - C28 Fraction	----	3100 mg/kg	116	53.0	131
		EP071: C29 - C36 Fraction	----	2060 mg/kg	116	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5491660)							
ES2342849-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	114	60.4	142
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5485298)							
ES2342906-001	BH1 0.2-0.3	EP071: >C10 - C16 Fraction	----	860 mg/kg	98.8	73.0	137
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	116	53.0	131
		EP071: >C34 - C40 Fraction	----	890 mg/kg	111	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5491660)							

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Acceptable Limits (%) Low	Matrix Spike (MS) Report: Acceptable Limits (%) High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5491660) - continued							
ES2342849-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	105	61.1	142
EP080: BTEXN (QCLot: 5491660)							
ES2342849-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	94.1	62.1	122
		EP080: Toluene	108-88-3	2.5 mg/kg	89.0	66.6	119
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	87.9	67.4	123
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	88.0	66.4	121
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	88.2	70.7	121
		EP080: Naphthalene	91-20-3	2.5 mg/kg	78.5	61.1	115

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Acceptable Limits (%) Low	Matrix Spike (MS) Report: Acceptable Limits (%) High
EG020T: Total Metals by ICP-MS (QCLot: 5491151)							
ES2342845-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	116	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	102	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	98.1	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	111	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	111	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	109	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	100	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5494994)							
ES2342896-001	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	91.5	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2342906**	Page	: 1 of 9
Client	: **ECON Environmental Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: info econenvironmental	Telephone	: +61-2-8784 8555
Project	: VILLAWOOD	Date Samples Received	: 11-Dec-2023
Site	: ----	Issue Date	: 18-Dec-2023
Sampler	: Con Kariotoglou	No. of samples received	: 10
Order number	: 23-1551	No. of samples analysed	: 10

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **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.**

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)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**----**	----	----	**14-Dec-2023**	25-Dec-2023	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag - Friable Asbestos/PSD Bag (EA200)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**----**	----	----	**13-Dec-2023**	08-Jun-2024	✓
EA200N: Asbestos Quantification (non-NATA)							
Snap Lock Bag - Friable Asbestos/PSD Bag (EA200N)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**----**	----	----	**13-Dec-2023**	08-Jun-2024	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**15-Dec-2023**	08-Jun-2024	✓	**16-Dec-2023**	08-Jun-2024	✓

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
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**15-Dec-2023**	08-Jan-2024	✓	**18-Dec-2023**	08-Jan-2024	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**16-Dec-2023**	24-Jan-2024	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**15-Dec-2023**	24-Jan-2024	✓
Soil Glass Jar - Unpreserved (EP068)							
BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**16-Dec-2023**	24-Jan-2024	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**15-Dec-2023**	24-Jan-2024	✓
Soil Glass Jar - Unpreserved (EP068)							
BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**16-Dec-2023**	24-Jan-2024	✓
EP075(SIM)A: Phenolic Compounds							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BH1 0.2-0.3	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**15-Dec-2023**	24-Jan-2024	✓
Soil Glass Jar - Unpreserved (EP075(SIM))							
BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**16-Dec-2023**	24-Jan-2024	✓

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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BH1 0.2-0.3	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**15-Dec-2023**	24-Jan-2024	✓
Soil Glass Jar - Unpreserved (EP075(SIM))							
BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**16-Dec-2023**	24-Jan-2024	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**14-Dec-2023**	25-Dec-2023	✓	**15-Dec-2023**	25-Dec-2023	✓
Soil Glass Jar - Unpreserved (EP071)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**15-Dec-2023**	24-Jan-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**14-Dec-2023**	25-Dec-2023	✓	**15-Dec-2023**	25-Dec-2023	✓
Soil Glass Jar - Unpreserved (EP071)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**15-Dec-2023**	25-Dec-2023	✓	**15-Dec-2023**	24-Jan-2024	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
BH1 0.2-0.3, BH2 0.1-0.2, BH3 0.1-0.2, BH4 0.1-0.2, BH5 0-0.1, BH6 0.1-0.2, BH7 0.2-0.3, BH8 0-0.1, D1	**11-Dec-2023**	**14-Dec-2023**	25-Dec-2023	✓	**15-Dec-2023**	25-Dec-2023	✓

Matrix: **WATER**

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

Matrix: **WATER**

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
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Natural (EG020A-T)							
R1	**11-Dec-2023**	**14-Dec-2023**	08-Jun-2024	✓	**14-Dec-2023**	08-Jun-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Natural (EG035T)							
R1	**11-Dec-2023**	**----**	----	----	**18-Dec-2023**	08-Jan-2024	✓

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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	14	**14.29**	**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	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	**7.14**	**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	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	**7.14**	**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	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

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

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Total Mercury by FIMS	EG035T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Asbestos Classification and Quantitation per NEPM 2013	* EA200N	SOIL	Asbestos Classification and Quantitation per NEPM with Confirmation of Identification by AS 4964 - Gravimetric determination of Asbestos Containing Material, Fibrous Asbestos, Asbestos Fines and sample weight and calculation of percentage concentrations per NEPM protocols. Asbestos (Fines and Fibrous FA+AF) is reported as the equivalent weight in the sample received after accounting for sub-sampling (where applicable for the <7mm and/or <2mm fractions).
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)
Polychlorinated Biphenyls (PCB)	EP066	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 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.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

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).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2342906**

Client	: **ECON Environmental Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: info econenvironmental	Contact	: Customer Services ES
Address	: 1 St Aidans Avenue Oatlands 2117	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: info@econenvironmental.com.au	E-mail	: ALSEnviro.Sydney@ALSGlobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: VILLAWOOD	Page	: 1 of 3
Order number	: 23-1551	Quote number	: ES2020ECONEV0001 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Con Kariotoglou		

Dates

Date Samples Received	: 11-Dec-2023 11:55	Issue Date	: 11-Dec-2023
Client Requested Due Date	: 18-Dec-2023	Scheduled Reporting Date	: **18-Dec-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 26.7'C, 26.2'C, 27.6'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 10 / 9

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Asbestos analysis will be conducted by ALS Newcastle.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EA200F Asbestos Quantitation (FA+AF) in Soil by	SOIL - S-19 TRH/BTEXN/PAH/Phl/OC/OP/PCB/8 metals
ES2342906-001	11-Dec-2023 00:00	BH1 0.2-0.3	✓	✓	✓
ES2342906-002	11-Dec-2023 00:00	BH2 0.1-0.2	✓	✓	✓
ES2342906-003	11-Dec-2023 00:00	BH3 0.1-0.2	✓	✓	✓
ES2342906-004	11-Dec-2023 00:00	BH4 0.1-0.2	✓	✓	✓
ES2342906-005	11-Dec-2023 00:00	BH5 0-0.1	✓	✓	✓
ES2342906-006	11-Dec-2023 00:00	BH6 0.1-0.2	✓	✓	✓
ES2342906-007	11-Dec-2023 00:00	BH7 0.2-0.3	✓	✓	✓
ES2342906-008	11-Dec-2023 00:00	BH8 0-0.1	✓	✓	✓
ES2342906-009	11-Dec-2023 00:00	D1	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	(On Hold) WATER No analysis requested
ES2342906-010	11-Dec-2023 00:00	R1	✓

Proactive Holding Time Report

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

Requested Deliverables

info econenvironmental

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

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOIL) EA200N: Asbestos Quantification (non-NATA)

(SOIL) EA200: AS 4964 - 2004 Identification of Asbestos in Soils

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2342906**

Client	: **ECON Environmental Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: info econenvironmental	Contact	: Customer Services ES
Address	: 1 St Aidans Avenue Oatlands 2117	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: info@econenvironmental.com.au	E-mail	: ALSEnviro.Sydney@ALSGlobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: VILLAWOOD	Page	: 1 of 3
Order number	: 23-1551	Quote number	: ES2020ECONEV0001 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Con Kariotoglou		

Dates

Date Samples Received	: 11-Dec-2023 11:55	Issue Date	: 12-Dec-2023
Client Requested Due Date	: 18-Dec-2023	Scheduled Reporting Date	: **18-Dec-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 26.7'C, 26.2'C, 27.6'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 10 / 10

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Asbestos analysis will be conducted by ALS Newcastle.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

Method Sample ID	Sample Container Received	Preferred Sample Container for Analysis
Total Mercury by FIMS : EG035T		
R1	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - Nitric Acid; Unfiltered
Total Metals by ICP-MS - Suite A : EG020A-T		
R1	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - Nitric Acid; Unfiltered

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EA200F Asbestos Quantitation (FA+AF) in Soil by	SOIL - S-19 TRH/BTEXN/PAH/Ph/OC/OP/PCB/8 metals
ES2342906-001	11-Dec-2023 00:00	BH1 0.2-0.3	✓	✓	✓
ES2342906-002	11-Dec-2023 00:00	BH2 0.1-0.2	✓	✓	✓
ES2342906-003	11-Dec-2023 00:00	BH3 0.1-0.2	✓	✓	✓
ES2342906-004	11-Dec-2023 00:00	BH4 0.1-0.2	✓	✓	✓
ES2342906-005	11-Dec-2023 00:00	BH5 0-0.1	✓	✓	✓
ES2342906-006	11-Dec-2023 00:00	BH6 0.1-0.2	✓	✓	✓
ES2342906-007	11-Dec-2023 00:00	BH7 0.2-0.3	✓	✓	✓
ES2342906-008	11-Dec-2023 00:00	BH8 0-0.1	✓	✓	✓
ES2342906-009	11-Dec-2023 00:00	D1	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - W-02T 8 metals (Total)
ES2342906-010	11-Dec-2023 00:00	R1	✓

Proactive Holding Time Report

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

Requested Deliverables

info econenvironmental

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

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOIL) EA200N: Asbestos Quantification (non-NATA)

(SOIL) EA200: AS 4964 - 2004 Identification of Asbestos in Soils

AIN OF STODY

.S Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5800 E: gladstone@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4422 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townesville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: ECON Environmental Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT **(List due date):**	18.12.2023
OFFICE: 1 St Aidans Avenue, Oatlands NSW 2117		☐ Non Standard or urgent TAT **(List due date):**	
PROJECT: VILLAWOOD	ECONEV		
ORDER NUMBER: 23-1551			
PROJECT MANAGER: Con Kariotoglou	**CONTACT PH: 0452 654 962**		
SAMPLER: Con Kariotoglou	**SAMPLER MOBILE: 0452 654 962**		
COC emailed to ALS? (YES)	**EDD FORMAT (or default):**		
Email Reports to (will default to PM if no other addresses are listed): **info@econenvironmental.com.au**			
Email Invoice to (will default to PM if no other addresses are listed): **info@econenvironmental.com.au**			

COC SEQUENCE NUMBER (Circle)

COC:	1	2	3	4	5	6	7
OF:	1	2	3	4	5	6	7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Con Kariotoglou	Asmd		
DATE/TIME: 023	DATE/TIME: 11/12 1155	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	S-19	Asbestos EA200F (%w/w)	Heavy Metals (S2)					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH1 0-2-0-3	11.12.2023	S		2	√	√						Sieved
2	BH2 0-1-0-2	11.12.2023	S		2	√	√						
3	BH3 0-1-0-2	11.12.2023	S		2	√	√						
4	BH4 0-1-0-2	11.12.2023	S		2	√	√						
5	BH5 0-0-1	11.12.2023	S		2	√	√						
6	BH6 0-1-0-2	11.12.2023	S		2	√	√						
7	BH7 0-2-0-3	11.12.2023	S		2	√	√						
8	BH8 0-0-1	11.12.2023	S		2	√	√						
9	D1	11.12.2023	S		2	√	√						
10	R1	11.12.2023	S		1			√					
				TOTAL	19	9	9	1					

Environmental Division Sydney
Work Order Reference
ES2342906

Telephone : +61-2-8784 8555

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

F = Formaldehyde Preserved Glass;