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18th August 2025

Ref: Prop. 24042-C

L.D.A. Services

303 The Ridgeway

LISAROW NSW 2250

Attention: Lachlan Atkinson

Re: **Preliminary Site Investigation**

**Lot 2 in DP1022771 63 – 69 Lake Road Tuggerah
Dumpers Handybin**

A Preliminary Site Investigation (PSI) (Phase I Environmental Site Assessment) was carried out in Lot 2 in DP1022771 63 – 69 Lake Road Tuggerah (the Site) in June 2024 (Ref. 24042-A dated 24th June 2024). The investigations and assessments were triggered by Dumpers Handybin who propose to develop a Resource Transfer Station on the Site.

A revised PSI has been prepared in August 2025 (Ref. 24042-B dated 14th August 2025) which addressed recent feedback and information from Central Coast Council.

The scope of works for a Preliminary Contaminated Site Investigation (PSI) is based on current NSW government guidelines in particular the Resilience and Hazards State Environmental Planning Policy (SEPP) and NSW Environment Protection Authority's Contaminated Land Guidelines - Consultants Reporting on Contaminated Land 2020 and Contaminated Sites – Sampling Design Guidelines (2022).

It is understood that the **aim of a PSI** is to assess:

- the potential for site contamination (Council's environmental concerns), and;
- the possibility of off-site migration of contaminants associated with the current and past activities within the site or surrounding areas.

In summary, it is our understanding that the PSI incorporates the following works:

- A site walkover and inspection of the subject area;
- Historical search of land titles (title search), review of historic state government aerial photographs and remotely sense data (satellite imagery) and interviews (if possible) with neighbors and or Council (or other relevant authorities);
- Establish the history of the land use in the site
- Review of the physical setting, type and depth of soils, site geology, groundwater setting (and any relevant data);

- Search of available records from dangerous goods, work cover authorities, EPA and/or LPI and/or WaterNSW and;
- Limited soil sampling and testing (if deemed necessary).
- Provide conclusions as to the potential for contamination.

In summary, the PSI is a preliminary site assessment (Phase I Environmental Site Assessment), not a detailed site assessment (Phase II Environmental Site Assessment). Some of the information contained within Council's most recent feedback would typically be undertaken as part of a Phase II (or later) site assessment, rather than forming part of a Phase I Preliminary Site Assessment.

The PSI that has been provided is considered to achieve the aim of a preliminary site contamination investigation while addressing the relevant elements and meeting the needs of the proposed development. No further need for additional investigation was identified as part of the preliminary assessment and no additional testing or reports are deemed to be necessary at this stage.

If you require any further information, please do not hesitate to contact Larry Cook on 0428 884645.

For and on Behalf of
Larry Cook Consulting Pty Ltd



Larry Cook
Environmental Consultant, Hydrogeologist and Geoscientist

Larry Cook Consulting Pty Ltd

REVISED PRELIMINARY SITE INVESTIGATION (PHASE I ENVIRONMENTAL SITE ASSESSMENT) WITH TARGETED SOIL SAMPLING AND TESTING, AND WATER QUALITY MONITORING PLAN

Lot 2 in DP1022771

63 – 69 Lake Road Tuggerah
NSW 2259

PREPARED FOR: DUMPERS HANDYBIN

PROJECT NUMBER: 24042

DATE: 14TH AUGUST 2025

Larry Cook Consulting

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Copies	Report No. & Title	Status	Date	Prepared for:	Initials
1 x PDF	24042-A Preliminary Site Investigation and Water Quality Monitoring Plan – Lot 2 DP1022771	Version I	24 th June 2024	Dumpers Handybin	LLC
1 x PDF	24042-B Revised Preliminary Site Investigation and Water Quality Monitoring Plan – Lot 2 DP1022771	Version I	14 th August 2025	Dumpers Handybin	LLC

EXECUTIVE SUMMARY

Larry Cook Consulting Pty Ltd recently carried out a Preliminary Site Inspection (Phase I Environmental Site Assessment) on Lot 2 (the Site). The site investigations assessed the potential for contamination in hardstand (fill) soil and overland flow in the 0.3-hectare Site which is zoned industrial. No previous environmental assessments are known.

The investigations and assessments were triggered by the owner who proposes to develop a Resource Transfer Station.

This Preliminary Site Inspection summarises the findings of a detailed site inspection in early June 2024, a review of available historical records and information including historical aerial photos, satellite imagery and results of other relevant investigations. A targeted preliminary soil sampling program was carried out in the hardstand area which was designed to supplement the site history data and provide an assessment of any potential contamination in targeted areas of environmental concern.

In summary, based on a review of historical and recent aerial photographs, satellite images and title records, the use of the Site has been mostly grazing up until about the early 2000s where there is evidence of placement of imported fill over the majority of the Site, industrial use with storage of skip bins and vehicle storage from about 2005 to present.

A detailed inspection of the Site was carried out on 3rd June 2024. The objectives were:

- Document land use and record details of the development.
- Collect strategically located preliminary soil samples from potentially contaminated hardstand areas.

In this regard, strategic preliminary soil sampling was carried out in three locations in the hardstand area.

The results of the site inspections, aerial photographs, satellite imagery and other records reviewed indicate a low risk of potential contamination for the proposed development. It is assessed that the risk of site contamination is low and unlikely to be significantly contaminated and assessed suitable or could be made suitable for the uses proposed in the DA.

The results of targeted soil testing in identified Areas of Environmental Concern (AEC) in the Site revealed the following:

- Levels of TRHs were less than NEPM Health and Soil Investigation Level guidelines and the Management Limits.
- Concentrations of BTEX were less than NEPM Health and Soil Investigation Level guidelines and the Management Limits.
- Levels of PAHs were less than NEPM Health and Soil Investigation Level guidelines and the Management Limits.
- Concentrations of the suite of eight (8) heavy metals analysed were less than the Health and Soil Investigation Level guidelines.

In summary, the laboratory report from the AEC targeted soil investigation shows that concentrations of tested analytes were all below the adopted Soil Investigation Level guidelines.

A conceptual site model, a Sampling and Analysis Plan and Data Gaps are incorporated in the report. A Water Quality Monitoring Program has been prepared for assessment of overland flow from the hardstand. The Plan incorporates a recommended monitoring schedule, list of analytes, sampling procedure and a list of items for inclusion in an on-site sampling kit.

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1.0 INTRODUCTION AND BACKGROUND

Larry Cook Consulting (LCC) was commissioned by *Dumpers Bin* (the owner), on behalf of the owner, in June 2024 to carry out environmental site investigations on the potential for contamination in Lot 2 in DP1022771 63 – 69 Lake Road Tuggerah (the Site). The location of the Site is shown in a *Near Map* lot plan in **Figure 1** and in a *Six Maps* topographic plan presented in **Figure 2**.

The owner has applied to Central Coast Council (Council) to construct a Resource Transfer Station in the Site. It is understood that an EIS was submitted to Council in late 2022. The proposed development requires consent in accordance with the provisions of Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). It is further understood that a set of Secretary's Environmental Assessment Requirements (SEARs) has been issued to the proponent.

The proposed layout and principal elements of the development are shown in **Figure 3**. The main elements of the development are:

- Container dome in the northern central part of the Site for the sorting of recycled concrete products.
- Hardstand storage parallel to, and close to the eastern part of the Site for empty skip bins.
- Four open storage bays in the south-eastern part for masonry and aggregate materials.
- Closed 'hook lift' bin storage for sorted dry waste in the north-eastern part of the Site.
- A site office and staff change room, and amenities close to the concrete driveway in the south-western part.
- Staff and visitor carparking for eight vehicles parallel to, and proximal to the colorbond fence and shrub row in the north-western part of the Site.
- Truck parking area in the central southern part of the Site.

A recent site inspection revealed existing infrastructure in the Site including a site office, shed and awning/dome cover built between two shipping containers.

The investigations and assessments were triggered by Council who, as part of their ongoing assessment, has requested further information regarding the potential for contamination from present and planned land use.

In order to address the issues raised by Council, a targeted environmental investigation was undertaken. A targeted soil sampling program supplements the site history data and provides an assessment of ground conditions and any potential contamination.

This report summarises the findings of site inspections, review of available historical records and information including historical aerial photos, land title records and results of targeted soil sampling, and results of other relevant investigations.

Table 2.1 in Section 2.2 (page 17) of NSW EPA's Contaminated Land Guidelines lists the level of detail and minimum reporting standards required to be addressed in a Preliminary Site Investigation. The checklist with detailed references for each element in this ESA is provided in **Appendix A**. All elements are addressed in this ESA. A review of Council's zoning plans identifies that the Site is zoned industrial. The subject land parcel is 4,300 m² in area.

1.1 OBJECTIVES

This assessment aims to identify the potential for on-site soil contamination with respect to previous, current or proposed land use. The objectives of this Targeted Environmental Investigation (TEI) were to:

- Document the available Site history;
- Identify potential on and off-site sources of contamination (past and present);
- Identify potential contamination types;
- Document the Site condition;
- Provide a preliminary assessment of potential Site contamination; and
- Assess the need for further investigations, if any.

1.2 SCOPE OF WORK

The scope of work for the Targeted Environmental Investigation included the review, assessment and reporting of the following data;

- Review of information held on the properties;
- Review of publicly available data (including historic aerial photographs, geological plans, topographical maps and other resource maps as available);
- Review of information held by State Government Departments (EPA);
- Review of relevant information held by Central Coast Council;
- Review of literature sources describing environmental issues (Type of facility e.g., hardware shop) at sites in NSW;
- On-site inspection (walk-over);
- Visual assessment of any potential hazardous materials;
- A photographic record of present site conditions;
- Review of locally available information on the site sources from the local Council and residents (if available);
- Discussion with relevant parties (if available) and local EPA/Council officials (if available);
- Selected (targeted) soil sampling, laboratory analysis and assessment against relevant guidelines; and
- Data assessment and reporting.

2.0 SITE DESCRIPTION

2.1 LOCATION

The subject parcel of land is located on the corner of Church Street and Lake Street in Tuggerah. The subject land is located in the Parish of Tuggerah, County of Northumberland and in the Central Coast Council local government area (LGA). The location of the Site is shown in a *Six Maps* cadastral plan in **Figure 2**.

The key features required to identify the Site are summarised in **Table 1**.

Table 1 Site Identification	
Zoning	Industrial
Street Address	63-69 Lake Road Tuggerah NSW 2259
Total Site Area	4,300 m ²
Title Identifier	Lot 2 in Deposited Plan 1022771
Local Government Area	Central Coast City Council

2.2 ACCESS

Access to the Site is off Church Road at the corner of Lake Road.

2.3 SURROUNDING LAND USES

The Site is essentially surrounded by industrial land to the east, west and south with a Council carpark and Tuggerah Nature Reserve to the north.

2.4 TOPOGRAPHY AND DRAINAGE

The Site is located within coastal lowlands, essentially wetlands belonging to the Wyong River flood plain. No defined drainages dissect the Site.

The elevation of the Site is at approximately 3.50 m Australian Height Datum (AHD).

2.5 SOIL LANDSCAPE

The reader is referred to the Soil Landscapes of the Gosford-Lake Macquarie 1:100,000 Sheet Report (Murphy, 1993). The soils beneath the area where the development is proposed are mapped by the state government as a disturbed soil landscape which sits atop the Wyong soil landscape – broad poorly drained deltaic floodplain and alluvial flats associated with the Wyong River system.

2.6 GEOLOGY

The reader is referred to the published Gosford-Lake Macquarie 1:100,000-scale Geology sheet (Och D.J., Jones D.C., Uren R.E. & Hughes K.S. (compilers) 2015).

The Site is underlain by Quaternary alluvial and fluvial deposits consisting of interbedded, interlensed and stacked sequences of loam, clay, sandy clay and sand associated with the present and former Wyong River system.

2.7 HYDROGEOLOGY

Water-bearing zones (aquifers) may be associated with water-bearing zones (aquifers) hosted by interbedded, interlensed and stacked sequences of estuarine alluvium and fluvium including loam, clay, sandy clay and sand associated with the present and former Wyong River system.

3.0 SITE HISTORY

3.1 SOURCES OF INFORMATION

The sources of information that were available for the historical Site assessment are listed below:

- Central Coast Council – Section 149
- Former Gosford City Council – Planning Certificate
- NSW Department of Lands Spatial Information eXchange (SIX Maps);
- WaterNSW Groundwater Bore Records Search;
- NSW OEH register of EPA Licences;
- NSW OEH list of registered Remediation or Investigation site Orders;
- Safe Work NSW - Search for on-site Licences to keep dangerous goods;
- Spatial Services NSW - Historical Aerial Photographs;
- Several site visits along this part of the coast as part of other investigations over 30 years, site inspections in 2023 and June 2024; and
- Interviews and discussions with the owner.

3.2 EPA RECORDS

A search of the NSW EPA register of Environmental Protection Notices under sections 58 and 60 of the Contaminated Land Management Act 1997 (CLM Act) was conducted in December 2023 to assess the potential for contaminated land in the area.

In summary;

- The search did NOT identify any records of notices for the land.
- The land parcel is NOT declared to be in an ‘investigation’ or ‘remediation’ area, nor is it subject to an ‘investigation’ or ‘remediation’ order under the Contaminated Land Management Act, 1997.

3.3 PUBLIC REGISTER OF POEO LICENSES

A search of the public register of licenses issued under the Protection of the Environment Operations Act 1997 (POEO) did not identify any licenses or prosecutions regarding the land.

3.4 SAFEWORK NSW

The site inspection did not identify any evidence of potentially dangerous goods stores, hence no search of the SafeWork NSW records for licences to keep dangerous goods was deemed necessary.

3.5 LOCAL CONSENT AUTHORITY

Central Coast Council is the local consent authority. A review of the Section 149(2) and (5) Planning Certificate did not reveal any impediments relating to contaminated lands.

3.6 ANECDOTAL EVIDENCE AND RESIDENT INTERVIEWS

Informal interviews with local residents in the area over approximately 30 years during many site inspections for wastewater and hydrogeological assessments provided further anecdotal evidence to support description of the site history.

In summary, anecdotal evidence and review of 36 years of historical state government aerial photos, and 23 years satellite coverage indicates that the Site has been a rural-residential property used over the years for possibly grazing up until the early 2000s then industrial with evidence of skip bin and vehicle storage from about 2005 to present.

3.7 HISTORICAL AERIAL PHOTOGRAPHS

A review of 59 years of archived satellite imagery and state government historical aerial photographs commencing in the mid-1960s was conducted to assess the timeline and nature of any development or land use in the Site. Historical aerial photographs were reviewed for the years 1965, 1970, 1975, 1983, 2000, 2005 and 2010, and a multitude of Near Map images acquired between 2010 and the most recent coverage in May 2024. It is noted that the 1965 coverage is the earliest aerial photographic coverage available from *Spatial Services NSW*.

Representative images are presented in **Appendix B**. The key observations made from aerial reconnaissance are summarised in **Table 2**.

Table 2 Review of Aerial Photographs	
Date & Details	Observations
Gosford Dec 1965	The earliest available aerial photo coverage. The Site (Lot 2) is a historically cleared almost vacant parcel of rural land with a shed in the north-eastern part.
Gosford Dec 1970	The Site has not changed significantly from the review of historical aerial photos commencing in the mid-1960s. However, there appears to be an additional building possibly a cottage in the north-eastern part of the Site.
Gosford Dec 1975	The Site has not changed significantly from the 1970 photo. However, there appears to be an additional building possibly a shed in the south-eastern part of the Site.
Gosford Dec 1983	The Site has not changed significantly from the 1975 aerial photo. However, there appears to be an additional building possibly another shed in the eastern part of the Site.
Gosford Dec 2000	The Site appears to have been cleared. Newly placed fill appears to have been placed in the Site and in the adjoining block to the south. The 2000 image suggests that the fill has been placed, spread and levelled. The fill platform is clear of any structures suggesting that it was placed and prepared in early to mid-2000.
Gosford Dec 2005	By 2005, the previously cleared Site is used to store what appears to be skip bins. A building in the south-western part of the Site is assumed to be the existing site office close to the entrance in the south-western corner on Church Street.
Near Map Dec 2010	The Site is used to store what still appears to be skip bins. The existing site office close to the entrance in the south-western corner on Church Street is clearer.
Near Map Oct 2011	An increased number of skip bins are observed on the Site. The site office remains.
Near Map Feb 2016	The use of the site has now changed to an ordered store for cars and several trucks and possibly buses?

Table 2 Review of Aerial Photographs	
Date & Details	Observations
Near Map May 2019	The site remains a depository for cars. The site office remains in the south-western corner of the Site.
Near Map Aug 2021	The site remains a depository for cars. The site office remains in the south-western corner of the Site.
Near Map Oct 2021	The Site is largely cleared with a small number of vehicles? And possibly skip bins in the south-eastern part of the Site. The site office has been retained.
Near Map Mar 2023	The site is once again store for skip bins. The office remains with a new small shed installed immediately to the north, A hardstand pad and shipping container has been placed in the central northern part of the Site close to the northern boundary.
Near Map May 2024	The latest Near Map image. The site is a store for skip bins. The office remains with a new small shed installed immediately to the north, The hardstand in the central north of the Site has a new awning (dome cover) spanning two shipping east-west oriented containers.

3.8 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

It is understood that there has been no previous environmental investigations or assessments carried out in the Site.

4.0 UNDERGROUND STORAGE TANKS

This current environmental assessment did not reveal the presence of any underground storage tanks.

5.0 ABOVE-GROUND STORAGE TANKS

This current environmental assessment did not reveal the presence of any above-ground storage tanks.

6.0 PRELIMINARY SITE INVESTIGATIONS

6.1 INTRODUCTION

Larry Cook (Environmental Consultant) conducted a site inspection on 3rd June 2024 to record land use, note any potential sites of contamination and carry out environmental field work including preliminary strategic sampling of the imported fill material forming the hardstand.

6.2 PRELIMINARY SITE INVESTIGATION – 3RD JUNE 2024

Preliminary investigations were undertaken in the site on 3rd June 2024. Photos of the hardstand, structures and skip bins are shown in **Plates 1, 2, 3 and 4**.



Plate 1 Hardstand – Looking Northwest



Plate 2 Stacked Skip Bins



Plate 3 Awning



Plate 4 Site Office

The detailed investigations incorporated inspection of the area covered by the hardstand, skip bins and structures. The objectives were:

- Collect strategically located soil samples in the hardstand platform; and
- Assess any potential contamination.

Descriptions of the soil sampling program, methodology and results of field and laboratory testing are documented in Sections 6.4, 7.4 and 9.

6.3 POTENTIALLY CONTAMINATED SOIL

Based on the established site history documented in this investigation and assessment, the recent site inspection and anecdotal information, the following areas of potential environmental concern are listed below in **Table 3**.

Table 3 Potential Contaminants of Concern		
Potential Contaminants	Historical Activities	Dispersion Mechanism & Areas of Environmental Concern (AEC)
Petroleum Hydrocarbons Total Recoverable hydrocarbons (TRH) Benzene Toluene Ethylbenzene, Xylenes (BTEXN) Polycyclic Aromatic Hydrocarbon (PAH) Anthropogenic material Asbestos	- Historical importation of uncontrolled fill (~2000) to construct the handstand platform - Storage of skip bins since about 2005 and a period of vehicle storage revealed between late 2015 and late 2021.	- Potential residual hydrocarbons contained within the historically imported fill material - Potential residual hydrocarbons associated with petroleum spills from vehicles and truck movements.
Heavy Metals	- Historical importation of uncontrolled fill (~2000) to construct the handstand platform - Storage of skip bins since about 2005 and a period of vehicle storage revealed between late 2015 and late 2021.	- Potential residual hydrocarbons contained within the historically imported fill material - Potential residual hydrocarbons associated with petroleum spills from vehicles and truck movements. - Battery leaching.

The detailed site walkover, inspection and observations did not reveal any significant discoloration, odours or signs of contamination.

6.4 SOIL SAMPLING AND TESTING

The scope of this investigation included a contingency for preliminary targeted (strategic) soil sampling to assess the type, degree and extent of any contamination within the historically placed handstand platform soil.

7.0 SOIL ASSESSMENT CRITERIA

7.1 INTRODUCTION

In evaluating potentially contaminated sites, a series of soil acceptance criteria should be adopted to assess the on-site contaminant concentrations of various environmental media.

7.2 NATIONAL ENVIRONMENT PROTECTION MEASURE

The National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM 1999) is made under the national Environment Protection Council Act 1994. The NEPM 1999 was amended in 2103 (16th May 2013).

The NSW EPA has endorsed the National Environment Protection (Assessment of Site Contamination) Amendment Measure (2013) 'Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater'. The NEPM provides a framework for the use of investigation and screening levels for soil, soil gas and groundwater. The framework is predicted on a matrix of human health, ecological and groundwater investigation and screening levels in conjunction with guidance for specific Contaminants of Concern (COC). The investigation levels and screening levels in the NEPM are the concentrations of a COC above which further appropriate investigation and evaluation would be required.

The guidelines are described as follows:

Health Investigation Levels (HILs)

Levels listed for a range of metal and organic substances applicable to assessing human health risk via all relevant pathways of exposure.

Health Screening Levels (HSLs).

For BTEX, TRH and naphthalene compounds applicable to assessing human health risk via the inhalation and direct contact pathways.

Ecological Investigation Levels (EILs)

Levels for selected metal and organic substances applicable for assessing risk to terrestrial ecosystems.

Ecological Screening levels (ESLs)

Levels for BTEX, Total Petroleum Hydrocarbons (TPH) and benzo(a)pyrene compounds applicable for assessing the risk to terrestrial systems.

Petroleum Hydrocarbon Management Limits (Management Limits)

Applicable to TRH compounds only. The NEPM states that these Management Limits are applicable as screening levels following an evaluation of human and ecological risks and risks to groundwater resources. The Management Limits are relevant for operating sites where significant sub-surface leakage of Total Petroleum Hydrocarbons (TPH) compounds has occurred and when decommissioning industrial and commercial sites.

Levels are provided for soil and groundwater in the NEPM for four (4) types of land uses:

- A Residential A with garden/accessible soil also includes children's day care centres, preschools and primary schools.
- B Residential B with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
- C Recreational C includes public open space such as parks, playgrounds, playing fields (e.g., ovals), secondary schools and unpaved footpaths.
- D Commercial/industrial D includes premises such as shops, offices, factories and industrial sites.**

Given the subject site is an industrial site, the soil assessment criterion considered most appropriate for this investigation is **Commercial/industrial D**. In general, the NEPM recommend site conditions be compared against the guidelines in a staged manner, firstly to assess for exceedances of the HSL's and the need for a Health Risk

Assessment prior to assessment against the ESL's and consideration of potential migration or exposure pathways, followed by an assessment of the physical and aesthetic suitability of the medium.

7.3 AESTHETIC CRITERIA

The NEPM (2013) *Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater* advises that there are no specific numeric aesthetic guidelines, however site assessment requires balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity.

General assessment considerations include:

- that chemically discoloured soils or large quantities of various types of inert refuse, particularly if unsightly, may cause ongoing concern to site users;
- the depth of the materials, including chemical residues, in relation to the final surface of the site;
- the need for, and practicality of, any long-term management of foreign material.

7.4 PRELIMINARY SOIL SAMPLING

7.3.1 OBJECTIVES

A site-specific preliminary sampling program was developed for the area covered by the hardstand. Soil samples were selected for analysis based on access to the hardstand.

7.3.2 HARDSTAND AREA AND FILL DEPTH

A review of the *Near Map* satellite images over the Site and review of a recently commissioned detailed ground survey plan reveals that the fill platform is approximately 0.7 m-thick covering an area of approximately 3,300 m² (0.3 hectares). This equates to a volume of approximately 2,300 m³.

7.3.3 SAMPLING PROCEDURE

Sample locations within the hardstand were excavated manually using a exploration digging tool. Soil descriptions and site coordinates were recorded in the field. Soil logging procedures followed a systematic and standardised format providing a classification of the soil group based on particle size and structure.

All soil samples were collected in accordance with industry standard QA/QC procedures. A minimum 0.5 kg sample was collected at designated sample locations and depths with disposable sterile nitrile gloves and placed directly into sterile glass containers. Sample containers were individually labelled with identification numbers, dates, and location clearly marked on the container. Samples were submitted to the project laboratory accompanied by Chain of Custody (COC) documentation.

Sample equipment was washed down and decontaminated between sample sites to prevent potential cross contamination.

7.3.4 PRELIMINARY SOIL SAMPLING

Larry Cook Consulting (Senior Environmental Consultant Larry Cook) conducted a program of soil sampling on 3rd June 2024. The locations of the soil sampling sites are shown in **Figure 4**. A photo of the hardstand is shown in **Plate 1**.

The soil material is generally grey to pale brown, gravelly semi-dense and moist (recent rain (see **Plate 1**)) blend comprising angular to sub-angular fragments of rock with common amounts of pale brown quartz-dominant sandy loam and uncommon sub-angular fragments of quartz sandstone to 30 mm, average 15 mm.

A summary of soil sample locations and soil descriptions is provided in **Table 4**.

Table 4 Summary Details - Soil Samples				
Sample ID	Location	Coordinates		Description
		E	N	
S1 Discreet	Hardstand in NE part of Site	353879	6313370*	Gravelly Loam .
S2 Discreet	Hardstand in S part of Site	353852	6313336	Gravelly Loam .

S3 Discreet	Hardstand in NW part of Site	353833	6313376	Gravelly Loam
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7.5 SOIL TESTING

A total of three primary soil samples (S1, S2 and S3) were submitted to *EnviroLab Services* (ELS) Chatswood, a NATA accredited testing laboratory and tested/analysed for:

- Total Petroleum Hydrocarbons C6-C40 (TRH);
- Benzene, Toluene, Ethylbenzene, Xylene, (BTEXN);
- Polycyclic Aromatic Hydrocarbon (PAH); and
- 8 Heavy Metals (Mercury, Cadmium, Lead, Arsenic, Chromium, Copper, Nickel and Zinc).

8.0 QUALITY ASSURANCE & QUALITY CONTROL

8.1 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQO) are required to define the quality and quantity of data needed to support management decisions. The process for establishing DQO's is documented by Australian Standard: AS 4482.1-2005 and referenced by the National Environment Protection (Assessment of the Site Contamination) Measure (NEPC 2013) and the Guidelines for the NSW Site Auditor Scheme, 2nd ed (NSW DEC, 2006). The DQO's for the investigation were to obtain sufficient representative data to allow a high-quality environmental assessment of:

1. The location, nature, and degree of soil and groundwater contamination at selected sampling locations (if any);
2. The risks posed to human health and the environment, including potential future users of the site;
3. The requirements for any further investigative works; and
4. To a standard consistent with generally accepted and current professional consulting practice for such an investigation.

The assessment was conducted to a standard consistent with generally accepted and current professional consulting practice for such an investigation. The evaluation criteria (Decision Rules) adopted for the investigation are summarised in **Table 5**.

Table 5 Data Quality Objectives	
DQO	Evaluation Criteria
Documentation completeness	Completion of field records, chain of custody documentation, laboratory test certificates from NATA-accredited laboratories.
Data comparability	Use of appropriate techniques for the sampling, storage and transportation of samples. Use of NATA accredited laboratory using NEPM procedures
Data representativeness	Adequate sampling coverage of all areas of environmental concern at the site, and selection of representative samples
Precision and accuracy for sampling and analysis	Use properly trained and qualified field personnel and Achieve laboratory QC criteria.

8.2 FIELD QUALITY ASSURANCE & QUALITY CONTROL

The Quality Assurance and Quality Control (QA/QC) protocols used during the field investigations are documented in **Table 6**.

Table 6 Field QA/QC	
Protocol	Description
Sampling Team	Site personnel comprised only professionally qualified environmental scientists and occupational hygienists trained in conducting asbestos surveys and site contamination investigations.
Sample Equipment	All sample equipment decontaminated between sample sites. Disposable equipment including gloves changed between each sample.
Field Screening	Visual and manual inspection of sample materials for potential contamination
Chain of Custody Forms	All samples were logged and transferred under appropriately completed Chain of Custody Forms.

8.3 LABORATORY QUALITY ASSURANCE & QUALITY CONTROL

Analysis and testing of soil samples was conducted by Envirolab, West Chatswood. Envirolab is NATA approved for the selected analysis. Laboratory QA/QC results are detailed in the laboratory report contained in the appendices section of this report.

8.4 QUALITY ASSURANCE & QUALITY CONTROL DISCUSSION

A summary of the Data Quality performance is provided in **Table 7**.

Table 7 Data Quality Objectives and Criteria		
DQO	Evaluation Criteria	Status
Documentation completeness	Completion of field records, chain of custody documentation, laboratory test certificates from NATA-registered laboratories.	✓
Data comparability	Use of appropriate techniques for the sampling, storage and transportation of samples. Use of NATA certified laboratory using NEPM procedures. Comparison with previous site information.	✓
Data representativeness	Good sampling coverage of all areas of environmental concern at the site, and selection of representative samples from each sampling location. Targeting Areas of Environmental Concern for contaminants of concern.	✓
Precision and accuracy for sampling and analysis	Use properly trained and qualified field personnel. Appropriate sampling and field techniques. Achieve laboratory QC criteria.	✓

The project laboratory is NATA accredited, and the Practical Quantitation Limits (PQL) were within the acceptable levels for the investigation criteria. The laboratory certificate of analysis provided in **Appendix C** indicate that for the samples collected during the scope of works, sampling techniques, transport procedures and laboratory analysis were satisfactory.

The QA/QC indicators either all complied with the required standards or showed variations that would have no significant effect on the quality of the data or the conclusions of this assessment. It is therefore concluded that, for the purposes of this study, the QA/QC results are valid, and the quality of the **data is acceptable for use in this assessment**.

9.0 SOIL ANALYSIS RESULTS

Laboratory results are summarised in **Table 8**. A copy of the laboratory certificate and Chain of Custody (COC) documentation are provided in **Appendix C**. Laboratory QA/QC results are also detailed in the laboratory report in **Appendix C**.

The NSW EPA has endorsed the National Environment Protection (Assessment of Site Contamination) Amendment Measure (2013) 'Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater'. The guidelines provide Health Investigation Levels (HILs), Health Screening Levels (HSLs) and Ecological screening levels (ESLs). Levels are provided for soil and groundwater in the NEPM for four (4) types of land uses:

- A Residential A with garden/accessible soil also includes children's day care centres, preschools and primary schools.
- B Residential B with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
- C Recreational C includes public open space such as parks, playgrounds, playing fields (e.g., ovals), secondary schools and unpaved footpaths.
- D Commercial/industrial D includes premises such as shops, offices, factories and industrial sites.

Given the subject site is zoned industrial, the most appropriate soil assessment criteria for this investigation is considered to be **NEPM D Commercial/industrial D includes premises such as shops, offices, factories and industrial sites**. In general, the NEPM recommend site conditions be compared against the guidelines in a staged manner, firstly to assess for exceedances of the HSL's and the need for a Health Risk Assessment prior to assessment against the ESL's and consideration of potential migration or exposure pathways, followed by an assessment of the physical and aesthetic suitability of the medium.

Analytical results were also assessed against the **Petroleum Hydrocarbon Management Limits (Management Limits)**

In summary:

- **Total Recoverable Hydrocarbons (TRH)** were detected above the Practical Quantification Limit (PQL) in all three soil samples.
 - 1,300 mg/L in Sample S1
 - 320 mg/L in Sample S2
 - 800 mg/L in Sample S3
- **BTEX** was not detected with all results recorded less than the PQL
- **Polycyclic Aromatic Hydrocarbons (PAHs)** were detected above the Practical Quantification Limit (PQL) in all three soil samples.
 - 2.5 mg/L in Sample S1
 - 0.87 mg/L in Sample S2
 - 0.99 mg/L in Sample S3
- Trace to low concentrations of some **heavy metals** were recorded above the PQL.

In summary, the laboratory report from the AEC targeted soil investigation shows that concentrations of tested analytes were all below the adopted Soil Investigation Level guidelines for **NEPM D Commercial/industrial D includes premises such as shops, offices, factories and industrial sites**.

Total Recoverable Hydrocarbons and BTEX

Laboratory analysis of the soil samples collected in the hardstand targeting AEC returned levels of BTEX all below the PQL and less than the Petroleum Hydrocarbon Management Limits (Management Limits) and relevant NEPM Health and Soil Investigation Level guidelines.

Laboratory analysis of the soil samples returned levels of TRH all above the PQL but less than the Petroleum Hydrocarbon Management Limits (Management Limits) and relevant NEPM Health and Soil Investigation Level guidelines.

Polycyclic Aromatic Hydrocarbons

Laboratory analysis of the soil samples returned levels of PAH were all above the PQL but less than the Petroleum Hydrocarbon Management Limits (Management Limits) and relevant NEPM Health and Soil Investigation Level guidelines.

Heavy Metals

Laboratory analysis targeting AEC returned levels of cadmium and mercury below the PQL and relevant NEPM Health and Soil Investigation Level guidelines.

Levels of arsenic, chromium, copper, lead and zinc were recorded above the PQL but significantly less than the NEPM Health and Soil Investigation Level guidelines.

10.0 CONCEPTUAL SITE MODEL

10.1 PRELIMINARY CONCEPTUAL SITE MODEL

A Conceptual Site Model generally provides an assessment of the fate and transport of Contaminants of Potential Concern (COPCs) relative to site-specific subsurface conditions having regard to their potential risk to human health and the environment. The site-specific factors incorporated in the Conceptual Site Model include the following:

- Source(s) of contamination;
- Identification of COPCs associated with past and present source(s);
- Vertical, lateral and temporal distribution of COPCs;
- Site-specific lithological information including soil type(s), depth to groundwater, effective porosity, groundwater gradient and groundwater flow velocity; and
- Actual or potential environmental receptors considering both current and future land use for both the Site and adjacent properties, and any sensitive ecological receptors.

In accordance with the EPA Guidelines, a Preliminary Conceptual Site Model has been developed and summarised in **Table 9**. The model is based on the available information documented in this PSI.

Table 9 Conceptual Site Model	
Element	Description
Site History	• Rural till mid 2000s • Light Industrial mid-2000s to present
Site Current and Future Use	• Light Industrial
Site Geology	• No intrusive investigation was undertaken during the current assessment. • Based on Site conditions and published state government geological data and results of other investigations in the district, the sub-surface conditions can be generally summarised as natural materials comprising Quaternary alluvial and fluvial deposits with historic filling associated with the hardstand area.
Site Hydrogeology	• Groundwater assessment was not undertaken as part of the scope. • Based on Site conditions and published state government hydrogeological data and results of other hydrogeological investigations in the district, water-bearing zones (aquifers) may be associated with water-bearing zones (aquifers) hosted by interbedded, interlensed and stacked sequences of estuarine alluvium and fluvium including loam, clay, sandy clay and sand associated with the present and former Wyong River system.
Area of Environmental Concern - Onsite	Potential contamination associated with: • dry waste imported and sorted on Site • uncontrolled platform fill on Site. • machinery use on Site (oil spills). • any soil stockpiles on the Site.
Potentially Impacted Media	• Potentially contaminated fill platform on Site. • Potentially contaminated underlying soils. • Potentially contaminated fill materials onsite. • Potentially contaminated groundwater beneath the Site.
Potential Human Receptors	• Day workers (on-site).
Potential Environmental Receptors	• Proximal waterbodies – i.e., drains & wetlands
Potential Exposure Pathways	• Air – inhalation of dusts. • Soil – dermal / direct contact. • Imported materials – dermal / direct contact. • Lateral migration via surficial runoff.

10.2 DATA GAPS

Based on the recent site inspection, the potential for contamination at this Site is not considered to present a significant constraint on the proposed Resource Transfer Station development. However, it is noted that the preliminary assessment was limited to a review of historical data and observations in the Site, with limited (targeted) intrusive sampling undertaken.

In summary:

- Limited intrusive sub-surface sampling during the current assessment.
- Limited laboratory testing and analysis. No testing for asbestos.
- No groundwater samples were collected.
- No sampling, testing and analysis of any existing stockpiles or imported dry waste (for sorting) on the Site.
- No dangerous goods search was undertaken for the Site; however, they are unlikely to be present.

11.0 ENVIRONMENTAL MANAGEMENT

11.1 NATURE OF SOIL CONTAMINATION

Based on the results reviewed during this assessment, *Larry Cook Consulting* has identified hydrocarbon contamination in the hardstand area. Field investigations comprising site investigations and manual excavation of soil did not identify any visible (stains/leachate) or olfactory signs of any significant soil contamination.

The aim of this targeted environmental investigation has been to focus on the potential for contamination on the Site associated with the AEC. **The assessment did not reveal any significant contamination in soil.**

BTEX and TRHs

The laboratory analysis of soil samples S1, S2 and S3 targeting AEC potentially associated with the proposed development footprint returned levels of BTEX below the PQL and TRH above the PQL but all results less than the Management Limits and less than the relevant NEPM HSILs.

Polycyclic Aromatic Hydrocarbons

The laboratory analysis of soil samples S1, S2 and S3 targeting AEC potentially associated with the proposed development footprint returned levels of PAH above the PQL but less than the Management Limits and less than the relevant NEPM HSILs.

Heavy Metals

Laboratory analysis of the three soil samples targeting AEC returned trace levels of heavy metals for six of the eight metals. However, all analyses were less than the relevant NEPM Health and Soil Investigation Level guidelines.

Summary of Soil Investigation Results

The following points summarise the key findings from the soil investigation:

- Level of TRHs were less than NEPM Health and Soil Investigation Level guidelines and the Management Limits.
- Concentrations of BTEX were less than NEPM Health and Soil Investigation Level guidelines and the Management Limits.
- Level of PAHs were less than NEPM Health and Soil Investigation Level guidelines and the Management Limits.
- Concentrations of the suite of eight (8) heavy metals analysed were less than the Health and Soil Investigation Level guidelines.

11.2 HUMAN HEALTH

The soil testing component of this investigation in the Site has been limited to targeted point source samples from accessible surface and near-surface sites. Analytical results from soil testing on the Site suggests that the risk of any contamination is low.

11.3 SIGNIFICANT RISK OF HARM

A critical concept under the Contaminated Land Management Act 1997 (CLM Act) is whether contamination 'presents a significant risk of harm to human health or some other aspect of the environment'. There are also obligations under *section s.60* of the CLM Act for landowners and persons whose activities have contaminated land and who become aware that land is contaminated 'in such a way as to present a significant risk of harm'.

Based on the available data outlined in this report, the risk of any contamination is assessed as low. However, it is noted that the NSW EPA are the sole arbiters as to whether land represents a significant risk of harm, and their view may differ from that expressed herein.

11.4 SITE SUITABILITY

This targeted environmental investigation incorporated a title search, established current land use and site history review of the Site including limited AEC targeted soil sampling within the hardstand fill platform. The environmental investigation did not identify any sources of significant contamination. That is, no hydrocarbon or heavy metal contamination was recorded that exceeds the NEPM guidelines for any of the land use category D.

Groundwater was not encountered during the investigation; however, hydrogeological conditions may change in the future dependant on climatic factors.

Therefore, in their present conditions, the industrial Site is considered suitable for the proposed industrial development.

12.0 CONCLUSIONS AND RECOMMENDATIONS

The Environmental Site Assessment for the Site was based on detailed field inspections, present land use, historical title search and review of historical aerial photographs and satellite imagery. Based on the site history, aerial photographs, satellite images and walkover inspections the following conclusions are made:

- The Site has been a rural-residential property used over the years for possibly grazing up until the early 2000s. Placement of soil fill, spreading and levelling appears to have been undertaken in the Site and adjoining land to the south in about early to mid-2000.
- Industrial use is evident from about 2005 to present with dominantly storage of skip bins and vehicles.
- The results of the site inspections, aerial photographs and other records reviewed indicate a low risk of potential contamination for the proposed development.
- It is assessed that the risk of significant site contamination to be low

This environmental assessment concludes that the Site is unlikely to be significantly contaminated and assessed suitable or could be made suitable for the proposed development.

The results of targeted soil testing in identified Area of Environmental Concern (AEC) in the Site revealed the following:

- Levels of TRHs were less than NEPM Health and Soil Investigation Level guidelines and the Management Limits.
- Concentrations of BTEX were less than NEPM Health and Soil Investigation Level guidelines and the Management Limits.
- Levels of PAHs were less than NEPM Health and Soil Investigation Level guidelines and the Management Limits.
- Concentrations of the suite of eight (8) heavy metals analysed were less than the Health and Soil Investigation Level guidelines.

In summary, the laboratory report from the AEC targeted soil investigation shows that concentrations of tested analytes were all below the adopted Soil Investigation Level guidelines.

13.0 SAMPLING AND ANALYSIS QUALITY PLAN

If soil sampling and testing is required as part of a detailed site investigation, a *Sampling and Analysis Quality Plan* (Plan) will be prepared. As documented in the EPA Guidelines, the objective of such a plan is to “provide the context, justification and details of the selected sampling and analysis approach”. The Plan ensures that the data collected is representative and provides a ‘robust’ basis for any decisions on site assessment which are indicated in *Schedule B2 - Guideline on Site Characterisation, of the ASC NEPM*.

The Plan incorporates a set of Data Quality Objectives which are performance and acceptance criteria developed during the planning of the site assessment. A description of Data Objectives is documented in Section 8.1.

The Plan would be prepared prior to any sampling and would specify the chosen strategy with justification for the sampling design including an assessment of representativeness and relevancy. The Plan must ensure that field work and analyses are carried out in a way that enables collection and reporting of reliable data to meet the project's objectives including the site characterisation requirements of the Detailed Site Investigations.

Given the nature of the Resource Transfer Station development, it is considered that overland flow potentially migrating off-site from the hardstand presents the highest risk of contamination. In this regard, a detailed Water Quality Monitoring Program is developed in Section 14.

14.0 WATER QUALITY MONITORING PLAN

14.1 INTRODUCTION

The risk of any impacts from overland flow migrating from the hardstand will be effectively mitigated by directing any runoff waters into a suitable type and capacity of treatment cell. The recommended location of the treatment cell and associated pits and kerbs are shown in **Figure 5**.

In summary, it is proposed to capture any overland flow from the hardstand and direct it to a stormwater pit with movable grate located in the north-western part of the Site. The discharge from the pit will flow directly into an in-line industrial-scale 1,000 L capacity oil-water separator then into the existing stormwater pit prior to discharging to street.

14.2 TREATMENT TRAIN

The proposed treatment train is an in-line silt arrestor and grease arrestor.

The proposed **silt arrestor** is a *Mascot Engineering* Model SA7 'flush to the ground' device, an important and integral component in any wastewater treatment stream that captures and retains any clay, silt and sand migrating off-site in overland flow. The proposed location is shown in **Figure 5** and a standard drawing provided in **Appendix D**.

A **grease arrestor** (grease trap) is also considered an important and integral component in the wastewater treatment stream that captures and retains any oils and grease migrating off-site in overland flow. In this regard, a commercial-scale grease arrestor is recommended for installation in line with, and immediately downstream of, the silt arrestor shown in **Figure 5**. An example with engineering drawings of a state government accredited, and Council-approved grease trap manufactured by Halgan, Wetherill Park is provided in **Appendix E**. The example is a 1,000 L capacity commercial scale below ground General Purpose Pit (HGPPS 1000 model) which is considered suitable for the purpose. A 1,000 L device (and larger volume units) can also be installed above ground.

The location of the General Purpose Pit can be selected by the plumber to suit the location of the proposed plumbing system. The preferred location is shown in **Figure 5**.

The final location of the treatment train can be refined by the project's plumbing contractor.

14.3 POTENTIAL CONTAMINANTS AND IMPACTS

It is not expected that the proposed development will have any significant impact on downstream water quality. The main contaminants of concern are suspended solids associated with the vehicle movements on the hardstand and petroleum hydrocarbons from accidental spillage. The potential contaminants are:

- Total Recoverable hydrocarbons (TRH)
- Benzene Toluene Ethylbenzene, Xylenes and Naphthalene (BTEXN)
- Polycyclic Aromatic Hydrocarbon (PAH)
- Heavy Metals

14.4 RELEVANT GUIDELINES AND STANDARDS

The legislation, plans, policies and guidelines relevant to this plan are listed in **Table 10**.

Table 10 Relevant Legislation, Plans, Policies and Guidelines
NSW Water Management Act, 2000
ANZECC 2020 Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Agriculture and Resource Management Council of Australia and New Zealand and the Australian and New Zealand Environment and Conservation Council, 2020)
Protection of the Environment Operations Act, 1997

14.5 SURFACE WATER QUALITY MONITORING

12.4.1 Water Quality Monitoring

The location of the discharge sample point M1 is shown in **Figure 5**, the existing stormwater pit. The details are summarised in **Table 11**.

Table 11 Recommended Surface Water Quality Monitoring Program		
Monitoring Site	Sample Frequency	Comment
M1	- Baseline sample to be collected following the first rain event that results in discharge from the existing stormwater pit. - Immediately following and during any flow from the stormwater pit for 12 months - Consult with Council within 1 month of end of Year 1 to discuss decrease of monitoring frequency from monthly to quarterly (3 monthly). <i>Depending</i> on results and trends, and approval from Council, decrease frequency to quarterly (1 sample every 3 months)	This sample frequency is designed to provide adequate and representative water quality data to assess any significant changes in surface water chemistry (contaminants of concern) that may be due to the waste recycling operations.

Careful analysis and progressive assessment of the results may lead to the reduction of the frequency of scheduled sampling for monitoring site W1. The NSW EPA will be consulted with any proposal to reduce the frequency of sampling and testing. The selected set of indicator analytes will alert the Site Manager of any significant changes in water quality that may require action. The prescribed list of analytes and tests for each monitoring site is provided in **Table 12**.

Table 12 List of Analytes and Tests		
Analytes	Unit of Measure	Monitoring Site
		M1
Total Recoverable Hydrocarbons (TRH)	mg/L	X
BTEXN	mg/L	X
Polycyclic Aromatic Hydrocarbon (PAH)	mg/L	X

Heavy Metals (8)	mg/L	X
Oil & Grease	mg/L	X

Sampling at monitoring site M1 must be conducted using nitrile disposable gloves and the sample stored in laboratory-supplied plastic bottles and chilled in an esky. The samples will be submitted to the NATA-accredited project laboratory for the suite of tests and determinations listed in **Table 12** in order to establish the concentrations of the potential contaminants of the surface water, reveal any potential changes and establish any trends. The samples will be transported under our Chain of Custody (COC) protocol.

12.4.2 Recommended Sampling Kit

A water sampling kit will be prepared by the environmental consultant and safely stored in the site office. The components of the kit are:

- Esky with secure lid and clearly marked 'Water Sampling Kit'.
- A set of laboratory-supplied 1L plastic sample bottles ('physical chemistry'), vials dedicated for collection of volatile hydrocarbons (BTEX) and dedicated bottles with preservative for metals analysis.
- Box disposable nitrile gloves.
- Disposable container to collect water sample from discharge outlet.
- List of relevant contacts with cell numbers, marker pens.
- Chain of Custody (COC) forms kept in a plastic sleeve.

12.4.3 Recommended Sampling Procedure

- Label sampling bottles with project identification, sample number (M1), date and time of sampling and sampler's name.
- Put on nitrile gloves.
- Carefully use the disposable container to collect water sample from discharge outlet.
- Fill 1 x 1L 'physical chemistry' bottle slowly with no air gap then cap securely. Fill dedicated metals bottle slowly with no air gap without spillage then cap securely. Fill 1 x vial and place cap securely.
- Temporarily store labelled sample bottles in fridge in site office.
- Contact environmental consultant regarding pick-up for laboratory and protocol.
- Deliver in a timely manner (1 – 3 days) to NATA-accredited project laboratory.

12.4.4 Water Quality Guidelines

The ANZECC guidelines provide useful trigger values for an extensive list of toxicants at alternative levels of protection. Trigger values for freshwater applying to typical slightly - moderately disturbed systems adopting a 95 per cent level of protection (per cent species) re adopted in the proposed sampling of the water discharge from the exiting stormwater pit. The adopted criteria are listed in **Table 13**.

Table 13 Recommended Guideline Values	
Analytes	Recommended Guideline Level¹ (mg/L) (95 per cent level of protection)
Total Recoverable Hydrocarbons (TRH)	ID
BTEXN	
Benzene	0.095
Toluene	ID
Ethylbenzene	ID
o-xylene	0.35
m-xylene	ID
p-xylene	0.20
Naphthalene	0.016
Polycyclic Aromatic Hydrocarbon	
Anthracene	ID
Benzo(a)pyrene	ID
Heavy Metals	
Arsenic (as III)	0.024
Cadmium	0.002
Chromium (CrVI)	0.001
Copper	0.0014
Lead	0.0034
Mercury	0.0006
Nickel	0.011
Zinc	0.08
Oil & Grease	ID

1. ANZECC Guidelines 2000

2. ID - Insufficient Data

14.6 PROTOCOL – INVESTIGATE/NOTIFY/MITIGATE ANY IDENTIFIED EXCEEDANCES

The water quality results will be compared against the default trigger levels (concentrations) tabled in the *Australian and New Zealand Environment and Conservation Council Guidelines for Fresh and Marine Quality 2020* (ANZECC). These guidelines values are considered conservative and represent a 95 % protection of species for slight to moderately disturbed ecosystems. The comparison of site water quality data can be undertaken to determine if the ANZECC guideline values are appropriate. It is noted that no additional water quality data was able to be sourced.

In regard to procedures required for any unforeseen impacts, it is considered that the potential impacts have been identified for example:

- water quality exceedances in surface water discharge at Monitoring Sites W1.

In the event that Detection Monitoring identifies quality parameters that exceed the agreed trigger levels in this water management plan, the exceedance/s will be reported to Council in writing within 1 week of receipt of the results and a program of Investigation Monitoring which consists of re-sampling and retesting the surface water monitoring site within 30 days to confirm the anomalous results.

If the follow-up test results confirm an exceedance/s, consultation with Council will be arranged regarding a suitable and agreed process of mitigation.

14.7 MITIGATION MEASURES

The proposed management controls designed to manage overland flow from the hardstand are considered adequate. In regard to potential impacts on local water users, it is noted that there are no water users downstream of the Site where controlled runoff from the Site enters the Council street drainage system.

14.8 DATA MANAGEMENT

Data management protocol is summarised as follows:

- The water quality data acquired from the surface water monitoring site should be imported into an electronic database or spreadsheet, collated and viewed by the site manager (and possibly the hydrological consultant) following each round of monitoring. This process will ensure that a progressive record of the data is stored and maintained, and the integrity/quality of the data can be checked on a regular basis.
- Email a copy of the water level data to the hydrological consultant for assessment and keep a backup copy of the water level database or spreadsheet in a secure off-site place.
- Develop and maintain an electronic water quality database or spreadsheet. A suitable database and progressive charting can be developed.
- Develop and maintain an electronic rainfall database or spreadsheet.

14.9 REPORTING

The protocol for reporting is summarised as follows.

- A complete set of surface water quality monitoring results will be recorded, collated and duly reported in-house on at least a six-monthly basis for the first 12 months then on an annual basis. The data should be reviewed by the

hydrological consultant. The aim is to assess any changes in surface water chemistry and identify reasons for the changes if they occur. The monitoring schedule should be reviewed annually and changed if deemed appropriate by the hydrological consultant.

- A complete set of results for the surface water monitoring program including a review of results and any exceedances should be formally reported to Council and the site Manager on an annual basis.
- The report will include but not necessarily limited to the following.
 - A progressive record of the surface water quality results for the monitoring site.
 - A figure showing the locations of the surface water monitoring site.
 - Rainfall data correlations.
 - Analytical results and progressive assessment of any trends in surface water chemistry.
 - Notification and assessment of any exceedances.
 - Conclusions and recommendations.

The report should be submitted in hard copy and electronic format to Council and to the site Manager. The raw water quality data will be appended to the report in electronic form.

15.0 LIMITATIONS

This report and the associated services performed by Larry Cook Consulting are in accordance with the scope of services set out in the agreement between Larry Cook Consulting and the owner. The scope of services was defined by the request of the owner's agent.

Larry Cook Consulting derived the data in this report primarily from visual inspections, examination of available records, interviews with individuals with information about the site, and limited sample collection and analysis made on the date/s indicated. In preparing this report, Larry Cook Consulting has relied upon, and presumed accurate, certain information provided by government authorities, the owners and others identified herein. The report has been prepared on the basis that while Larry Cook Consulting believes all the information in it is deemed reliable and accurate at the time of preparing the report, it does not warrant its accuracy or completeness and to the full extent allowed by law excludes liability in contract, tort or otherwise, for any loss or damage sustained by the owners arising from or in connection with the supply or use of the whole or any part of the information in the report through any cause whatsoever.

Limitations also apply to analytical methods used in the identification of substances (or parameters). These limitations may be due to non-homogenous material being sampled (i.e., the sample to be analysed may not be representative), low concentrations, the presence of 'masking' agents and the restrictions of the approved analytical technique. As such, non-statistically significant sampling results can only be interpreted as 'indicative' and not used for quantitative assessment.

The data, findings, observations, conclusions and recommendations in the report are based solely upon the state of the site at the time of the investigation. The passage of time, manifestation of latent conditions or impacts of future events (e.g., changes in legislation, scientific knowledge, land uses, etc.) may render the report inaccurate. In those circumstances, Larry Cook Consulting shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of the report.

This report has been prepared on behalf of and for the exclusive use of the owners. Larry Cook Consulting accepts no liability or responsibility whatsoever and expressly disclaims any responsibility for or in respect of any use of or reliance upon this report by any third party or parties.

It is the responsibility of the owners to accept if they so choose any recommendations contained within and implement them in an appropriate, suitable and timely manner.

16.0 REFERENCES

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- Department of Urban Affairs and Planning • Environment Protection Authority 1998. *Managing Land Contamination Planning Guidelines SEPP 55–Remediation of Land*
- NSW Environment Protection Authority. 2020. *Contaminated Land Guidelines - Consultants Reporting on Contaminated Land 2020*.
- NSW Environment Protection Authority. 2022. *Contaminated Land Guidelines - Consultants Reporting on Contaminated Sites – Sampling Design Guidelines*.

FIGURES



Near Map May 2025

0 m 20



Larry Cook Consulting
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Phone (02) 4340 1114

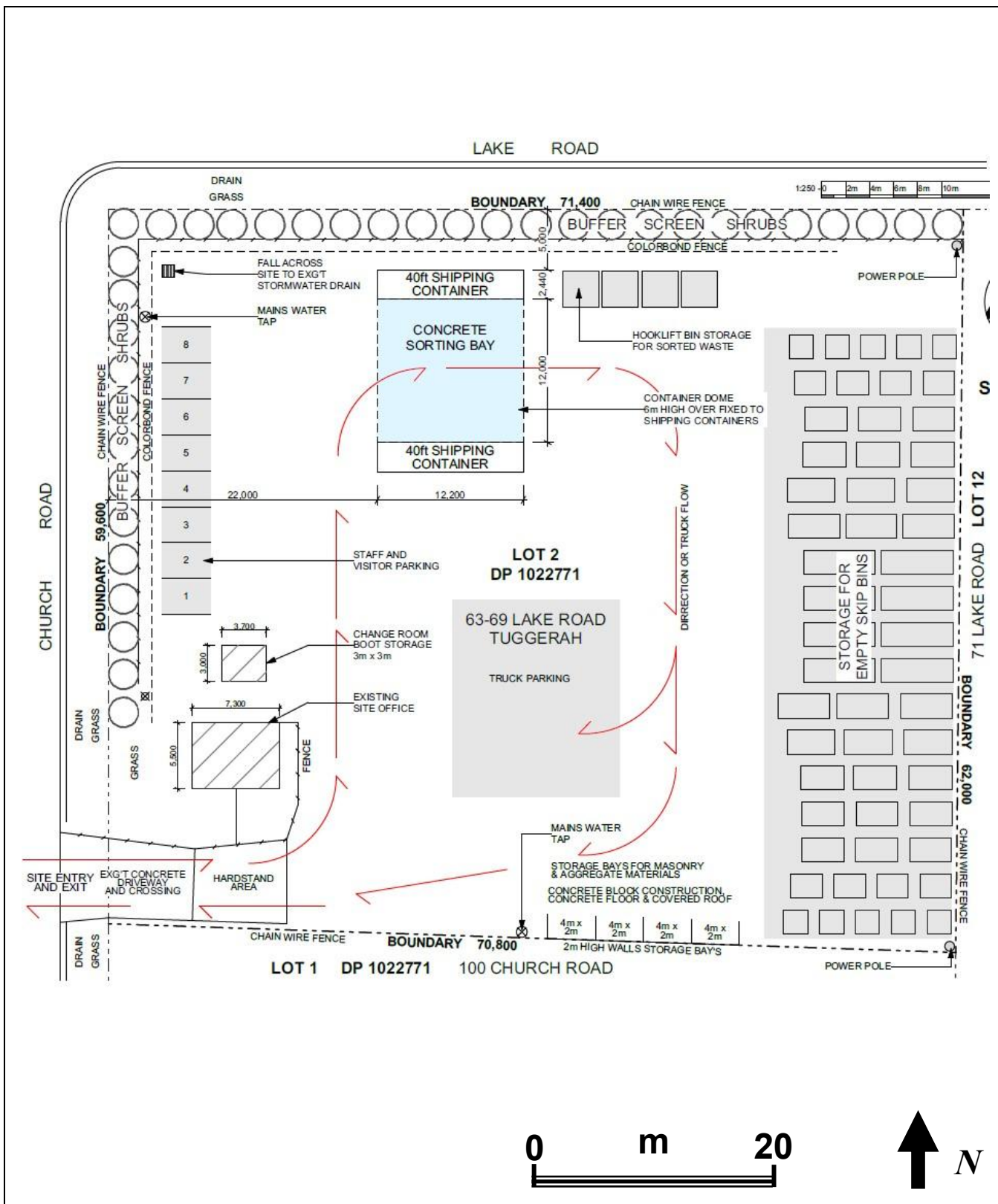
Preliminary Site Investigation

Lot 2 in DP1022771
63-69 Lake Road Tuggerah
Lot Plan

Scale: As shown

FIGURE 1





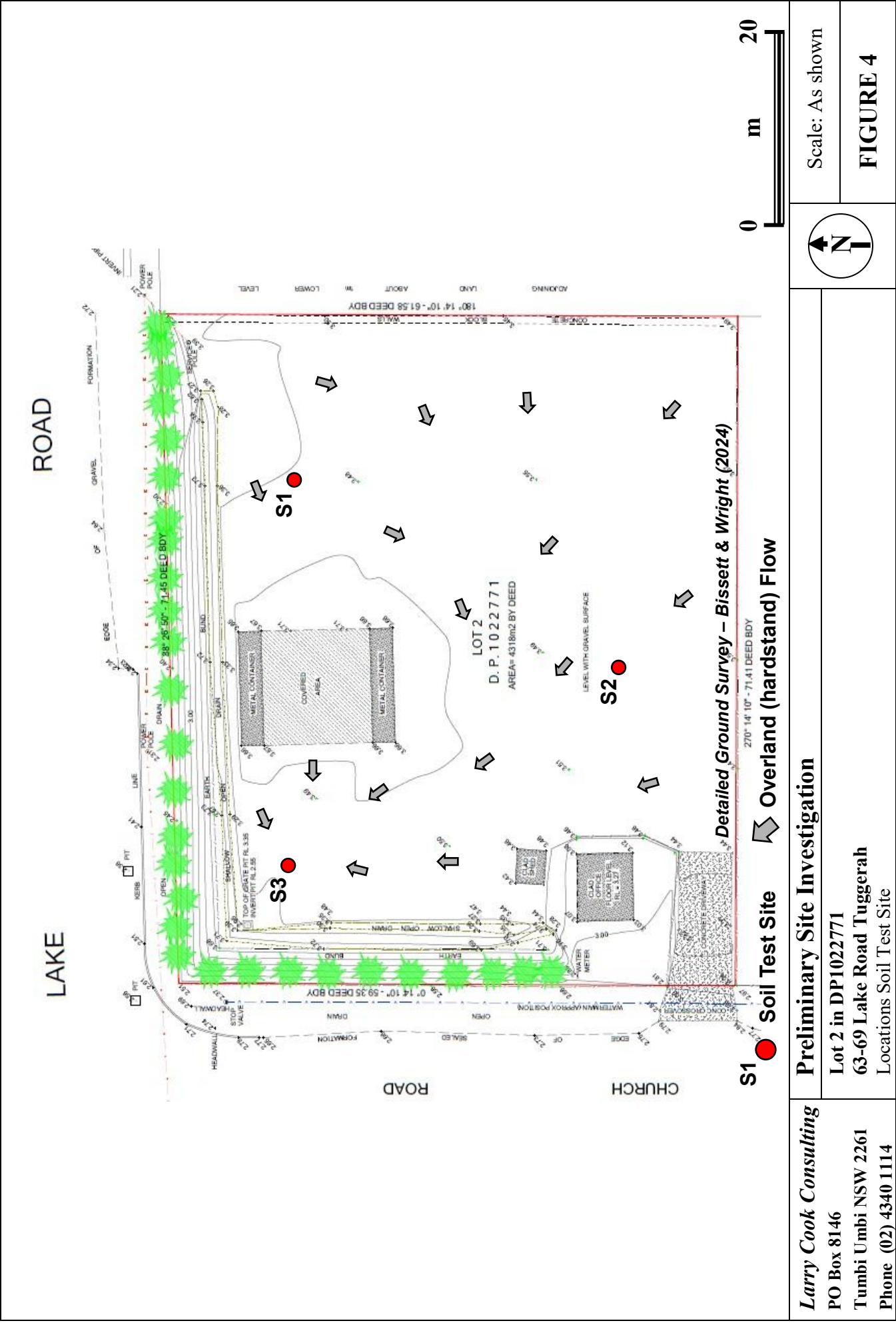
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Phone (02) 4340 1114

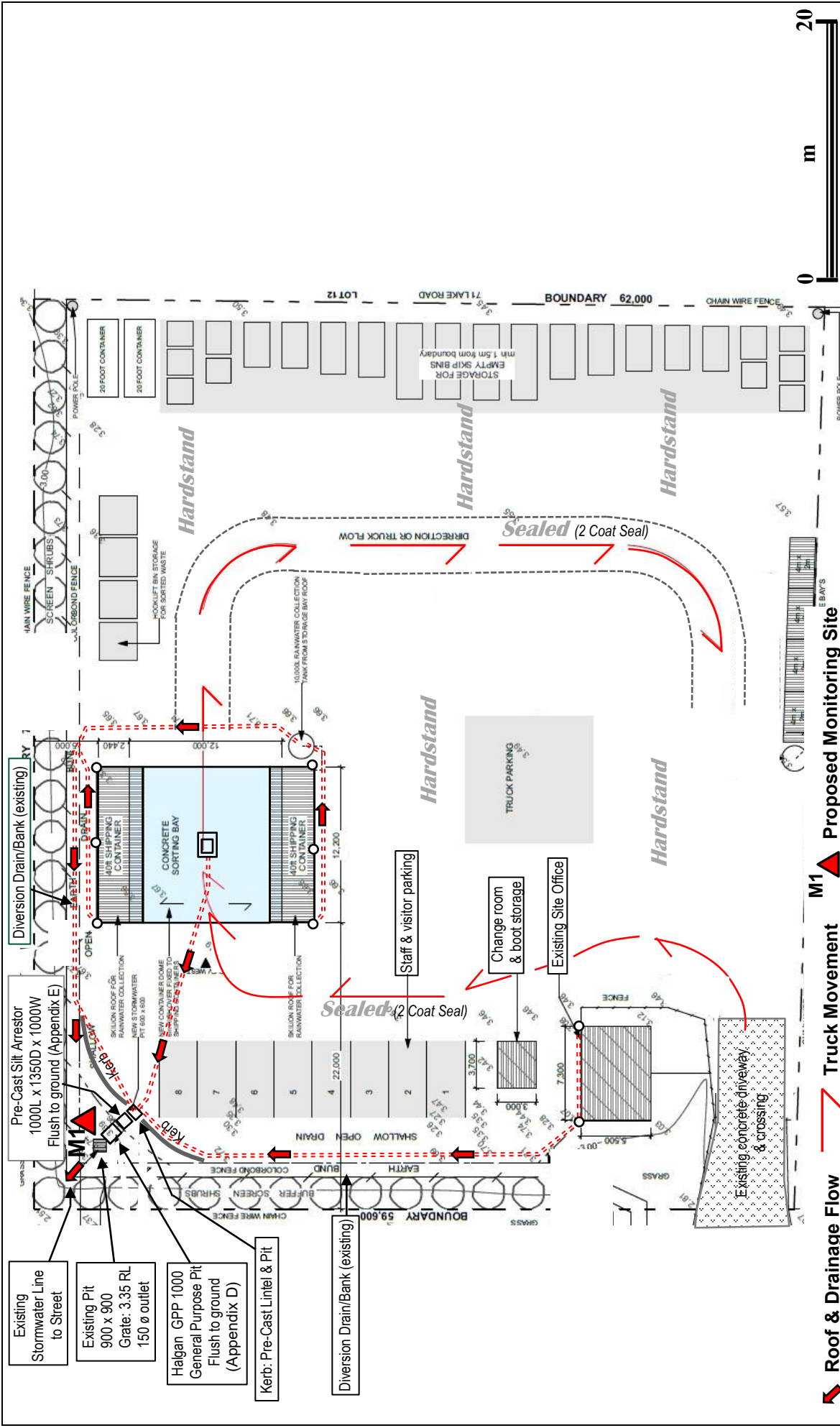
Preliminary Site Investigation

Lot 2 in DP1022771
63-69 Lake Road Tuggerah
Layout of Development

Scale: As shown

FIGURE 3





Larry Cook Consulting

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Tumbi Umbi NSW 2261

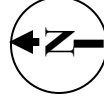
Phone (02) 4340 1114

Preliminary Site Investigation

Lot 2 in DP1022771

63-69 Lake Road Tuggerah

Location Treatment Train and Proposed Water Quality Monitoring Site



Scale: As shown

FIGURE 5

APPENDICES

Appendix A	Checklist - EPA's Contaminated Land Guidelines - Preliminary Site Investigations
Appendix B	Historic Aerial Photos
Appendix C	Laboratory Certificate and Chain of Custody Documentation
Appendix D	Mascot Engineering Model SA7 Silt Arrestor
Appendix E	Halgan HGPPS 1000 Model General Purpose Pit

APPENDIX A

CHECKLIST

TABLE 2.1 IN SECTION 2.2

EPA CONTAMINATED LAND GUIDELINES

PRELIMINARY SITE INVESTIGATIONS

Table 2.1 NSW EPA - Consultants Reporting on Contaminated land (2020) Table 2.1 Preliminary Site Investigation Reporting Checklist			
Report Section	Required Information	Reference in Report	Compliance
Document Control	Date, version number, author and reviewer (including certification details) and who commissioned the report	Document Control & Record of Distribution Sec 1	✓
Executive Summary	Background	Executive Summary	✓
	Objectives of the investigation		✓
	Scope of Work		✓
	A summary of key findings, observations and sampling results (if available)		✓
	Summary of conclusions and recommendations		✓
Objectives	The objectives of the investigation/report and the broader objectives for the site/investigation	Sec 1.1	✓
Scope of Work	Scope of work performed (and work not undertaken where relevant)	Sec 1.2	✓
Site Identification	Site identification and detail items from ASC NEPM Field Checklist 'Site information' sheet	Sec 2	✓
Site History	Site history items from ASC NEPM Field Checklist 'Site information' sheet	Sec 3 App. A	✓
Site condition and surrounding environment	Site condition and surrounding environment items from ASC NEPM Field Checklist 'Site information' sheet	Sec 2	✓
Conceptual Site Model	See Table 2(a)	Sec 10	✓
Data Gaps	See Table 2(a)	Sec. 10.2	✓
Data quality objectives (if sampling is undertaken)	See Table 2(b)	Sec 8.1	✓
Sampling and analysis plan and sampling methodology (if sampling is undertaken)	See Table 2.2, and note and explain the rationale for any deviations from the plan	Secs 6.4, & 7.4	✓
Quality assurance/quality control data evaluation	See Table 2(c)	Sec 8.2	✓

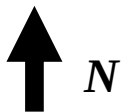
(if sampling is undertaken)			
Field and analytical results (if sampling is undertaken)	Summary of previous results, if applicable	Sec 3.8	✓
	A table(s) of analytical results that: - shows all essential details such as sample identification numbers and sampling depth - shows assessment criteria - highlights all results exceeding any assessment criteria	Table 8 Secs 7.4 & 7.5. Table 4	✓
	Summary/discussion of the analytical results table	Sec 9	✓
	Sample descriptions for all media where applicable (e.g. soil, sediment, surface water, groundwater, soil vapour, ground gas, indoor air and biota)	Sec 7.5	✓
	Test pit or bore logs (well construction details where appropriate for example groundwater level expressed in Australian height datum)	Sec 7.5	✓
	Site plan showing all sample locations	Fig 4	✓
	Site plan(s) showing the extent of soil and groundwater contamination (if known)	N/A	N/A
	Refer to ASC NEPM Schedule B2 sections 13 and 14 for information regarding the data presentation	Incapsulated in report format and presentation	✓
Conclusions and recommendations	Summary of all findings and discussion of results	Secs 9 & 12	✓
	Conclusions addressing the stated objectives		✓
	Assumptions used in reaching the conclusions		✓
	Extent of uncertainties in the results (quantified where possible)		✓
	Recommendations for further work (if appropriate)		✓

APPENDIX B

HISTORICAL AERIAL PHOTOS



Dec 1965



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Environmental Site Assessment

Lot 2 in DP1022771
63-69 Lake Road Tuggerah
Historic Aerial Photos

Scale: As shown

FIGURE B1



Dec 1970



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Environmental Site Assessment
 Lot 2 in DP1022771
 63-69 Lake Road Tuggerah
 Historic Aerial Photos

Scale: As shown

FIGURE B2



Dec 1975



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Environmental Site Assessment

Lot 2 in DP1022771
63-69 Lake Road Tuggerah
Historic Aerial Photos

Scale: As shown

FIGURE B3



Dec 1983



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Environmental Site Assessment

Lot 2 in DP1022771
63-69 Lake Road Tuggerah
Historic Aerial Photos

Scale: As shown

FIGURE B4



Dec 2000



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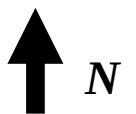
Environmental Site Assessment
 Lot 2 in DP1022771
 63-69 Lake Road Tuggerah
 Historic Aerial Photos

Scale: As shown

FIGURE B5



Dec 2005



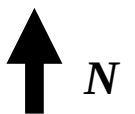
Larry Cook Consulting
 PO Box 8146
 Tumby Umbi NSW 2261
 Phone (02) 4340 1114

Environmental Site Assessment
 Lot 2 in DP1022771
 63-69 Lake Road Tuggerah
 Historic Aerial Photos

Scale: As shown
FIGURE B6



Mar 2010



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Environmental Site Assessment
 Lot 2 in DP1022771
 63-69 Lake Road Tuggerah
 Historic Aerial Photos

Scale: As shown

FIGURE B7



Oct 2011



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 Phone (02) 4340 1114

Environmental Site Assessment
 Lot 2 in DP1022771
 63-69 Lake Road Tuggerah
 Historic Aerial Photos

Scale: As shown

FIGURE B8



Feb 2016



Larry Cook Consulting
 PO Box 8146
 Tumby Umbi NSW 2261
 Phone (02) 4340 1114

Environmental Site Assessment

Lot 2 in DP1022771
 63-69 Lake Road Tuggerah
 Historic Aerial Photos

Scale: As shown

FIGURE B9



May 2019



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 Tumby Umbi NSW 2261
 Phone (02) 4340 1114

Environmental Site Assessment
 Lot 2 in DP1022771
 63-69 Lake Road Tuggerah
 Historic Aerial Photos

Scale: As shown

FIGURE B10



Aug 2021



Larry Cook Consulting
PO Box 8146
Tumbi Umbi NSW 2261
Phone (02) 4340 1114

Environmental Site Assessment

Lot 2 in DP1022771
63-69 Lake Road Tuggerah
Historic Aerial Photos

Scale: As shown

FIGURE B11



Oct 2021



Larry Cook Consulting
PO Box 8146
Tumbi Umbi NSW 2261
Phone (02) 4340 1114

Environmental Site Assessment

Lot 2 in DP1022771
63-69 Lake Road Tuggerah
Historic Aerial Photos

Scale: As shown

FIGURE B12



Mar 2023



Larry Cook Consulting
PO Box 8146
Tumbi Umbi NSW 2261
Phone (02) 4340 1114

Environmental Site Assessment

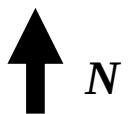
Lot 2 in DP1022771
63-69 Lake Road Tuggerah
Historic Aerial Photos

Scale: As shown

FIGURE B13



May 2024



Larry Cook Consulting
PO Box 8146
Tumbi Umbi NSW 2261
Phone (02) 4340 1114

Environmental Site Assessment

Lot 2 in DP1022771
63-69 Lake Road Tuggerah
Historic Aerial Photos

Scale: As shown

FIGURE B14

APPENDIX C

LABORATORY CERTIFICATE AND COC

JOB. 352867

25/6/24

CERTIFICATE OF ANALYSIS 352867

Client Details

Client	Larry Cook Consulting
Attention	Larry Cook
Address	PO Box 8146, Tumby Umbi, NSW, 2261

Sample Details

Your Reference	<u>Tuggerah</u>
Number of Samples	3 Soil
Date samples received	03/06/2024
Date completed instructions received	03/06/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	05/06/2024
Date of Issue	25/06/2024
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Giovanni Agosti, Group Technical Manager
Liam Timmins, Organics Supervisor
Timothy Toll, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		352867-1	352867-2	352867-3
Your Reference	UNITS	S1	S2	S3
Date Sampled		03/06/2024	03/06/2024	03/06/2024
Type of sample		Soil	Soil	Soil
Date extracted	-	04/06/2024	04/06/2024	04/06/2024
Date analysed	-	05/06/2024	05/06/2024	05/06/2024
TRH C ₆ - C ₉	mg/kg	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25
vTRH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	99	94	102

svTRH (C10-C40) in Soil				
Our Reference		352867-1	352867-2	352867-3
Your Reference	UNITS	S1	S2	S3
Date Sampled		03/06/2024	03/06/2024	03/06/2024
Type of sample		Soil	Soil	Soil
Date extracted	-	04/06/2024	04/06/2024	04/06/2024
Date analysed	-	05/06/2024	05/06/2024	05/06/2024
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	220	110	180
TRH C ₂₉ - C ₃₆	mg/kg	670	290	700
Total +ve TRH (C10-C36)	mg/kg	880	400	890
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50
TRH >C ₁₀ -C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	640	290	630
TRH >C ₃₄ -C ₄₀	mg/kg	700	320	800
Total +ve TRH (>C10-C40)	mg/kg	1,300	620	1,400
Surrogate o-Terphenyl	%	78	76	78

PAHs in Soil				
Our Reference		352867-1	352867-2	352867-3
Your Reference	UNITS	S1	S2	S3
Date Sampled		03/06/2024	03/06/2024	03/06/2024
Type of sample		Soil	Soil	Soil
Date extracted	-	04/06/2024	04/06/2024	04/06/2024
Date analysed	-	05/06/2024	05/06/2024	05/06/2024
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.4	0.2	0.2
Pyrene	mg/kg	0.4	0.2	0.3
Benzo(a)anthracene	mg/kg	0.2	0.1	0.1
Chrysene	mg/kg	0.2	0.1	0.2
Benzo(b,j+k)fluoranthene	mg/kg	0.3	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.3	0.1	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	0.1	0.1
Total +ve PAH's	mg/kg	2.5	0.87	0.99
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	105	93	94

Client Reference: Tuggerah

Acid Extractable metals in soil				
Our Reference		352867-1	352867-2	352867-3
Your Reference	UNITS	S1	S2	S3
Date Sampled		03/06/2024	03/06/2024	03/06/2024
Type of sample		Soil	Soil	Soil
Date prepared	-	05/06/2024	05/06/2024	05/06/2024
Date analysed	-	05/06/2024	05/06/2024	05/06/2024
Arsenic	mg/kg	10	10	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	12	21	25
Copper	mg/kg	22	21	16
Lead	mg/kg	15	12	13
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	13	22	21
Zinc	mg/kg	130	43	57

Moisture				
Our Reference		352867-1	352867-2	352867-3
Your Reference	UNITS	S1	S2	S3
Date Sampled		03/06/2024	03/06/2024	03/06/2024
Type of sample		Soil	Soil	Soil
Date prepared	-	04/06/2024	04/06/2024	04/06/2024
Date analysed	-	05/06/2024	05/06/2024	05/06/2024
Moisture	%	12	13	10

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Client Reference: Tuggerah

Method ID	Methodology Summary
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			04/06/2024	[NT]	[NT]	[NT]	[NT]	04/06/2024	[NT]
Date analysed	-			05/06/2024	[NT]	[NT]	[NT]	[NT]	05/06/2024	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	93	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	89	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	92	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	95	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	102	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			04/06/2024	[NT]	[NT]	[NT]	[NT]	04/06/2024	[NT]
Date analysed	-			05/06/2024	[NT]	[NT]	[NT]	[NT]	05/06/2024	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	129	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	129	[NT]
Surrogate o-Terphenyl	%		Org-020	75	[NT]	[NT]	[NT]	[NT]	77	[NT]

Client Reference: Tuggerah

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			04/06/2024	[NT]	[NT]	[NT]	[NT]	04/06/2024	[NT]
Date analysed	-			05/06/2024	[NT]	[NT]	[NT]	[NT]	05/06/2024	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	125	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	124	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	123	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	120	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	123	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	101	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate <i>p</i> -Terphenyl-d14	%		Org-022/025	89	[NT]	[NT]	[NT]	[NT]	92	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			05/06/2024	[NT]	[NT]	[NT]	[NT]	05/06/2024	[NT]
Date analysed	-			05/06/2024	[NT]	[NT]	[NT]	[NT]	05/06/2024	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	94	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	93	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

To: Envirolab Services Pty Ltd
12 Ashley Street
Chatswood NSW 2147

CHAIN OF CUSTODY

Date: 3.6.24 Page: / of /

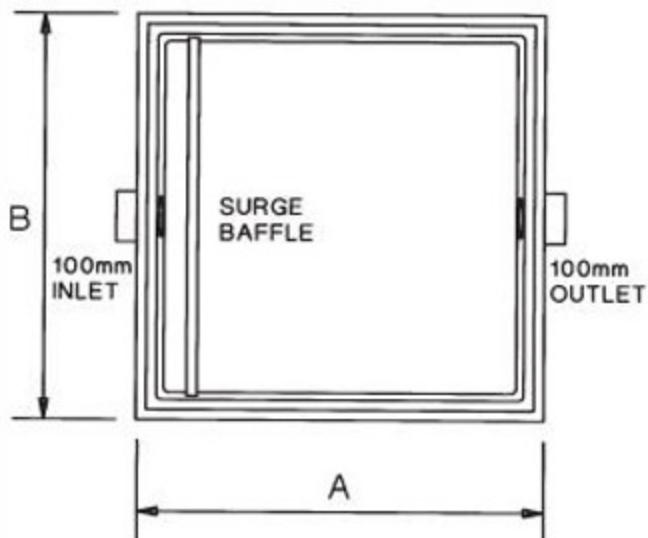
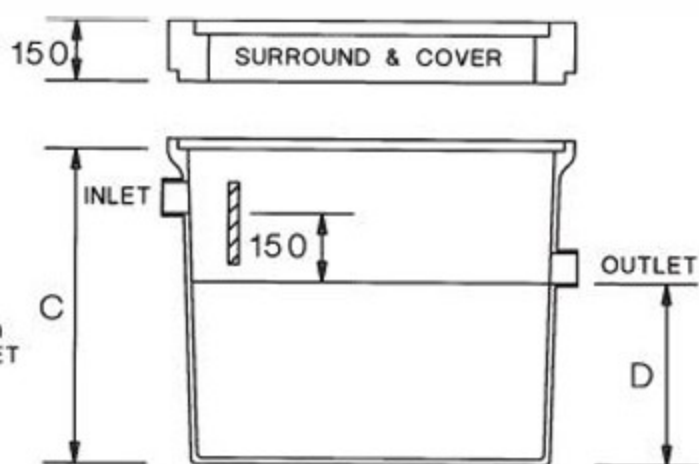
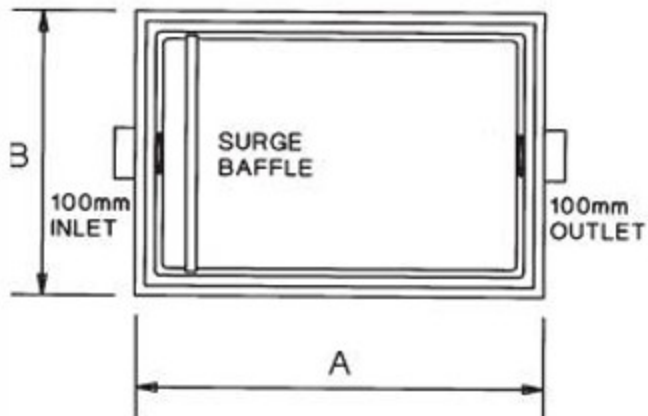
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APPENDIX D

MASCOT ENGINEERING

MODEL SA7

SILT ARRESTOR



Product Code	Capacity (L)	A (mm)	B (mm)	C (mm)	D (mm)	Mass (kg)
SA3	300	1000	700	1050	600	130
SA4	400	1000	700	1350	800	165
SA5	500	1000	1000	1050	700	210
SA6	600	1000	1000	1350	800	275
SA7	700	1000	1000	1350	900	335
SA8	800	1000	1000	1350	1000	395
SA9	900	1000	1000	1650	1150	490

APPENDIX E

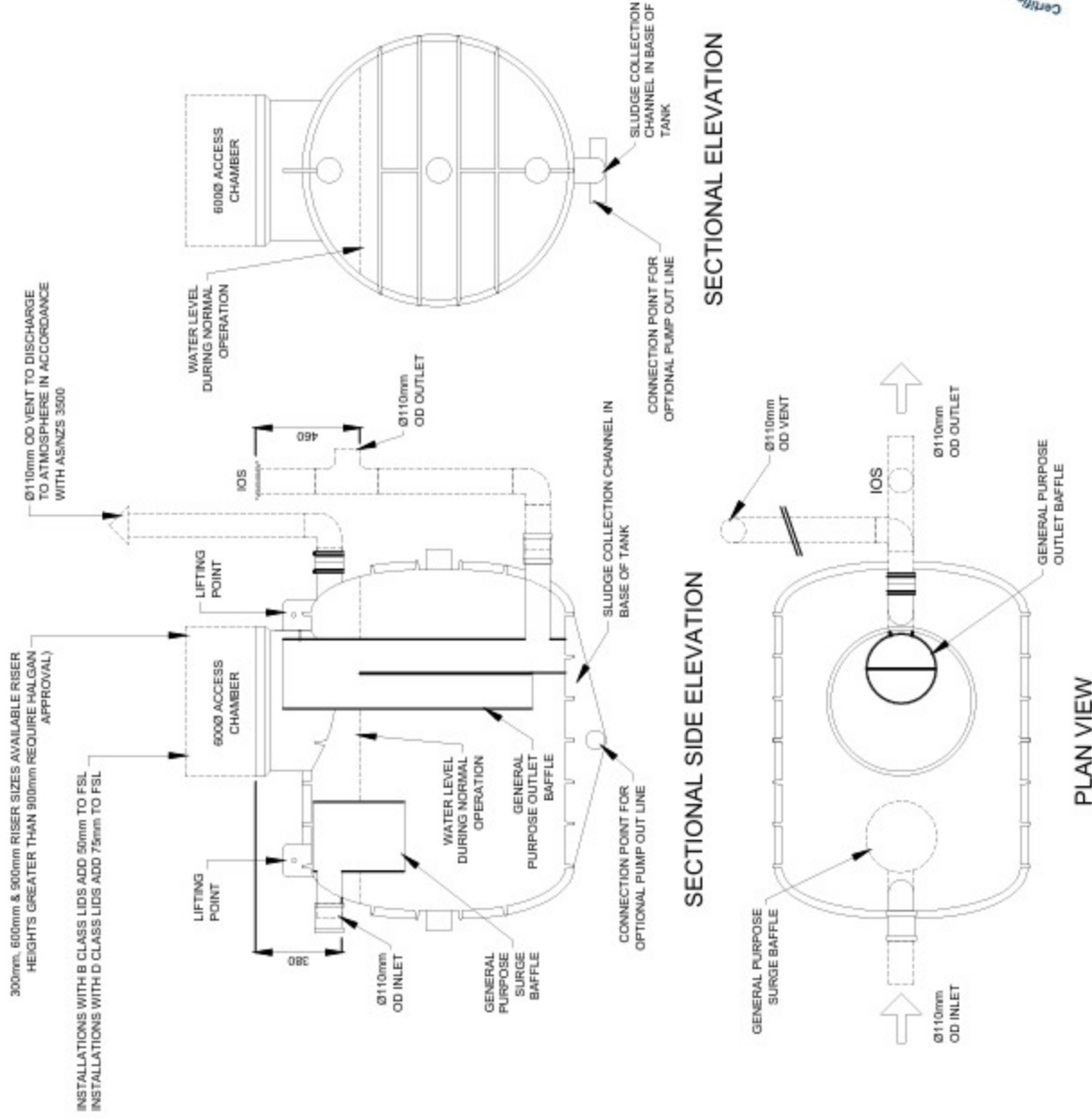
HALGAN HGPPTS 1000 MODEL GENERAL PURPOSE PIT

HALGAN™ HGPPS 1000 GENERAL PURPOSE PIT DETAIL

Notes

General

- | | | |
|------|--|--|
| 1. | General | |
| 1.1. | Vessel constructed from Polyethylene. | |
| 1.2. | The vessel is to be installed in a location that will not cause a nuisance, obstruct fire access, cannot be vandalised or be damaged by vehicles. | |
| 1.3. | The vessel must have ease of access to pump out point for maintenance. | |
| 1.4. | A hose tap fitted with RPZD backflow protection (as per AS/NZS 3500) should be installed within 5 metres for maintenance and cleaning. | |
| 1.5. | Non-standard installations require Haigan approval. | |
| 2. | Installation above ground- 1000 - 5000litre only | |
| 2.1. | The vessel is to be supported on a 100mm thick concrete pad or structural floor slab. | |
| 2.2. | A stand is available for 5 Series models if required. | |
| 2.3. | Any maintenance platform must be installed in accordance with Australian Standard AS1657 allowing safe access while inspecting, maintaining and servicing. | |
| 2.4. | All pipes connecting to the vessel shall be fully supported; there shall be no stress on the tank connections. | |
| 2.5. | All stormwater must be diverted away from the vessel to prevent undermining of foundation. | |
| 3. | Installation below ground | |
| 3.1. | All connections to the vessel shall be in accordance with the appropriate authorities. | |
| 3.2. | Any excavation exceeding 1.5 metres in depth shall comply with the construction safety acts and regulations before backfilling. | |
| 3.3. | Riser heights greater than 900mm require Haigan approval. | |
| 4. | Excavation dimensions | |
| 4.1. | The excavated hole width shall be kept as narrow as practicable. The depth shall not be greater than 150mm more than the required depth. | |
| 4.2. | 75mm clearance is required at the sides of tank. | |
| 5. | Over excavation | |
| 5.1. | Where an excavation has been made deeper than required, the excess depth shall be filled either with 4:1 sand cement compacted to achieve 98% compaction or concrete. | |
| 6. | Bedding/Backfill | |
| 6.1. | The bedding/backfill material shall be Blue Metal granular material between 6-10mm diameter. | |
| 6.2. | The bedding/backfill shall be minimum 75mm thick. | |
| 6.3. | The bedding/backfill material shall encase the whole tank. | |
| 7. | Water Charged Ground | |
| 7.1. | Installation in areas subject to flooding & groundwater is only permitted when the level of water does not exceed the height of the middle of the tank. | |
| 7.2. | In areas of heavy, clay-like soils, the installation is only permitted when there is sufficient drainage underneath the body of the tank. | |
| 7.3. | Where installation is in high water table or water charged ground, mine subsidence, filled or unstable areas, the services of a qualified structural engineer is required for certification. | |
| 8. | Final Backfill | |
| 8.1. | The final backfill material shall comply with the following: | |
| 8.2. | Spoil from the excavation of the trench may be used. | |
| 8.3. | Foreign material such as builder's waste, bricks, and concrete shall not be used. | |
| 8.4. | The backfill shall be compacted to restore the excavated hole as near as practicable to the normal ground. | |



MODEL	HEIGHT	WIDTH	LENGTH	VOLUME	WEIGHT
HGPPS 1000	1550mm	1130mm	1700mm	1000L	95KG