Environment & Natural Resource Solutions

REPORT

STAGE 1 PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT INCORPORATING SOIL SAMPLING – PROJECT AREA C

19 BTU ROAD
LOT 1 DP 227233
NOWRA HILL, NSW, 2540

PREPARED FOR:	**SHOALHAVEN CITY COUNCIL**
PROJECT NUMBER:	**ENRS0394**
DATE:	**27TH OCTOBER 2015**

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EXECUTIVE SUMMARY

Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent environmental consultants in October 2015 by *Shoalhaven City Council* (the Client) to conduct a Stage One Environmental Site Assessment (ESA) incorporating soil testing for Project Area 'C' in the southwest portion of the former sanitary depot located at 19 BTU Road, Nowra Hill, NSW, 2540 (*herein referred to as the site*). This report summarises the findings of site inspections and review of available historical records supported by two rounds of test pit investigations and NATA laboratory soil analysis in accordance with the NSW Office of Environment and Heritage (OEH) *Guidelines for Consultants Reporting on Contaminated Sites* (OEH;2011).

This assessment of Project Area C aims to identify the potential for soil and groundwater contamination with respect to current or proposed landuse. The objectives of this Stage One Preliminary ESA were to;

- Confirm and document the site investigation boundaries, title descriptions, available site history and ground conditions;
- Assess the potential for on and off site sources of contamination, and the risks from any contamination; and
- Assess the site's suitability for the proposed landuse and identify potential constraints to development in relation to contamination issues.

The scope of work for the Stage One ESA included the review, assessment and reporting of the following data;

- Review of information held on the property, if any;
- Review of publicly available data (including aerial photographs, geological plans, topography, soil and groundwater maps);
- Review of information held by State Government Departments (OEH);
- Review of literature sources describing environmental issues (Type of facility eg sanitary depot) at sites in NSW;
- Site inspection (walk-over) of the premises and surrounding areas;
- Visual assessment of potential hazardous materials;
- A photographic record of present site conditions;
- Review of locally available information and Council records, if available;
- Discussion with relevant parties (former employees and Council staff, if available);
- Test pit investigations, soil sampling, laboratory analysis and assessment against relevant guidelines; and
- Data assessment and reporting.

Based on the findings outlined during this Stage 1 ESA the following conclusions and recommendations are provided;

- The site comprises approximately 0.8 Hectares in the southwestern portion of the Shoalhaven Water Depot at 19 BTU Road, Nowra Hill, NSW, 2540. The proposal is to relocate the Shoalhaven Animal Shelter and Pound;
- This ESA is required to assess for potential ground contamination associated with the historical site use as a sanitary depot and farming of night soil;
- Test pit excavations intersected relatively uniform conditions across the site with between 0.1-0.5 metres of clayey silt overlying natural clays and shale;
- Results of NATA certified laboratory analysis reported concentrations of potential contaminants, including; heavy metals; hydrocarbons; PAHs; PCBs; and pesticides in soil below the relevant NEPM C and NEPM D landuse criteria;
- Supplementary testing delineated a hotspot area of elevated mercury and zinc above the agricultural guidelines for biosolids within a 5 metre radius of TP14. The area is outside the development footprint and does not limit the site proposal
- No groundwater was intersected during this investigation. However previous assessment of the adjoining area to the north identified potential for groundwater contamination due to leachate from the historical sanitary works. Groundwater is not suitable for application including irrigation, drinking water or discharge to the environment pending more detailed assessment if required;
- The investigation did not identify any evidence of gross ground contamination. Based on the data reviewed during this assessment. The project Area C comprising the southwest portion of the site does not pose an unacceptable risk to human health or to the environment and is ***suitable for the proposed 'commercial and industrial landuse (NEPM D)***;
- Tested soils within project Area 'C' are assessed as suitable for reuse on-site as the chemical concentrations are below the NEPM C and NEPM D, or if required may be disposed off-site as ENM as the results also comply with the ENM waste exemption (EPA;2012). In general ENM is suitable for engineering or earthworks applications;
- Should any change in Site conditions or incident occur which causes a potential environmental impact, ENRS should be notified to further assess the site and consider requirements for any additional assessment; and
- This report must be read in conjunction with the attached Statement of Limitations.

ENRS recommend SCC consider the following recommendations for environmental management during the site development:

- Where practical excavate any residual biosolids from the building footprint to remove any risk of soil pathogens or unidentified hotspot contamination. Chemical testing and comparison against the NEPM C and D landuse guidelines reports the material is suitable to remain on site and may be moved to a less sensitive area on site;

- Consider installing a network of shallow monitoring bores with at least two (2) bores adjacent the downgradient boundary and one (1) upgradient to support further risk assessment for the larger site;
- Consider soil improvements in residual area to improve aesthetic requirements and reduce the potential for soil pathogens as the current conditions present clayey silt with a high water holding capacity. For example drainage improvements and application of lime;
- Site personnel should consider appropriate PPE and protocols to reduce potential exposure to shallow soil pathogens, dust and groundwater during redevelopment; and
- Consider hazmat and dilapidation survey if site works are required in proximity to former military buildings.
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1.0 INTRODUCTION

Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent environmental consultants in October 2015 by *Shoalhaven City Council* (the Client) to conduct a Stage One Environmental Site Assessment (ESA) incorporating soil testing for Project Area 'C' in the southwest portion of the former sanitary depot located at 19 BTU Road, Nowra Hill, NSW, 2540 (*herein referred to as the site*). This report summarises the findings of site inspections and review of available historical records supported by two rounds of test pit investigations and NATA laboratory soil analysis in accordance with the NSW Office of Environment and Heritage (OEH) *Guidelines for Consultants Reporting on Contaminated Sites* (OEH;2011).

1.1 BACKGROUND

ENRS understand this assessment has been undertaken in anticipation of proposed redevelopment of the southern portion of the site which was previously used to farm night soil. Night soil comprised untreated waste material collected from houses and septic tanks which lacked sewage infrastructure and is contemporarily referred to as biosolids. Due to the historical use of the site it is necessary to conduct a preliminary environmental site assessment to assess the site suitability for the proposed landuse and the potential for ground contamination in accordance with the provisions of the NSW State Environmental Planning Policy No. 55 (SEPP55).

ENRS previously conducted a Stage 1 ESA for the northern portion of the site referred to as Project Area 1. The assessment identified levels of potential contaminants in soils below the adopted landuse criteria with the exception of faecal pathogens in Test Pit 2 on the western boundary. Shallow groundwater indicates some potential for contamination associated with leachate from the historical spreading of night soil on the surface. Recommendations were provided to reduce potential exposure to shallow soil pathogens and groundwater during redevelopment and ongoing site operations, including the installation of a network of shallow monitoring bores with at least two (2) bores adjacent the downgradient site boundary and one (1) upgradient to support further risk assessment.

1.2 OBJECTIVES

This assessment of Project Area C aims to identify the potential for soil and groundwater contamination with respect to current or proposed landuse. The objectives of this Stage One Preliminary ESA were to;

- Confirm and document the site investigation boundaries, title descriptions, available site history and ground conditions;
- Assess the potential for on and off site sources of contamination, and the risks from any contamination; and
- Assess the site's suitability for the proposed landuse and identify potential constraints to development in relation to contamination issues.

1.3 SCOPE OF WORK

The scope of work for the Stage One ESA included the review, assessment and reporting of the following data;

- Review of information held on the property, if any;
- Review of publicly available data (including aerial photographs, geological plans, topography, soil and groundwater maps);
- Review of information held by State Government Departments (OEH);
- Review of literature sources describing environmental issues (Type of facility eg sanitary depot) at sites in NSW;
- Site inspection (walk-over) of the premises and surrounding areas;
- Visual assessment of potential hazardous materials;
- A photographic record of present site conditions;
- Review of locally available information and Council records, if available;
- Discussion with relevant parties (former employees and Council staff, if available);
- Test pit investigations, soil sampling, laboratory analysis and assessment against relevant guidelines; and
- Data assessment and reporting.

2.0 SITE DESCRIPTION

2.1 LOCATION

The site is located approximately six (6) kilometres south of Nowra. The regional location of the site is shown in **Figure 1** and the key features required to identify the site are summarised in **Table 1**.

Figure 1 Site Location

Table 1: Site Identification

Item	Description
Street Address	19 BTU Road, Nowra Hill, NSW, 2540
Project Area C	1.3 Hectare
Title Identifier	Lot 1 DP 227233
Local Government Area	Shoalhaven City Council
Zone	SP2 – Infrastructure (SLEP 2014)

2.2 SITE LAYOUT

The investigation area comprises an irregular polygon of grassed land with minor regrowth native trees positioned on the southern boundary of Project Area 'C' as depicted in Figure **3**. The investigation site 'C' presents an area of approximately 0.8 hectares which represents ~6.5 per cent of the larger title area (12.25 Ha). Vehicle access is via Nowra Hill Road with a gravel ring road providing access to the northern half of the site.

2.3 SURROUNDING LANDUSE

The current activities and operations on adjacent properties and the surrounding area are summarised in **Table 2**.

Table 2: Surrounding Landuse

Item	Description
North:	Rural grassland with farm dams, further to woodland.
East:	Regrowth woodland further to industrial timber yards and sawmill.
South:	BTU Road further to residential and rural landuse with grass paddocks and farm dams.
West:	Trees within road reserve further to residential and rural landuse with farm dams, buildings and sheds.

2.4 TOPOGRAPHY AND DRAINAGE

A review of the site topography was undertaken with reference to the current series Nowra 1:25,000 topographic map sheet (9028-3-S) to assess the potential drainage and groundwater controls in the area.

The site is situated between approximately 60 metres and 70 metres AHD with a subtle ridgeline extending northeast which divides the majority of site drainage to the east-southeast towards Brownes Creek. Numerous farm dams are scattered across the adjoining land, however no significant or mapped drainage lines are present within the site boundary.

2.5 SOIL LANDSCAPE

Review of the regions soil classification was conducted with reference to the Kiama 1:100,000 soil landscape series sheet 9028. The soil landscape at the Site is mapped

as Nowra Group (no) described as moderate to gently undulating rises to low hills on Nowra Sandstone. Nowra soils are located in areas of relief greater than 40 metres AHD with slopes less than 5%. Broad ridges and crests, benched sandstone outcrops adjacent to drainage lines. Extensive to moderately cleared tall open forest. Soils are described as moderately deep (50-100cm) brown podzolic soils (DB1.11) occurring on crests and upper slopes such as the site area subject of this assessment. Whilst Soloths (Dy3.21) and/or yellow earths (Gn2.61) occur midslope, and Yellow podzolic soils (Dy5.11) on lower slopes and drainage lines. In general limitations associated with the nowra landscape include run-on, rock outcrops (localised), stoniness, hardsetting, sodicity, low permeability, and low wet bearing strength in the subsoil. Site observations were consistent with the soil mapping with native soil conditions observed at depths below 0.1-0.5m underlying fill associated with former night soil application.

2.6 GEOLOGY

Review of the Site's geological setting was conducted with reference to the Shoalhaven 1:100,000 coastal quaternary geological series sheet. The Site is located in an area mapped as Permian Sedimentary (Ps) rocks and minor volcanic rocks including sandstone, conglomerate, shale, and coal measures (Sydney Basin). Site observations noted weathered shale which is consistent with the geological mapping.

2.7 HYDROGEOLOGY

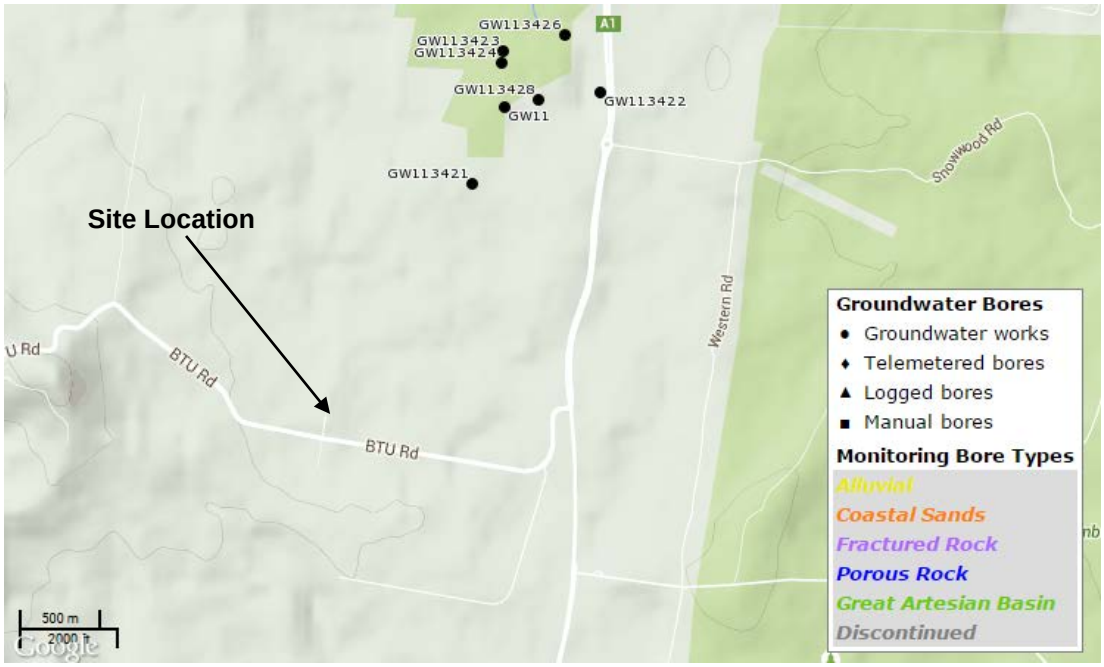
Groundwater resources in the area are expected to be associated with two (2) primary forms of aquifer systems;

1. *Shallow ephemeral* systems *in unconsolidated soils and weathered shale*, generally less than 5m in depth with low yields, and strongly controlled by rainfall recharge with potential for contamination from surface processes; and
2. *Deep fractured rock* and dual porosity aquifers associated with the underlying sedimentary rock sequences. Standing Water Levels are expected to be deeper than 20m with low yields, high iron and variable salinity with low connection and risk from overlying surface processes.

Shallow groundwater flow is inferred to mimic topography with a low hydraulic gradient primarily to the east approaching Brownes Creek.

A search of the NSW Office of Water (NOW) groundwater bore database was conducted to develop the conceptual understanding of regional groundwater conditions, including aquifer depths, yields, water quality, and distribution. However, the search did not identify any registered bores within one (1) kilometre of the Site area (see **Figure 2**).

Figure 2 Registered Groundwater Bores



3.0 SITE HISTORY

3.1 SOURCES OF INFORMATION

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

- Council records;
- NSW Department of Lands spatial information exchange (SIX Maps);
- NSW Office of Water (NOW) groundwater bore records;
- Search of POEO public register environmental protection licences; clean up notices, penalty notices, remediation or investigation site orders;
- Historical aerial photographs;
- Site inspections conducted 18th May and 12th October 2015;
- Previous reports (ENRS;2010); and
- Interviews and discussions with previous site staff, council officers and local residents.

3.2 EPA RECORDS

A search of the NSW EPA register of Environmental Protection Notices was conducted on the 9th October 2015 to assess the potential for contaminated land in the area. The search did not identify any property records within a one (1) kilometre radius of the Site. The subject site 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 WORKCOVER NSW

A registered search of WorkCover NSW records for licences to keep dangerous goods, including the Stored Chemical Information Database (SCID) and microfiche records was NOT conducted during this Stage 1 assessment as the site inspection did not identify any evidence of infrastructure within the assessment area that may indicate former UPSS or chemical stores were present at the project site.

3.4 LAND TITLES

A search of the NSW Office of Lands and Property Information database was conducted for current and historical land titles. Review of the title records can provide an indication of historical landuse and associated risks of contamination. The title search reports are provided in **Appendix A**. A summary of records maintained by the Office of Land and Property Information is provided in **Table 3** with details of title transfers and land ownership for the Site.

Table 3: Summary of Historical Title Information

Date	Name of Owner – Occupation (if any)
1889	Crown grant (Vol 931 Folio 23)
1963	Davies and Herbert (Tomerong) Pty Limited. Volume 9441 Folio 166. (Prior title Volume 5481 Folio 216)
1965	The Council of the Shire of Shoalhaven. Volume 10145 Folio 226.

3.5 COUNCIL RECORDS

ENRS understand from site meetings with Shoalhaven Council officers (pers comm. 18/5/2015) the site previously operated as a sanitary depot since circa 1960's. Night soil was landfarmed at the site by spreading with a tractor and plough. Sanitary pots used to transport the material to the site were washed and re-coated with bitumen at facilities in the centre of the property, which is outside the study area. Former military ammunitions storage building remain around the perimeter of site. The structures are understood to be empty and abandoned.

3.6 AERIAL PHOTOGRAPHS

A review of current and historical aerial photographs was conducted to assess the timeline and nature of development at the site and surrounding area. Aerial photographs were reviewed from the years 1959, 1961, 1974, 1986, 1994, 1997 and 2012. Copies are provided in **Appendix B**. The key observations made from aerial reconnaissance are summarised in the **Table 4**.

Table 4: Review of Aerial Photographs

Date & Details	Observations
1/4/1959	➢ Site area is covered with trees with minor access roads evident. Adjoining land to the west and north is cleared. ➢ Former military storage buildings visible within tree cover.

Date & Details	Observations
21/9/1961	➢ Poor resolution. ➢ Similar layout and extent of vegetation to previous aerial imagery.
1974	➢ Site appears to be cleared with no vegetation. ➢ Area to the south appears to be cleared. ➢ Access roads evident.
6/7/1986	➢ Area is primarily grassed with tree lines on the east and southern boundaries ➢ Access roads evident ➢ Sanitary farm buildings evident to the north and former military buildings.
23/6/1994	➢ Layout and conditions as per 1986 imagery.
22/2/1997	➢ Layout and conditions as per 1986 and 1994 imagery.
2012 (Six Maps)	➢ Layout and conditions as per 1986-1997 imagery.

3.7 PREVIOUS REPORTS

ENRS understand the investigation area, which comprises project Area C in the southern portion of the site, has not been subject to any previous environmental or geotech assessments.

ENRS (2015) recently completed a stage 1 ESA with a similar scope of work to investigate project Areas A and B in the northern portion of the site. This previous report should be read in conjunction with this document.

The area east of the former sanitary depot buildings in the centre of the site was previously assessed during landfarming of contaminated soil from the SCC Bomaderry UPSS (E2W; 2014). The E2W report does not document any details of ground conditions relevant to this assessment.

3.8 SITE HISTORY SUMMARY

The following points summarise the site history based on the information reviewed during assessment:

- The surrounding area has comprised rural landuse since circa 1940's;
- The curved roof bunker style buildings to the south and in the east of the site indicate the area was used by the Military, likely for ammunitions storage during WWII;
- The assessment area and larger site operated as a sanitary depot during the 1960's and 1970's with landfarming of night soil and bitumen treatment of transports pots;
- The larger site is currently used by Shoalhaven Water as a service depot, however no distinct activities or landuse are noted within the designated assessment area;
- The assessment area currently comprises grass with some trees;

- The available site records indicate potential sources of contamination associated with night soil and military storage at the site; and
- NSW OEH records report the subject Site 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;

4.0 SITE INSPECTION

Site inspections were conducted by Rohan Last, Hydrogeologist and Environmental Scientist on 18th of May; and the 8th, 12th and 22nd of October 2015 with the following observations recorded. The inspections consisted of soil sampling and a site walk over to confirm boundaries, access, layout, surface condition, landuse, buildings, potential for Above ground Storage Tanks (AST) and Underground Storage Tanks (UST), evidence of any cut and filling, and a preliminary assessment for liquid and solid waste.

4.1 LANDUSE

- The Site is situated in a 'rural' area bounded by rural landuse;
- The site is currently operated by Shoalhaven Water for temporary storage of equipment and materials.

4.2 ACCESS

Vehicle and pedestrian access is through a secure gate via Nowra Hill Road. A gravel ring road loops around the north of the site and has been built upon a mixed base including fly ash.

4.3 BOUNDARY CONDITIONS

- The north and western boundary adjoins rural land with farm dams and grass. The nearest buildings are approximately 100m to the west;
- The east and southern boundaries comprise woodland further to industrial and residential/rural landuse; and
- The remaining sanitary depot infrastructure in the centre of the larger site is outside the assessment area and the scope of this assessment.

4.4 BUILDINGS AND STRUCTURES

The site inspection identified two (2) former military bunkers adjacent the eastern and southern site boundary. The buildings were not entered for further inspection. Should the site proposal comprise any works in proximity to the building ENRS recommend a hazmat and dilapidation survey with targeted soil sampling be conducted to consider conditions associated with the buildings. Further information should also be sort from the Department of Defence regarding the specific use of the site to consider the potential risk from unexploded ordnance (UXO).

4.5 SURFACE CONDITIONS

The assessment area primarily comprises grass with some trees and a gravel road along the northern boundary. The ground surface retains the windrows and drainage lines likely established during the historical spreading of night soil which limits vehicle access due to the irregular surface and tendency for water retention.

4.6 WASTE AND POTENTIAL HAZARDOUS MATERIALS

The inspection identified the following sources of potential waste and hazardous materials;

- Potential soil contamination from spreading of night soil, remnant bitumen and associated foreign matter;
- Road base material including fly ash and coal;
- Former military buildings and likely historical ammunition storage; and
- Shallow groundwater likely impacted by historical spreading of night soil and associated materials.

4.7 PETROLEUM STORAGE TANKS

No evidence of fill points, mounting or venting infrastructure for Underground Petroleum Storage Systems (UPSS) was observed during the Site inspection.

4.8 ASBESTOS

The site inspection did not identify any evidence of any asbestos containing material (ACM) in soil. However, a separate Hazmat survey may be required should the site proposal include works in proximity to any buildings.

4.9 POTENTIALLY CONTAMINATED SOILS

The landform at the site is relatively consistent with the surrounding environment and gradient which indicates the historical spreading of night soil has likely been applied on the existing surface. Test Pit investigations documented in the later sections of this report provide a more detailed assessment of soil conditions which present limited potential for shallow soil contamination associated with the historical landuse as a sanitary depot.

5.0 ASSESSMENT CRITERIA

In evaluating potentially contaminated sites a series of soil and groundwater acceptance criteria should be adopted to assess the onsite contaminant concentrations of various environmental media. The following sections outline the relevant guidelines and assessment criteria for interpreting ground conditions.

5.1 POTENTIAL CONTAMINANTS

Based on the site history, the site inspection, previous reports and information provided by the client the following areas of potential environmental concern are listed below in **Table 5**.

Table 5: Potential Contaminants of Concern

Potential Contaminants	Historical Activities	Dispersion Mechanism & Areas of Environmental Concern (AEC)
Heavy Metals	**Sanitary Depot and military operations**	Spreading of night soil and uncontrolled fill of unknown origin and composition. Leaching from night soil and fill into shallow groundwater.
Total Recoverable Hydrocarbons (TRH)		
Benzene Toluene Ethylbenzene, Xylenes (BTEX)		
Polycyclic Hydrocarbons (PAH)		
Organochlorine Pesticides (OCP)		
Organophosphate Pesticides (OCP)		
Polychlorinated Biphenyls (PCBs)		
Phenolics		
Pathogens / Bacteria		

5.2 REFERENCE GUIDELINES

ENRS have adopted the most appropriate site assessment criteria in accordance with current state and national guidelines. Where available, Australian and NSW EPA endorsed guidelines have been referenced in preference to international standards.

5.2.1 National Environment Protection Measure (NEPM)

The EPA has endorsed the use of the Health Investigation Levels (HILs) given in the *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)* 'Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater'. The NEPM provide a framework for risk-based assessment of soil and groundwater contamination. Health Screening Levels (HILs) are provided for four (4) landuse categories:

Table 6: Summary of NEPM Landuse Categories

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

Given the Site proposal for operation as an ***Animal Shelter and Pound*** the relevant assessment criteria is **NEPM C** and **NEPM D** for open space and commercial sites.

The appropriate ***Soil*** and ***Groundwater*** Investigation Levels (SILs & GILs) should be applied based on the receiving environment and groundwater resources. GILs are provided in NEPM Table 1C for; Fresh Waters; Marine Waters; and Drinking Water.

The NEPM also provide criteria for ***Ecological Investigation Levels*** (***EILs***) for common contaminants in soil based on three (3) generic land use settings:

- Areas of ecological significance;
- Urban residential areas and public open space
- Commercial and industrial land uses.

The EILs should be applied to sample results in the top two (2) metres of soil measured from the finished surface/ground level which corresponds to the root zone and habitation zone of many species.

5.2.2 Service Station Guidelines

The UPSS Technical Note for Site Validation Reporting (DECCW;2008) endorse the Guidelines for Assessing Service Station Sites (EPA 1994) which provides Threshold Concentrations for Sensitive Land Use for assessment of soil and groundwater conditions. While these guidelines are for 'sensitive land use', such as standard residential, the NSW EPA recommends these criteria is applied to other landuses unless a site-specific risk assessment justifies the use of different criteria.

5.2.3 ANZECC Guidelines

The relevant criteria for assessment of water quality are the Australian and New Zealand Guidelines for Fresh and Marine Waters (ANZECC Guidelines) Trigger Values (TV) for fresh water. The Trigger Values are categorised by the per cent of species possibly affected. The EPA (DECC;2007) endorsed groundwater management guidelines recommend assessment for aquatic ecosystems based on the 95 per cent of species level of protection.

5.2.4 Biosolids Guidelines

The NSW EPA environmental guidelines for the Use and Disposal of Biosolids Products (2000) document the acceptable contaminant thresholds and criteria for assessing the stabilisation grade of biosolids. The guidelines specify the suitability of biosolids application for specific landuse based on the stabilisation grade.

Unrestricted landuse requires Grade A classification based on the results of microbial testing for the following pathogens in addition to contaminant thresholds:

Parameter	Biosolid Criteria for Unrestricted Landuse
E. coli	<100 MPN per gram (dry weight)
Faecal coliforms	<1,000 MPN per gram (dry weight)
Salmonella sp.	Not Detected / 50 grams of final product (dry weight)

5.3 SOIL ASSESSMENT CRITERIA

The adopted soil assessment criteria for the proposed landuse are the **NEPM C** and **NEPM D** (2013) investigation levels and the EPA Service Station Guidelines (1994) summarised in **Table 7**. The NEPM also provide health screening levels for vapour intrusion in soil which should be considered based on the depth of soil and composition of soil medium, a summary is provided in **Table 8**.

Table 7: Soil Assessment Criteria for Landuse Suitability

Analyte		Units	NEPM D	Service Stations[C]
Polycyclic Aromatic Hydrocarbons (PAHs)	Naphthalene	mg/Kg	370	-
	Benzo (a) Pyrene	mg/Kg	1.0	1.0
	Total PAHs	mg/Kg	4,000	20
Metals & Metalloids	Arsenic	mg/Kg	3,000	-
	Cadmium	mg/Kg	900	-
	Chromium	mg/Kg	3,600	-
	Copper	mg/Kg	240,000	-
	Lead	mg/Kg	1,500	300
	Mercury	mg/Kg	730	-
	Nickel	mg/Kg	6,000	-
	Zinc	mg/Kg	35,000	-
OCPs	Aldrin	mg/Kg	45	-
	Dieldrin	mg/Kg	45	-
	Chlordane	mg/Kg	530	-
	DDT, DDD, DDE	mg/Kg	3,600	-
	Heptachlor	mg/Kg	50	-
Phenolics	T.Phenols	mg/Kg	240,000	-
PCBs	PCBs	mg/Kg	1.0	-
BTEX	Benzene	mg/Kg	-	1
	Toluene	mg/Kg	-	130
	Ethyl benzene	mg/Kg	-	50
	m+p-Xylene	mg/Kg	-	25
	o-Xylene	mg/Kg	-	25
Total Recoverable Hydrocarbons	TRH C6-C9	mg/Kg	-	65
	TRH C10-C40	mg/Kg	-	1,000
	F1 TRH C6-C10	mg/Kg	-	65
	F2 TRH C10-C16	mg/Kg	-	1,000
	F3 TRH C16-C34	mg/Kg	-	1,000
	F4 TRH C34-C40	mg/Kg	-	1,000

[C] Investigation levels are taken from the NSW EPA (1994) Guidelines for Assessing Service Station sites.

Table 8: Soil Screening Criteria for Potential Vapour Intrusion

NEPM D mg/Kg			Benzene	Toluene	Ethyl benzene	m+p-Xylene	o-Xylene	Naphthalene	F1 C6-C10	F2 >C10-C16	F3 >C16-C34	F4 >C34-C40
NEPM D HSL FOR VAPOUR INTRUSION SCREENING	SAND	0-1m	3	-	-	230	230	-	260	-	-	-
		1-2m	3	-	-	-	-	-	370	-	-	-
		2-4m	3	-	-	-	-	-	630	-	-	-
		>4m	3	-	-	-	-	-	-	-	-	-
	SILT	0-1m	4	-	-	-	-	-	250	-	-	-
		1-2m	4	-	-	-	-	-	360	-	-	-
		2-4m	6	-	-	-	-	-	590	-	-	-
		>4m	10	-	-	-	-	-	-	-	-	-
	CLAY	0-1m	4	-	-	-	-	-	310	-	-	-
		1-2m	6	-	-	-	-	-	480	-	-	-
		2-4m	9	-	-	-	-	-	-	-	-	-
		>4m	20	-	-	-	-	-	-	-	-	-

Source: adapted from NEPM (2013) Table 1A(3)

5.4 GROUNDWATER ASSESSMENT CRITERIA

The relevant criteria are the ANZECC (2000) with reference to the 95% Trigger values for Freshwater. Where ANZECC criteria are not available results should be assessed against the Australian Drinking Water Guidelines (2011) and the EPA Service Station Guidelines (1994) summarised in **Table 9**:

5.5 AESTHETIC CRITERIA

The NEPM (2013) *Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater* advises that there exist no 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; and
- The need for, and practicality of, any long-term management of foreign material.

Table 9: Groundwater Assessment Criteria

Analyte		Units	Freshwater[A]	Drinking Water[B]	Service Stations[C]
Polycyclic Aromatic Hydrocarbons (PAHs)	Naphthalene	µg/L	16	-	-
	Acenaphthylene	µg/L	-	-	-
	Acenaphthene	µg/L	-	-	-
	Fluorene	µg/L	-	-	-
	Phenanthrene	µg/L	-	-	-
	Anthracene	µg/L	-	-	-
	Fluoranthene	µg/L	-	-	-
	Pyrene	µg/L	-	-	-
	Benzo(a)anthracene	µg/L	-	-	-
	Chrysene	µg/L	-	-	-
	Benzo(b+k)fluoranthene	µg/L	-	-	-
	Benzo(a) pyrene	µg/L	-	0.01	0.01
	Indeno(1,2,3-c,d)pyrene	µg/L	-	-	-
	Dibenzo(a,h)anthracene	µg/L	-	-	-
	Benzo(g,h,i)perylene	µg/L	-	-	-
	Benzo(a)pyrene TEQ	µg/L	-	-	-
	Total PAH	µg/L	-	-	-
Metals & Metalloids	Arsenic	µg/L	24 as As(III) 13 as As(V)	10	-
	Cadmium	µg/L	0.2	2	-
	Chromium, Cr (III)	µg/L	-	-	-
	Chromium, Cr (VI)	µg/L	1	50	-
	Copper	µg/L	1.4	2000	-
	Lead	µg/L	3.4	10	5
	Mercury	µg/L	0.06	1	-
	Nickel	µg/L	11	20	-
	Zinc	µg/L	8	-	-
BTEX	Benzene	µg/L	950	1	300
	Toluene	µg/L	-	800	300
	Ethyl benzene	µg/L	-	300	140
	m+p-Xylene	µg/L	200	600	380
	o-Xylene	µg/L	350	600	380
TRH	TRH C_6-C_{40}	µg/L	600*	-	10,000
Bact	Faecal Coliform & E.Coli	count	-	Nil/100ml	-

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

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

[C] Investigation levels are taken from the NSW EPA (1994) Guidelines for Assessing Service Station Sites - Threshold Concentrations for Aquatic Environments - Fresh Waters.

*Netherlands (2000) Circular on Target Values and Intervention Values for Soil Remediation. Ministry of Housing, Spatial Planning and the Environment, Netherlands Government (Dutch Intervention Value/Indicative of Serious Contamination).

6.0 SAMPLING METHODOLOGY

6.1 SAMPLE LOCATIONS

A systematic sampling regime was undertaken by installation of test pits on the 12th October 2015. The objective was to assess the depth of historical filling and potential soil contamination within investigation Area 'C' and adjoining site areas. Sample locations were selected to provide an adequate and well distributed spatial assessment with consideration of potential contamination sources, laydown and transport mechanisms. Locations were selected with considerations of the NSW EPA (1995) Sampling Design Guidelines. Based on the assessment area (0.8 ha) 19 sample points are recommended to provide a 95% confidence level of identifying hotspots at the site. However, given the preliminary nature of this assessment eight (8) test pit sites were selected to provide an initial screening for ground contamination with four (4) within the proposed development footprint. A second round of supplementary sampling was undertaken on the 22nd of October to delineate potential mercury in shallow soils adjacent Test Pit 14 (TP14), which is noted to be outside the development foot print and is not proposed to disturbed during the site works.

6.2 EXCAVATION METHOD

Samples were obtained from an excavator used to construct test pits. Soil descriptions 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. Field tests and observations were conducted to distinguish between soil composition, condition, and structure.

6.3 SAMPLING DEPTHS

Soil samples were collected from near the surface and every one (1) metre or at significant intervals indicated by changes in soil structure or possible contamination layers. The maximum investigation depth was 2.0 metres in TP16 with test pits terminated in natural ground comprising weathered shale. Given the top down nature of deposition associated with potential contamination from landfarming biosolids, imported fill, and any top down spills or leachate, shallow soil samples are considered appropriate to provide an assessment of soil conditions at the site.

6.4 SAMPLE COLLECTION

All soil samples were collected in accordance with industry standard QA/QC procedures. Sample containers were individually labelled with sample identification clearly marked on the container and sealed lid. Soil samples were obtained by discrete excavation methods. Soil samples were collected with disposable sterile gloves and placed directly in laboratory supplied 250 mL jars with Teflon lined lids and immediately stored on ice.

6.5 VOLATILE LOSSES

Volatile compound losses were kept to a minimum by employing the following sampling techniques:

- Minimal disturbance of soil during sampling;
- Soil cuttings placed in sampling jars as soon as possible;
- Sampling containers containing zero headspace;
- Samples placed directly on ice and transported to the laboratory as soon as possible;
- Employing the most appropriate analytical method to minimise volatile losses at a NATA accredited laboratory.

6.6 SELECTION OF SAMPLES FOR ANALYSIS

Samples were selected for analysis based on the stratigraphic conditions and as to provide an understanding of potential contamination vertically and laterally. All other samples not selected for analysis were put on hold for subsequent analysis, if required. Soil samples were selected to assess primarily near surface and shallow soil conditions across the Site.

6.7 SURVEY CONTROL

All test pit locations were recorded in the field with a hand held GPS unit. Final locations may be surveyed as required. Refer to Figure **3** for sample locations.

7.0 LABORATORY ANALYSIS

Envirolab, a NATA registered laboratory undertook the laboratory analysis in general accordance with:

- Schedule B(3) of the NEPM Guidelines; and
- ANZECC (1996*) 'Guidelines for the Laboratory Analysis of Contaminated Soils*.

A summary of the laboratory testing program is provided in the following table. Blind field duplicates were collected at the standard rate of at least 1 in 10 primary samples. However, given the preliminary nature of the assessment no allowance was made for testing of duplicate samples.

Table 10: Laboratory Analysis Summary

Samples	Heavy Metals	TPH BTEX	PAH	OCP, OPP, PCB, T.Phenols	EC pH	Ecoli. & Faecal C.
Soil R2	8	8	8	5	8	5
Soil R3	4	-	-	-	-	-
Groundwater	-	-	-	-	-	-
Total	12	8	8	5	8	5

A detailed outline of sampling locations and identification codes is included in the **Figure 2** site Plan.

8.0 QUALITY ASSURANCE & QUALITY CONTROL PROCEDURES

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 Site Contamination) Measure (NEPC;2013). The DQO's for the investigation were to obtain sufficient representative data to allow a high quality environmental assessment of:

- The location, nature, and degree of soil contamination at selected sampling locations (if any);
- The risks posed to human health and the environment, including potential future users of the Site; and
- The requirements for any further investigative works.

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 11**

Table 11 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 fieldwork are shown in **Table 12**. Refer to **Appendix E** for sample Chain of Custody (COC) documentation.

Table 12: Field QA/QC

Protocol	Description
Sampling Team	Site personnel comprised only professionally qualified environmental scientists and contractors trained in conducting site contamination investigations.
Sample Equipment	All sample and investigation equipment decontaminated between sample sites. Disposable equipment including gloves changed between each sample.
Field Screening	Visual and olfactory inspection of sample materials for potential contamination.
Chain of Custody Forms	All samples were logged and transferred under appropriately completed Chain of Custody Forms.
Preservation	All samples were delivered to the laboratory in appropriately preserved containers, with preservation consisting of packing samples in eskies with ice.

8.3 LABORATORY ANLYTICAL METHODS

Analysis of soil samples was conducted by Envirolab Laboratory Services (ELS). ELS is NATA accredited 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 13**.

Table 13 Data Quality Objectives and Criteria

DQO	Evaluation Criteria	Status
Documentation completeness	Completion of field records, chain of custody documentation, equipment calibration, 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, if any.	✓
Data representativeness	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 (AEC) 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 laboratory was NATA accredited and the Practical Quantitation Limits (PQL) were within the acceptable levels for the investigation criteria. Laboratory certificates of analysis provided in **Appendix C** (Soil) and **Appendix D** (groundwater) 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 ENVIRONMENTAL SITE ASSESSMENT

This section presents the results of the soil and groundwater sampling programme supported by a photographic record of the site works and ground conditions provided in **Appendix F**.

9.1 STRATIGRAPHIC CONDITIONS

Test pit investigations reported shallow topsoil originating from decomposed night soil described as brown clayey silt. This layer of top soil was generally 0.1-0.5 metres deep underlain by native yellow-grey clay overlying weathered grey shales to the maximum investigation depth of **2.0 m**. A summary of the test pit profiles is provided in **Table 14**. No foreign matter or groundwater was observed in test pit investigations. Test pit observations indicate there is some potential for variation in ground conditions with a deeper profile of the former biosolids in the eastern portion of the site.

Table 14 Data Quality Objectives and Criteria

Test Pit 11	0-0.3 Clayey silt 0.3-0.75 Clay, yel-brown 0.75-1.0 shale	**Test Pit 15**	0.0-0.6 Clayey silt 0.6-0.8 Clay, yellow-brown 0.8-1.0 shale
Test Pit 12	0-0.2 Clayey silt 0.2-0.8 Clay, yel-brown 0.8-1.0 shale	**Test Pit 16**	0-0.2 Clayey silt 0.2-1.0 Clay, yellow-brown 1.0-1.8 shale with groundwater
Test Pit 13	0-0.2 Clayey silt 0.2-1.3 Clay, yel-brown 1.3-1.5 shale	**Test Pit 17**	0-0.4 Clayey silt w charcoal 0.4-1.2 Clay, yellow-brown 1.2-1.5 shale
Test Pit 14	0-0.4 Clayey silt 0.4-1.4 Clay, yel-brown 1.4-1.5 shale	**Test Pit 18**	0-0.3 Clayey silt 0.3-0.8 Clay, yellow-brown 0.8-1.0 shale

9.2 ANALYTICAL RESULTS (SOIL)

Laboratory Certificates of Analysis are contained in **Appendix C** and summarised in **Table 15**. Samples were analysed for the following suite of analytes:

- Total Petroleum Hydrocarbons (TPH);
- Benzene Toluene Ethylbenzene, Xylenes (BTEX);
- Polycyclic Hydrocarbons (PAH);
- Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, and Zn); and
- Organochlorine Pesticides (OCP);
- Organophosphate Pesticides (OPP);
- Polychlorinated Biphenyls (PCBs);

- Electrical Conductivity;
- pH; and
- Bacteria (E.Coli & Faecal Coliform).

The NATA laboratory results generally report levels of analytes in soil below the laboratory practical quantification limit (PQL) and/or the adopted soil assessment guidelines, **NEPM C** and **NEPM D** for open space and commercial landuse.

Minor detections of hydrocarbons, PAHs and heavy metals were reported in TP18 situated outside the project area to the northeast. The results do not limit the site proposal.

Levels of mercury and zinc were also detected in TP14 outside the project area at concentrations above the biosolids guidelines for agricultural use. The results triggered an additional round of soil testing with four (4) supplementary samples collected from within a 5 metre radius of TP14. The results of these samples reported levels of mercury below the laboratory level of detection which is satisfactory.

Based on the results of this investigation the project Area 'C' presents a low risk for gross soil contamination. However, levels of E.coli in soil will require site management to consider soil improvements such as dosing with lime and improving drainage to reduce potential for faecal pathogens. Further testing for faecal pathogens including salmonella may be required where soil remains accessible.

9.3 NATURE OF SOIL CONTAMINATION

Through this assessment ENRS has identified a low to risk of ground contamination associated with historical spreading of night soil (biosolids) and uncontrolled filling across the assessment area.

Field investigations comprising installation of eight (8) test pits did not identify signs (olfactory or visual) of gross soil contamination. The majority of the site was observed to be covered with a 0.1-0.5 m layer of clayey silt derived from decomposed biosolids. Chemical analysis of soil samples did not report any exceedances of the relevant NEPM C and NEPM D soil assessment criteria to indicate there may be gross ground contamination within project Area 'C'. Given the limited number of test pits the site presents an ongoing risk for potential hot spot contamination that may not have been detected during this preliminary assessment. Based on the site history and results of this investigation the shallow soil conditions at the site may be considered acceptable for the proposed site use supported by soil improvements and monitoring of shallow groundwater.

9.4 HUMAN HEALTH

Given the site proposal to relocate the Shoalhaven Animal Shelter and Pound the potential exposure pathways are expected to be greatest during redevelopment and construction. The soil testing component of this investigation has been limited to point source samples from eight (8) test pit excavations. Analytical results from soil testing were reported below the NEPM (2013) health investigation levels which indicates there is a low probability of shallow soil contamination that may present a concern for users of the site. However, elevated levels of mercury in test pit 14 and E.coli in the

north of the site indicate potential for hot spot contamination including pathogens in soil which will require consideration during site redevelopment and ongoing operations to manage potential health exposure. ENRS recommend site personnel should consider appropriate PPE and personal hygiene whilst working with soil and dust during the site redevelopment.

9.5 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 land owners 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, it is unlikely that the site poses a significant risk of harm in its current state. 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.

9.6 WASTE CLASSIFICATION

During this landuse suitability assessment, the NATA accredited laboratory results were tabulated and compared against the following soil assessment criteria to inform the management of soil material to be excavated during the project works:

Step 1: Compare results against relevant NEPM (2013) landuse screening levels for the proposed site use to assess soil suitability to remain on site;

Step 2: Compare results against the EPA (2012) Excavated Natural Material (ENM) waste exemption to assess suitability for offsite disposal or re-use. Characterisation criteria is provided in Table 2 of the ENM (EPA 2012) exemption; and

Step 3: Compare results against the OEH Waste Classification Guidelines (DECCW:2009) for offsite disposal as waste. Where results are identified above the Contaminant Threshold (CT) further analysis should be conducted for leachate potential. TCLP results are then compared against the Specific Contaminant Concentration (SCC) criteria as defined by Table 1 and Table 2 of the OEH Waste Classification Guidelines (DECCW:2009).

The classification methodology provides for a tiered assessment to determine if the material is suitable for re-use on site and classification for offsite disposal.

Project Area 'C' soil material tested in TP11-13 & TP15 is assessed as suitable for reuse on-site as the chemical concentrations are below the NEPM C and NEPM D, or if required may be disposed off-site as ENM as the results also comply with the ENM waste exemption (EPA;2012). In general ENM is suitable for engineering or earthworks applications.

10.0 ENVIRONMENTAL MANAGEMENT

Based on the available site history, inspections, information provided to ENRS by the client, and the results of targeted soil sampling, this Stage 1 ESA identified levels of

potential contaminants in soils within project Area 'C' below the adopted NEPM C and D landuse criteria. This assessment did not document evidence of gross ground contamination to identify any areas of environmental concern (AEC). However, given the potential for unidentified hotspots the following recommendations are provided for environmental management during the site re-development and construction:

- Where practical excavate any residual biosolids from the building footprint to remove any risk of soil pathogens or unidentified hotspot contamination. Chemical testing and comparison against the NEPM C and D landuse guidelines reports the material is suitable to remain on site and may be moved to a less sensitive area on site;
- Consider installing a network of shallow monitoring bores with at least two (2) bores adjacent the downgradient boundary and one (1) upgradient to support further risk assessment for the larger site;
- Consider soil improvements in residual area to improve aesthetic requirements and reduce the potential for soil pathogens as the current conditions present clayey silt with a high water holding capacity. For example drainage improvements and application of lime;
- Site personnel should consider appropriate PPE and protocols to reduce potential exposure to shallow soil pathogens, dust and groundwater during redevelopment; and
- Consider hazmat and dilapidation survey with soil targeted sampling and Ground Penetrating Radar (GPR) to clear areas for Unexploded Ordinates (UXO) if site works are required in proximity to former military buildings.

11.0 CONCLUSIONS AND RECOMMENDATIONS

11.1 CONCLUSIONS

Based on the findings outlined during this Stage 1 ESA the following conclusions and recommendations are provided;

- The site comprises approximately 0.8 Hectares in the southwestern portion of the Shoalhaven Water Depot at 19 BTU Road, Nowra Hill, NSW, 2540. The proposal is to relocate the Shoalhaven Animal Shelter and Pound;
- This ESA is required to assess for potential ground contamination associated with the historical site use as a sanitary depot and farming of night soil;
- Test pit excavations intersected relatively uniform conditions across the site with between 0.1-0.5 metres of clayey silt overlying natural clays and shale;
- Results of NATA certified laboratory analysis reported concentrations of potential contaminants, including; heavy metals; hydrocarbons; PAHs; PCBs; and pesticides in soil below the relevant NEPM C and NEPM D landuse criteria;
- Supplementary testing delineated a hotspot area of elevated mercury and zinc above the agricultural guidelines for biosolids within a 5 metre radius of TP14. The area is outside the development footprint and does not limit the site proposal

- No groundwater was intersected during this investigation. However previous assessment of the adjoining area to the north identified potential for groundwater contamination due to leachate from the historical sanitary works. Groundwater is not suitable for application including irrigation, drinking water or discharge to the environment pending more detailed assessment if required;
- The investigation did not identify any evidence of gross ground contamination. Based on the data reviewed during this assessment. The project Area C comprising the southwest portion of the site does not pose an unacceptable risk to human health or to the environment and is ***suitable for the proposed 'commercial and industrial landuse (NEPM D)***;
- Tested soils within project Area 'C' are assessed as suitable for reuse on-site as the chemical concentrations are below the NEPM C and NEPM D, or if required may be disposed off-site as ENM as the results also comply with the ENM waste exemption (EPA;2012). In general ENM is suitable for engineering or earthworks applications;
- Should any change in Site conditions or incident occur which causes a potential environmental impact, ENRS should be notified to further assess the site and consider requirements for any additional assessment; and
- This report must be read in conjunction with the attached Statement of Limitations.

11.2 RECOMMENDATIONS

ENRS recommend SCC consider the following recommendations for environmental management during the site development:

- Where practical excavate any residual biosolids from the building footprint to remove any risk of soil pathogens or unidentified hotspot contamination. Chemical testing and comparison against the NEPM C and D landuse guidelines reports the material is suitable to remain on site and may be moved to a less sensitive area on site;
- Consider installing a network of shallow monitoring bores with at least two (2) bores adjacent the downgradient boundary and one (1) upgradient to support further risk assessment for the larger site;
- Consider soil improvements in residual area to improve aesthetic requirements and reduce the potential for soil pathogens as the current conditions present clayey silt with a high water holding capacity. For example drainage improvements and application of lime;
- Site personnel should consider appropriate PPE and protocols to reduce potential exposure to shallow soil pathogens, dust and groundwater during redevelopment; and
- Consider hazmat and dilapidation survey if site works are required in proximity to former military buildings.

12.0 REFERENCES

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13.0 LIMITATIONS

This report and the associated services performed by ENRS are in accordance with the scope of services set out in the contract between ENRS and the Client. The scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to Site.

ENRS derived the data in this report primarily from visual inspections, and, limited sample collection and analysis made on the dates indicated. In preparing this report, ENRS has relied upon, and presumed accurate, certain information provided by government authorities, the Client and others identified herein. The report has been prepared on the basis that while ENRS 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 Client 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 assessments.

The data, findings, observations, conclusions and recommendations in the report are based solely upon the state of 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, ENRS 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 Client, and is subject to and issued in connection with the provisions of the agreement between ENRS and the Client. ENRS 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 Client to accept if the Client so chooses any recommendations contained within and implement them in an appropriate, suitable and timely manner.

TABLES

Table 15 Comparison of Soil results against assessment criteria

Table 15: Total Concentration Results - PROJECT AREA C SOIL TESTING

Site Location: 19 BTU Road - Former Sanitary Depot

Analyte					Organochlorine Pesticides (OCP)								BTEX					Total Recoverable Hydrocarbons						Polycyclic Aromatic Hydrocarbons (PAHs)																			Metals/Metalloids											
					Aldrin	Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Organophosphate Pesticides (OPP)	Total PCB's	Total Phenols	Benzene	Toluene	Ethyl benzene	m+p-Xylene	o-Xylene	TRH C6-C9	TRH C10-C36	F1 TRH C6-C10	F2 TRH C10-C16	F3 TRH C16-C34	F4 TRH C34-C40	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	Benzo(a)pyrene TEQ calc (zero)	Benzo(a)pyrene TEQ calc(half)	Benzo(a)pyrene TEQ calc(PQL)	Total Positive PAHs	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	pH	Electrical Conductivity (uS/cm)	Faecal Coliforms in soil	E. Coli in soil
Assessment Criteria - NEPM (2013) Soil Investigation Levels (mg/Kg)																																																						
NEPM A (Std residential,Prim.Schools & Accessible Soil)					6	6	50	240	6	-	1.0	3000	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	3	3	3	300	100	20	100	6000	300	40	400	7400	-	-	-	-
NEPM B (Residential minimal Access to Soils)					10	10	90	600	10	-	1.0	45000	-	-	-	-	-	-	-	-	-	-	-	170	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	4	4	4	400	500	150	500	30000	1200	120	1200	60000	-	-	-	-
NEPM C (Recreational Open Space, Secondary Schools)					**10**	**10**	**70**	**400**	**10**	-	**1.0**	**40000**	-	-	-	-	-	-	-	-	-	-	-	**170**	-	-	-	-	-	-	-	-	-	-	**1.0**	-	-	-	**3**	**3**	**3**	**300**	**300**	**90**	**300**	**17000**	**600**	**80**	**1200**	**400000**	-	-	-	-
NEPM D (Industrial and Commercial)					45	45	530	3600	50	-	1.0	240000	-	-	-	-	-	-	-	-	-	-	-	370	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	40	40	40	4000	3000	900	3600	240000	1500	730	6000	35000	-	-	-	-
NEPM Ecological Investigation levels (EILs)					-	-	-	-	-	-	-	-	**50**	**85**	**70**	**105**	**105**	-	-	**180**	**120**	**300**	**2800**	**170**	-	-	-	-	-	-	-	-	-	-	**0.7**	-	-	-	-	-	-	-	**100**	-	**400**	**$280_{pH6.5}$**	**1100**	-	**350**	**$590_{pH6.5}$**	**$590_{pH6.6}$**	**$590_{pH6.7}$**		
NSW EPA Service Station Guideline for Sensitive Landuse					-	-	-	-	-	-	-	-	**1.0**	**130**	**50**	**25**	**25**	**65**	**1000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1.0**	-	-	-	-	-	-	**20**	-	-	-	-	**300**	-	-	-	-	-	-	-
NSW EPA (2000) Biosolids Guidelines. T4-5 for Agricultural Land					**0.02**	**0.02**	**0.02**	**0.5**	**0.02**	-	**0.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**20**	**1.0**	**100**	**150**	**150**	**1.0**	**60**	**200**	-	-	**1000**	**100**
Excavated Natural Material Exemption (NSW EPA 2012)																																																						
Absolute Max. Concentration (Table 2 Column 3)					-	-	-	-	-	-	-	-	**0.5**	**65**	**25**	**15**	**15**	-	**500**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1.0**	-	-	-	-	-	-	**40**	**40**	**1.0**	**150**	**200**	**100**	**1.0**	**60**	**300**	**4.5 to 10**	**3000**	-	-
Max. Ave. Concentration for Characterisation (Table 2 Column 2)					-	-	-	-	-	-	-	-	**NA**	**NA**	**NA**	**NA**	**NA**	-	**250**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.5**	-	-	-	-	-	-	**20**	**20**	**0.5**	**75**	**100**	**50**	**0.5**	**30**	**150**	**5 to 9**	**1500**	-	-
Total Concentrations (ppm) - PQL					**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**5.0**	**0.2**	**0.5**	**1**	**2**	**1**	**25**	**100**	**25**	**50**	**100**	**100**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**	**0.05**	**0.1**	**0.1**	**0.1**	**0.5**	**0.5**	**0.5**	**0.5**	**4**	**0.4**	**1**	**1**	**1**	**0.1**	**1**	**1**	**0.1**	**0.1**	**CFU/g**	**CFU/g**
Area	**ID**	**Depth**	**Description**	**Date**																																																	
South-West Portion of BTU Road Former Sanitary Depot	TP11	0.1	Soil	12/10/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<0.2	<0.5	<1	<2	<1	<25	<100	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	NIL (+)VE	**8**	<0.4	**15**	**15**	**12**	<0.1	**5**	**36**	**6.1**	**57**	**2**	**2**
	TP12	0.2	Soil	12/10/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<0.2	<0.5	<1	<2	<1	<25	<100	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	NIL (+)VE	**15**	<0.4	**18**	**21**	**10**	<0.1	**5**	**32**	**5.9**	**32**	<2	<2
	TP13	0.2	Soil	12/10/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<0.2	<0.5	<1	<2	<1	<25	<100	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	NIL (+)VE	**5**	<0.4	**10**	**18**	**11**	<0.1	**3**	**70**	**6.1**	**30**	**23**	**23**
	TP14	0.3	Soil	12/10/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<0.2	<0.5	<1	<2	<1	<25	<100	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.2**	**0.2**	<0.1	**0.1**	<0.2	**0.1**	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	**0.64**	**15**	**0.7**	**25**	**160**	**120**	**9.2**	**10**	**240**	**6.2**	**27**	**8**	**8**
	TP15	0.3	Soil	12/10/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<0.2	<0.5	<1	<2	<1	<25	<100	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	NIL (+)VE	**15**	<0.4	**17**	**10**	**14**	<0.1	**4**	**28**	**5.9**	**26**	**23**	**23**
	TP16	0.2	Soil	12/10/2015	-	-	-	-	-	-	-	-	<0.2	<0.5	<1	<2	<1	<25	<100	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	NIL (+)VE	**5**	<0.4	**10**	**11**	**10**	<0.1	**4**	**22**	**5.8**	**32**	-	-
	TP17	0.3	Soil	12/10/2015	-	-	-	-	-	-	-	-	<0.2	<0.5	<1	<2	<1	<25	<100	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	NIL (+)VE	**8**	<0.4	**16**	**20**	**16**	<0.1	**8**	**71**	**6.6**	**28**	-	-
	TP18	0.2	Soil	12/10/2015	-	-	-	-	-	-	-	-	<0.2	<0.5	<1	<2	<1	<25	**160**	<25	<50	**180**	**100**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.2**	**0.2**	**0.1**	**0.2**	**0.3**	**0.1**	<0.1	<0.1	**0.1**	<0.5	<0.5	<0.5	**1.3**	**27**	**2**	**40**	**170**	**81**	**1.3**	**16**	**630**	**6.1**	**42**	-	-
TP14 5m radius	TP14 N	0.1-0.2	Soil	22/10/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	**300**	-	-	-	-
	TP14 E	0.1-0.2	Soil	22/10/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	**260**	-	-	-	-
	TP14 S	0.1-0.2	Soil	22/10/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	**720**	-	-	-	-
	TP14 W	0.1-0.2	Soil	22/10/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	**90**	-	-	-	-
95% Upper Confidence Limit Calculations																																																						
Number of samples					5	5	5	5	5	5	5	5	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12	8	12	8	8	5	5
Average					0.05	0.05	0.05	0.05	0.05	0.05	0.05	2.50	0.1	0.3	0.5	1.0	0.5	12.5	64	12.5	25	66	56	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.04	0.1	0.1	0.1	0.3	0.3	0.3	0.2	12	0.5	18.9	53.1	34	0.9	6.9	208	6.1	34	11.4	11
Maximum					0.05	0.05	0.05	0.05	0.05	0.05	0.05	2.5	0.1	0.3	0.5	1.0	0.5	12.5	160	12.5	25	180	100	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.3	0.3	0.3	1.3	27	2.0	40	170	120	9.2	16	720	6.6	57	23.0	23
Minimum					0.05	0.05	0.05	0.05	0.05	0.05	0.05	2.50	0.1	0.3	0.5	1.0	0.5	12.5	50	12.5	25	50	50	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.03	0.1	0.1	0.1	0.3	0.3	0.3	0.0	5.0	0.2	10.0	10.0	10.0	0.1	3.0	22.0	5.8	26.0	1.0	1.0
Standard deviation					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	39	0.0	0.0	46	17.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.03	0.0	0.0	0.0	0.0	0.0	0.0	0.5	7.4	0.6	9.8	69.2	42.2	2.6	4.4	239.6	0.2	10.5	10.9	10.9
Coefficient of Variation					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.3	0.8	0.6	0.71	0.0	0.0	0.3	0.0	0.0	0.0	2.0	0.6	1.3	0.5	1.3	1.2	2.9	0.6	1.2	0.0	0.3	1.0	1.0
t statistic at a=0.05					2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.89	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.8	1.9	1.9	2.1	2.1
95% UCL average					**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**2.5**	**0.1**	**0.3**	**0.5**	**1.0**	**0.5**	**12.5**	**90**	**12.5**	**25**	**97**	**68.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**	**0.06**	**0.1**	**0.1**	**0.1**	**0.3**	**0.3**	**0.3**	**0.6**	**17.2**	**0.9**	**25**	**99.5**	**63**	**2.28**	**10**	**332.5**	**6**	**41**	**22**	**22**

FIGURES

Figure 3 Site Layout and Sample Plan

ENRS
Environment & Natural Resource Solutions
25 River Road, Shoalhaven Heads, NSW, 2535
T/F 02 90374708 M. 0401518443 projects@enrs.com.au

Scale:	**scale bar**	Status:	**Rev 3**	Client:	**Shoalhaven City Council**	Title:	**Sample Plan**
Revision:	**A**	Drawn:	**RL**	Project:	**ENRS0394.2**	Date:	**06/11/2015**
Checked:	**RL**	Approved:	**RL**	Location:	**19 BTU Road Nowra Hill**	Figure:	**3**

Appendix A

Land Title Records

09441166

C. [redacted] TIFICATE OF TITLE

NEW SOUTH WALES [redacted] PERTY ACT, 1900, as amended.

(For title prior to 1st edition
see Volume 5481 Folio 216
For grant see description

Vol. 9441 Fol. 166

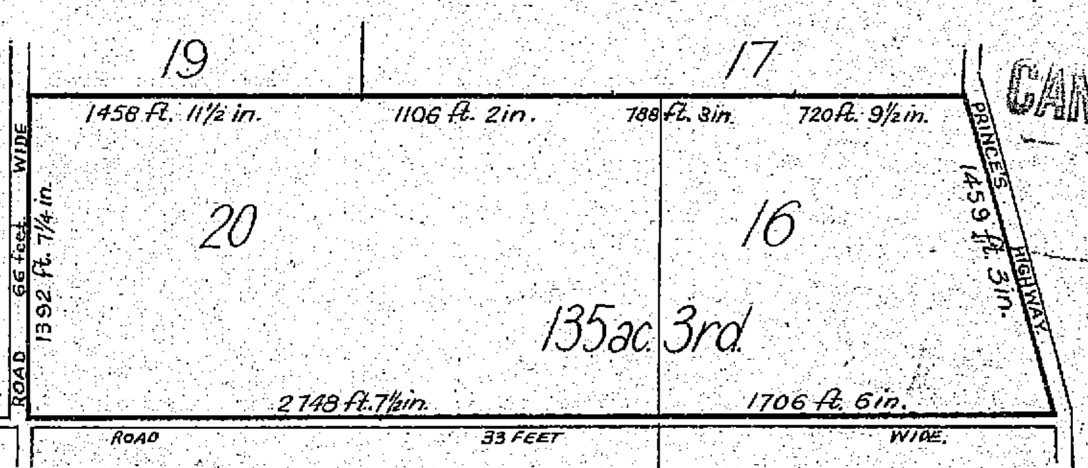
1st Edition issued 4-6-1963
J330282

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness R. Drawns

J. Watson
Registrar-General.

PLAN SHOWING LOCATION OF LAND



CANCELLED

J330282.

Scale: 800 feet to one inch

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in that piece of land in the Shire of Shoalhaven Parish of Nowra and County of St. Vincent being portions 16 and 20 granted on 24th June 1889 by Crown Grant Volume 931 Folio 23 excepting thereout the minerals reserved by the Crown Grant.

FIRST SCHEDULE (Continued overleaf)

DAVIS AND HERBERT (TOMERONG) PTY. LIMITED.

J. Watson
Registrar General

SECOND SCHEDULE (Continued overleaf)

1. Reservations and conditions, if any, contained in the Crown Grant(s) above referred to.

J. Watson
Registrar General

70939 1.62 SF 1609 V. C. N. BLIGHT, GOVERNMENT PRINTER

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar-General
Separate CT issuing for lots in DP 227233 No dealings to be registered hereon without reference to S.D.B.					
This deed is cancelled as to the whole					
New Certificates of Title have issued for lots in Deposited Plan No. 227233 as follows:-					
Lots 1 and 2 Vol. 9446 Fol. 226 and 227 respectively					
J. Watson REGISTRAR GENERAL					

DP 227233 10/12/1968

Diagram prepared on DP227233 being whole

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION

FORM No. 183A NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

[redacted]

TIFICATE OF TITLE

PERTY ACT, 1900, as amended.

10145226

NEW SOUTH WALES

Crown Grant Volume 931 Folio 23
Prior Title Volume 9441 Folio 166

ID

Vol. 10145 Fol. 226

1st Edition issued 21-10-1965

Vol. 10145 Fol. 226

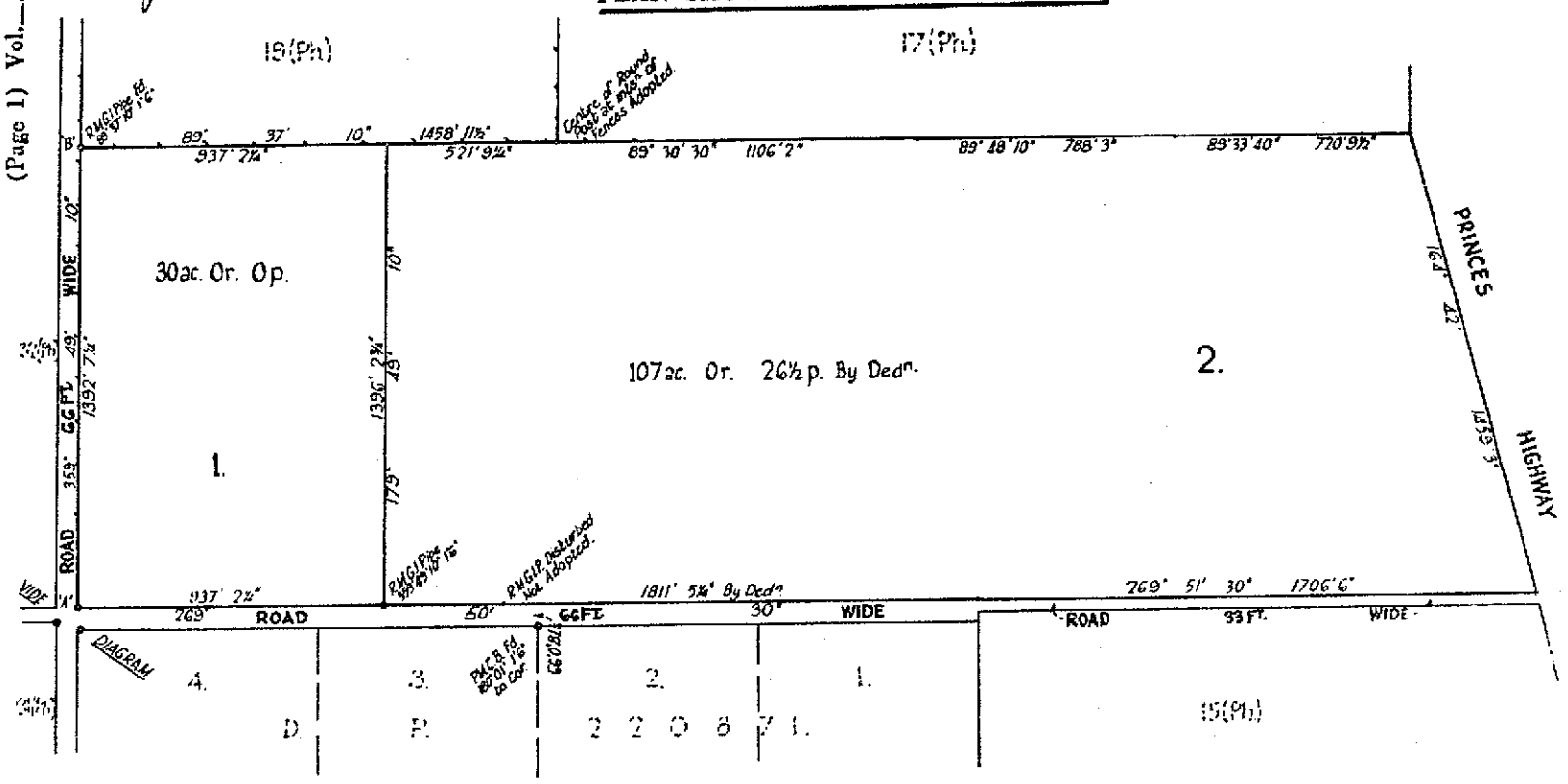
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the second schedule.

CANCELLED

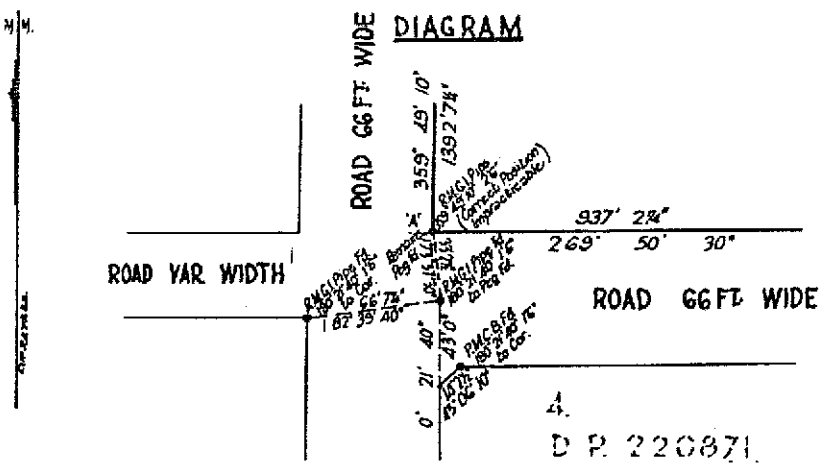
Witness J. Charles

Registrar General.

PLAN SHOWING LOCATION OF LAND



DIAGRAM



ESTATE AND LAND REFERRED TO

S Estate in Fee Simple in Lot 1 in Deposited Plan 227233 at Nowra Hill in the Shire of Shoalhaven Parish of Nowra and County of St.Vincent Excepting thereout the minerals reserved by the Crown Grant.

FIRST SCHEDULE (continued overleaf)

~~DAVIS AND HERBERT (TOMERONG) PTY. LIMITED.~~

Registrar General

SECOND SCHEDULE (continued overleaf)

GRM 1. Reservations and conditions, if any, contained in the Crown Grant above referred to.

Registrar General

(Page 1) Vol. 10145 Fol. 226

ST 1608 V. C. N. PLIGHT, GOVERNMENT PRINTER

Vol. 10145 Fol 226

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
The Council of the Shire of Shoalhaven	Transfer	K196162	16.10.1965	20.12.1965	

CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

Appendix B

Historical Aerial Photographs

22/2/1997

23/6/1994

6/7/1986

1974

21/9/1961

1/4/1959

Appendix C

Laboratory Certificate of Analysis (Soil)

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 135861

Client:
ENRS
25 River Rd
Shoalhaven Heads
NSW 2535

Attention: Rohan Last

Sample log in details:

Your Reference:	**ENRS0394-2, BTU Rd**		
No. of samples:	8 soils		
Date samples received / completed instructions received	14/10/15	/	14/10/15

This report replaces the R00 due to additional phenolics results to the report.

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.
Please refer to the last pages of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	19/10/15	/	21/10/15
Date of Preliminary Report:	Not Issued		

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Nancy Zhang
Chemist

Nick Sarlamis
Inorganics Supervisor

Alex MacLean
Chemist

ACCREDITED FOR TECHNICAL COMPETENCE

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
TRHC6 - C9	mg/kg	<25	<25	<25	<25	<25
TRHC6 - C10	mg/kg	<25	<25	<25	<25	<25
vTPHC6 - C10 less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	89	79	95	94	93

vTRH(C6-C10)/BTEXN in Soil				
Our Reference:	UNITS	135861-6	135861-7	135861-8
Your Reference	----------	TP16	TP17	TP18
Depth	----------	0.2	0.3	0.2
Date Sampled		12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil
Date extracted	-	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	15/10/2015	15/10/2015	15/10/2015
TRHC6 - C9	mg/kg	<25	<25	<25
TRHC6 - C10	mg/kg	<25	<25	<25
vTPHC6 - C10 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
Surrogate aaa-Trifluorotoluene	%	97	94	91

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	88	86	85	85	84

svTRH (C10-C40) in Soil				
Our Reference:	UNITS	135861-6	135861-7	135861-8
Your Reference	----------	TP16	TP17	TP18
Depth	----------	0.2	0.3	0.2
Date Sampled		12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil
Date extracted	-	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	15/10/2015	15/10/2015	15/10/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	160
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	<100	<100	180
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	100
Surrogate o-Terphenyl	%	87	88	93

PAHs in Soil						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	0.1	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	0.64	NIL (+)VE
Surrogate p-Terphenyl-d14	%	92	91	90	90	92

PAHs in Soil				
Our Reference:	UNITS	135861-6	135861-7	135861-8
Your Reference	----------	TP16	TP17	TP18
Depth	----------	0.2	0.3	0.2
Date Sampled		12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil
Date extracted	-	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	15/10/2015	15/10/2015	15/10/2015
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	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.2
Pyrene	mg/kg	<0.1	<0.1	0.2
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.1
Chrysene	mg/kg	<0.1	<0.1	0.2
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.3
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.1
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
Total Positive PAHs	mg/kg	NIL (+)VE	NIL (+)VE	1.3
Surrogate p-Terphenyl-d14	%	92	97	97

Organochlorine Pesticides in soil						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	16/10/2015	16/10/2015	16/10/2015	16/10/2015	16/10/2015
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	104	104	104	104

Organophosphorus Pesticides						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	16/10/2015	16/10/2015	16/10/2015	16/10/2015	16/10/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	104	104	104	104

PCBs in Soil						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	16/10/2015	16/10/2015	16/10/2015	16/10/2015	16/10/2015
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	105	104	104	104	104

Acid Extractable metals in soil						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Arsenic	mg/kg	8	15	5	15	15
Cadmium	mg/kg	<0.4	<0.4	<0.4	0.7	<0.4
Chromium	mg/kg	15	18	10	25	17
Copper	mg/kg	15	21	18	160	10
Lead	mg/kg	12	10	11	120	14
Mercury	mg/kg	<0.1	<0.1	<0.1	9.2	<0.1
Nickel	mg/kg	5	5	3	10	4
Zinc	mg/kg	36	32	70	240	28

Acid Extractable metals in soil				
Our Reference:	UNITS	135861-6	135861-7	135861-8
Your Reference	----------	TP16	TP17	TP18
Depth	----------	0.2	0.3	0.2
Date Sampled		12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil
Date prepared	-	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	15/10/2015	15/10/2015	15/10/2015
Arsenic	mg/kg	5	8	27
Cadmium	mg/kg	<0.4	<0.4	2
Chromium	mg/kg	10	16	40
Copper	mg/kg	11	20	170
Lead	mg/kg	10	16	81
Mercury	mg/kg	<0.1	<0.1	1.3
Nickel	mg/kg	4	8	16
Zinc	mg/kg	22	71	630

Misc Inorg - Soil						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	16/10/2015	16/10/2015	16/10/2015	16/10/2015	16/10/2015
Date analysed	-	16/10/2015	16/10/2015	16/10/2015	16/10/2015	16/10/2015
pH 1:5 soil:water	pH Units	6.1	5.9	6.1	6.2	5.9
Electrical Conductivity 1:5 soil:water	µS/cm	57	32	30	27	26

Misc Inorg - Soil				
Our Reference:	UNITS	135861-6	135861-7	135861-8
Your Reference	----------	TP16	TP17	TP18
Depth	----------	0.2	0.3	0.2
Date Sampled		12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil
Date prepared	-	16/10/2015	16/10/2015	16/10/2015
Date analysed	-	16/10/2015	16/10/2015	16/10/2015
pH 1:5 soil:water	pH Units	5.8	6.6	6.1
Electrical Conductivity 1:5 soil:water	µS/cm	32	28	42

Misc Soil - Inorg						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/10/2015	20/10/2015	20/10/2015	20/10/2015	20/10/2015
Date analysed	-	20/10/2015	20/10/2015	20/10/2015	20/10/2015	20/10/2015
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg				
Our Reference:	UNITS	135861-6	135861-7	135861-8
Your Reference	----------	TP16	TP17	TP18
Depth	----------	0.2	0.3	0.2
Date Sampled		12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil
Date prepared	-	20/10/2015	20/10/2015	20/10/2015
Date analysed	-	20/10/2015	20/10/2015	20/10/2015

Micro testing in soil						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date of testing	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Faecal Coliforms in soil	CFU/100g	200	<200	2,300	800	2,300
E. Coli	CFU/100g	200	<200	2,300	800	2,300

Moisture						
Our Reference:	UNITS	135861-1	135861-2	135861-3	135861-4	135861-5
Your Reference	----------	TP11	TP12	TP13	TP14	TP15
Depth	----------	0.1	0.2	0.2	0.3	0.3
Date Sampled		12/10/2015	12/10/2015	12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/10/2015	15/10/2015	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	16/10/2015	16/10/2015	16/10/2015	16/10/2015	16/10/2015
Moisture	%	16	13	9.8	13	14

Moisture				
Our Reference:	UNITS	135861-6	135861-7	135861-8
Your Reference	----------	TP16	TP17	TP18
Depth	----------	0.2	0.3	0.2
Date Sampled		12/10/2015	12/10/2015	12/10/2015
Type of sample		Soil	Soil	Soil
Date prepared	-	15/10/2015	15/10/2015	15/10/2015
Date analysed	-	16/10/2015	16/10/2015	16/10/2015
Moisture	%	17	24	33

Method ID	Methodology Summary
Org-016	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.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	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-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ 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. 'TEQ 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. 'TEQ 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-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Ext-008	Subcontracted to Sonic Food & Water Testing. NATA Accreditation No. 4034.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/10/2015	[NT]	[NT]	LCS-1	15/10/2015
Date analysed	-			15/10/2015	[NT]	[NT]	LCS-1	15/10/2015
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-1	100%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-1	100%
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	LCS-1	94%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-1	99%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-1	100%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-1	103%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-1	102%
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	97	[NT]	[NT]	LCS-1	101%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/10/2015	135861-1	15/10/2015 || 15/10/2015	LCS-1	15/10/2015
Date analysed	-			15/10/2015	135861-1	15/10/2015 || 15/10/2015	LCS-1	15/10/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	135861-1	<50 || <50	LCS-1	99%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	135861-1	<100 || <100	LCS-1	85%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	135861-1	<100 || <100	LCS-1	79%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	135861-1	<50 || <50	LCS-1	99%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	135861-1	<100 || <100	LCS-1	85%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	135861-1	<100 || <100	LCS-1	79%
Surrogate o-Terphenyl	%		Org-003	90	135861-1	88 || 88 || RPD: 0	LCS-1	100%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/10/2015	135861-1	15/10/2015 || 15/10/2015	LCS-1	15/10/2015
Date analysed	-			15/10/2015	135861-1	15/10/2015 || 15/10/2015	LCS-1	15/10/2015
Naphthalene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	LCS-1	97%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	LCS-1	99%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	LCS-1	98%
Anthracene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	LCS-1	91%
Pyrene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	LCS-1	101%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	LCS-1	118%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	135861-1	<0.2 || <0.2	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	135861-1	<0.05 || <0.05	LCS-1	111%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	96	135861-1	92 || 90 || RPD: 2	LCS-1	93%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/10/2015	135861-1	15/10/2015 || 15/10/2015	LCS-1	15/10/2015
Date analysed	-			16/10/2015	135861-1	16/10/2015 || 16/10/2015	LCS-1	16/10/2015
HCB	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	LCS-1	102%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	LCS-1	82%
Heptachlor	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	LCS-1	89%
delta-BHC	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	LCS-1	92%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	LCS-1	89%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	LCS-1	85%
Dieldrin	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	LCS-1	119%
Endrin	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	LCS-1	106%
pp-DDD	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	LCS-1	93%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	LCS-1	95%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	105	135861-1	105 || 106 || RPD: 1	LCS-1	123%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/10/2015	135861-1	15/10/2015 || 15/10/2015	LCS-1	15/10/2015
Date analysed	-			16/10/2015	135861-1	16/10/2015 || 16/10/2015	LCS-1	16/10/2015
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	LCS-1	69%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	LCS-1	91%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	LCS-1	95%
Dimethoate	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	LCS-1	100%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	LCS-1	118%
Malathion	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	LCS-1	93%
Parathion	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	LCS-1	114%
Ronnel	mg/kg	0.1	Org-008	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-008	105	135861-1	105 || 106 || RPD: 1	LCS-1	123%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/10/2015	135861-1	15/10/2015 || 15/10/2015	LCS-1	15/10/2015
Date analysed	-			16/10/2015	135861-1	16/10/2015 || 16/10/2015	LCS-1	16/10/2015
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	135861-1	<0.1 || <0.1	LCS-1	114%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	135861-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	105	135861-1	105 || 106 || RPD: 1	LCS-1	106%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			15/10/2015	135861-1	15/10/2015 || 15/10/2015	LCS-2	15/10/2015
Date analysed	-			15/10/2015	135861-1	15/10/2015 || 15/10/2015	LCS-2	15/10/2015
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	135861-1	8 || 7 || RPD: 13	LCS-2	113%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	135861-1	<0.4 || <0.4	LCS-2	109%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	135861-1	15 || 15 || RPD: 0	LCS-2	108%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	135861-1	15 || 13 || RPD: 14	LCS-2	111%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	135861-1	12 || 10 || RPD: 18	LCS-2	106%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	135861-1	<0.1 || <0.1	LCS-2	106%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	135861-1	5 || 4 || RPD: 22	LCS-2	105%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	135861-1	36 || 26 || RPD: 32	LCS-2	106%

QUALITY CONTROL Misc Inorg - Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			16/10/2015	135861-1	16/10/2015 || 16/10/2015	LCS-1	16/10/2015
Date analysed	-			16/10/2015	135861-1	16/10/2015 || 16/10/2015	LCS-1	16/10/2015
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	135861-1	6.1 || 5.8 || RPD: 5	LCS-1	101%
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	135861-1	57 || 50 || RPD: 13	LCS-1	95%

QUALITY CONTROL Misc Soil - Inorg	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			20/10/2015	135861-1	20/10/2015 || 20/10/2015	LCS-1	20/10/2015
Date analysed	-			20/10/2015	135861-1	20/10/2015 || 20/10/2015	LCS-1	20/10/2015
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	135861-1	<5 || <5	LCS-1	103%

QUALITY CONTROL Micro testing in soil	UNITS	PQL	METHOD	Blank
Date of testing	-			[NT]
Faecal Coliforms in soil	CFU/100g	200	Ext-008	[NT]
E. Coli	CFU/100g	1	Ext-008	[NT]

QUALITY CONTROL Misc Soil - Inorg	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	135861-2	20/10/2015
Date analysed	-	[NT]	[NT]	135861-2	20/10/2015
Total Phenolics (as Phenol)	mg/kg	[NT]	[NT]	135861-2	99%

Report Comments:

Faecal Coliforms & E coli analysed by Sonic Food & Water Testing. Report No.W1516022.

INS: Insufficient sample for this test
NR: Test not required
<: Less than
NR: Not Reported

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

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.

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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-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.

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Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 136338

Client:
ENRS
25 River Rd
Shoalhaven Heads
NSW 2535

Attention: Rohan Last

Sample log in details:

Your Reference:	**ENRS0394.2, BTU Rd**		
No. of samples:	1 soil		
Date samples received / completed instructions received	23/10/15	/	23/10/15

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.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	26/10/15	/	26/10/15
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

Acid Extractable metals in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	136338-1 TP14N/.01 Soil	136338-2 TP14E/0.1 Soil	136338-3 TP14S/0.1 Soil	136338-4 TP14W/0.1 Soil
Date prepared	-	23/10/2015	23/10/2015	23/10/2015	23/10/2015
Date analysed	-	23/10/2015	23/10/2015	23/10/2015	23/10/2015
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Zinc	mg/kg	300	260	720	90

Moisture Our Reference: Your Reference Type of sample	UNITS ---------- ----------	136338-1 TP14N/.01 Soil	136338-2 TP14E/0.1 Soil	136338-3 TP14S/0.1 Soil	136338-4 TP14W/0.1 Soil
Date prepared	-	23/10/2015	23/10/2015	23/10/2015	23/10/2015
Date analysed	-	26/10/2015	26/10/2015	26/10/2015	26/10/2015
Moisture	%	15	20	21	11

Method ID	Methodology Summary
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			23/10/2015	136338-1	23/10/2015 || 23/10/2015	LCS-6	23/10/2015
Date analysed	-			23/10/2015	136338-1	23/10/2015 || 23/10/2015	LCS-6	23/10/2015
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	136338-1	<0.1 || <0.1	LCS-6	85%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	136338-1	300 || 320 || RPD: 6	LCS-6	102%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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.

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Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
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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.

NOT USED

Appendix D

Laboratory Certificate of Analysis (Groundwater)

Appendix E

Sample Chain of Custody

ENRS

Environment & Natural Resource Solutions

CHAIN OF CUSTODY - ENRS

ENVIROLAB SERVICES

Envirolab

Consultant:	ENRS	**ENRS Project Name and Number:**	ENRS0394.2 BTU Rd
Project Mgr:	Rohan Last (0401 518 443)		
Sampler:	RL	**PO No.:**	Approval RL
Address:	25 River Road, Shoalhaven Heads, NSW, 2535	**Envirolab Services Quote No. :**	-
Delivery:	TNT	**Date results required:**	19/10/2015 1:00:00 PM
Email:	rohan@enrs.com.au	**Or choose:**	standard / 1 day / 2 day / 3 day
Phone:	02 9037 4708 **Fax:** 02 9037 4708	Note: Inform lab in advance if urgent turnaround is required - surcharge applies	

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Sample information				Tests Required														Comments
Envirolab Sample ID	ENRS Sample ID	Date sampled	Type of sample	HOLD	Comb#6 (TRH, BTEX, PAH, OC, OP, PCB, 8HM, T.Phenols)	EC	pH	Faecal Coliform & E.Coli	Comb#3 (TRH, BTEX, PAH, 8HM)									sample description
1	TP11 / 0.1	12/10/2015	Soil jar		1	1	1	1										
2	TP12 / 0.2	12/10/2015	Soil jar		1	1	1	1										
3	TP13 / 0.2	12/10/2015	Soil jar		1	1	1	1										
4	TP14 / 0.3	12/10/2015	Soil jar		1	1	1	1										
5	TP15 / 0.3	12/10/2015	Soil jar		1	1	1	1										
6	TP16 / 0.2	12/10/2015	Soil jar			1	1		1									
7	TP17 / 0.3	12/10/2015	Soil jar			1	1		1									
8	TP18 / 0.2	12/10/2015	Soil jar			1	1		1									
			Total	*0*	*5*	*8*	*8*	*5*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 135861
Date Received: 14/10/15
Time Received: 12:30
Received by: PT
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No:
Date Received:
Time Received:
Received by:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by (company):	ENRS	**Received by (company):**	ELS
Print Name:	Rohan Last	**Print Name:**	PT
Date & Time:	13/10/2015	**Date & Time:**	14/10/15 12:30
Signature:		**Signature:**	PT

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier

ENRS

Environment & Natural Resource Solutions

CHAIN OF CUSTODY - ENRS

ENVIROLAB SERVICES

Envirolab

Consultant:	ENRS
Project Mgr:	Rohan Last (0401 518 443)
Sampler:	RL
Address:	25 River Road, Shoalhaven Heads, NSW, 2535
Delivery:	TNT
Email:	rohan@enrs.com.au
Phone:	02 9037 4708 **Fax:** 02 9037 4708

ENRS Project Name and Number:	ENRS0394.2 BTU Rd
PO No.:	Approval RL
Envirolab Services Quote No. :	-
Date results required:	26/10/2015
Or choose:	standard / 1 day / 2 day / 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Sample information				Tests Required														Comments
Envirolab Sample ID	ENRS Sample ID	Date sampled	Type of sample	HOLD	Comb#6 (TRH, BTEX, PAH, OC, OP, PCB, 8HM, T.Phenols)	EC	pH	Faecal Coliform & E.Coli	Comb#3 (TRH, BTEX, PAH, 8HM)	Mercury, Zinc								sample description
																		136338
1	TP14 N / 0.1	22/10/2015	Soil jar							1								
2	TP14 E / 0.1	22/10/2015	Soil jar							1								
3	TP14 S / 0.1	22/10/2015	Soil jar							1								
4	TP14 W / 0.1	22/10/2015	Soil jar							1								
			Total	*0*	*0*	*0*	*0*	*0*	*0*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 136338.
Date Received: 23/10/15.
Time Received: 10/9am.
Received by:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by (company):	ENRS
Print Name:	Rohan Last
Date & Time:	22/10/2015
Signature:	

Received by (company):	ES
Print Name:	Sophie
Date & Time:	23/10
Signature:	

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier

Appendix F

Photographic Record of Site Conditions

Photo 1: TP15 and TP16

Photo 2: TP12

Photo 3: TP13

Photo 4: TP14