Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Preliminary Site Investigation for Contamination

Pre-Purchase Due Diligence
49 Beach Road, Batemans Bay

Prepared for
Aspen Group

Project 89333.00
September 2017

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	89333.00	Document No.	R.001.Rev0
Document title	Report on Preliminary Site Investigation for Contamination Pre-Purchase Due Diligence		
Site address	49 Beach Road, Batemans Bay		
Report prepared for	Aspen Group		
File name	89333.00.R.001.Rev0		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	David McIntosh	Paul Gorman	8 September 2017

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	0	Aspen Group, Mr Joss Engelbretsen

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature		Date
Author			8 September 2017
Reviewer		For Paul Gorman	8 September 2017

bsi. ISO 9001 Quality Management

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
1/1 Luso Drive
Unanderra NSW 2526
PO Box 486
Unanderra NSW 2526
Phone (02) 4271 1836
Fax (02) 4271 1897

Douglas Partners
Geotechnics | Environment | Groundwater

Table of Contents

Report on Preliminary Site Investigation for Contamination
Pre-Purchase Due Diligence
49 Beach Road, Batemans Bay

1. Introduction

This report presents the results of a preliminary site investigation for contamination (PSI) undertaken for a pre-purchase due diligence at 49 Beach Road, Batemans Bay. The investigation was commissioned by Aspen Group and was undertaken in accordance with Douglas Partners' proposal WOL170466 dated 25 August 2017.

The investigation concentrated on two areas within the overall address of 49 Beach Road, Batemans Bay: Area A, which comprises a variably 10 – 30 m wide area of reclaimed land adjacent to the northern boundary of the site; and Area B, which comprises a variably 42 – 48 m wide area along the southern site boundary. Combined these two areas are referred to herein as "the site", as shown on Drawing 1, Appendix B. It is understood that the intended use of the site is for ongoing tourism and recreational purposes with potential future residential development.

The aim of this PSI was to:

- assess the compatibility of the site, from a contamination perspective, for the tourism and recreational purposes with potential future residential development; and
- assess the contamination status of fill at the site and in so doing assess the site reuse potential and off-site disposal options.

The PSI was undertaken concurrently with a geotechnical investigation (DP Project 89333.00.R.002 dated 7 September 2017), the results of which are reported separately.

2. Scope of Works

The scope of work for the PSI compromised:

- Review of readily available site history information, comprising:
  - Current and historic titles and deposited plans;
  - Historical and current aerial photographs;
  - Public databases held under the *Contaminated Land Management Act* 1997 and the *Protection of the Environment Operations Act* 1997;
  - Records held in the SafeWork NSW Stored Chemical Information Database (SCID). The records held by SafeWork NSW may include current and historic licences to store Dangerous Goods; and
  - Readily accessible Council Records and the Section 149 (2&5) certificate.
- Review of site information, comprising:

- Published maps of acid sulphate soil (ASS) potential;
- Geological and topographical maps/drawings;
- Groundwater bores registered with the NSW Office of Water; and
- Relevant information provided by the client (e.g. previous reports, survey plans, design plans etc.).

- Conducting a site walkover to observe situations that indicate a potential for contamination and to identify environmental receptors;
- Excavation of 10 test pits, as requested by the client, to depths ranging between 2.0 m and 2.5 m below ground level (bgl).
- Collection of soil samples from each test pit including one soil jar and one 500mL asbestos sample bag from regular intervals;
- Screening of all surface soil and fill samples collected with a photo-ionisation detector (PID);
- Laboratory analysis of selected soil samples for a range of following common contaminants:
  - Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Total recoverable hydrocarbons (TRH) and benzene, toluene, ethylbenzene and xylene (BTEX);
  - Phenols;
  - Organochlorine pesticides (OCP) and organophosphorous pesticides (OPP),
  - Polychlorinated biphenyls (PCB); and
  - Asbestos
- Field sampling and laboratory analysis in compliance with standard environmental protocols, including a Quality Assurance/Quality Control (QA/QC) plan consisting of approximately 10% replicate sampling and appropriate Chain of Custody procedures and in–house laboratory QA/QC testing;
- The preparation of this report detailing the methodology and the findings of the PSI, commenting on the potential for contamination at the site; identifying observed areas of environmental concern and associated potential contaminants; providing comment on the compatibility of the site for its proposed usage; and recommendations for further assessment, if considered necessary.

3. Site Description and Regional Geology

The overall street address, which includes Lot 101 in Deposited Plan 850637 and Lot 12 in Deposited Plan 124295, is an irregular shaped area of approximately 6 ha with maximum north-south and east-west dimensions of 172 m and 524 m respectively (refer to Drawing 1, Appendix B). It is bounded to the north by the tidal flats at the southern end of the Batemans Bay Marina, to the east by the Hanging Rock Boat Ramp, to the south by low-density residential dwellings and to the west by Hanging Rock Creek, which enters the tidal flats at the southern end of the Batemans Bay Marina to the northwest of the site. The investigation concentrated on two areas within the overall address: Area A, which comprises a variably 10 – 30 m wide area of reclaimed land adjacent to the northern boundary of the

site; and Area B, which comprises a variably 42 – 48 m wide area along the southern site boundary. Combined these two areas are referred to herein as "the site", as shown on Drawing 1, Appendix B.

The site is relatively flat with the difference in elevation estimated to be less than 1 m across much of the site. A concrete block retaining wall located along the northern boundary of the site is up to about 1.0 m high. A perennial watercourse, oriented approximately north-south, is located through the central part of Area B. Drawings provided indicate that the watercourse is piped beneath Area A and outlets into the tidal flats to the north of the site.

At the time of the investigation, Area A was lightly grassed. The retaining wall along the northern boundary of Area A was leaning downslope, towards the tidal flats below. Concrete blocks had been placed against the wall in a few places to buttress it. In other places a gap was observed between the concrete block wall and the dredged filling behind the wall. Likewise, Area B was lightly grassed with rows of trees along much of the boundary and around site improvements. Site improvements in Area B comprised asphalt car parking and access ways in the western and central areas, a playground, volley ball and tennis courts, and maintenance sheds in the central-western area. The eastern part of Area B comprised a grassed field.

The site is mapped on the NSW South Coast Comprehensive Assessment (SCCA) Quaternary Geology Sheet (Ref 2), which indicates that Area A is underlain by estuarine sediments of a tidal delta, and that Area B is underlain by marine sands associated with beach ridge and associated strand of a coastal barrier. The tidal delta typically comprises fine to medium quartzose sand, clayey and/or silty sand, sandy silt, sandy silty clay with variable shell content. The coastal barrier typically comprises fine to medium quartzose sand with variable shell content and minor gravel. The results of the subsurface investigation confirmed the regional mapping with increased proportions of fines within the sandy substrate underlying Area A and a lack of fines within the substrate underlying Area B.

Reference to the 1:25 000 acid sulfate soil risk mapping (Ref 3), indicates that the site is located in an area generally not expected to contain acid sulfate soil (ASS) material, although highly localised occurrences may occur near boundaries.

4. Site History

4.1 Title Deeds

A title deeds search was conducted by Scott Ashwood Pty Ltd, Settlement Agents and Legal Searchers. Title information can assist in the identification of previous land uses through the recorded occupation of individual land owners, or by a descriptive company name and may establish potentially contaminating activities which have occurred or are occurring at the sites.

A summary of the results of the sites historical title deeds search is shown in Table 1 with the full results of the searches provided in Appendix C.

Table 1: Summary of Title Deeds Search for the site

Date Range	Owner and Occupation where available	Inferred Land Use
1921 to 1955	Wilfred Percy Bill (Freeholder)	Vacant Land
1955 to 1977	Australian Securities Pty Limited Then Australian Subdivisions Pty Limited Then Hooker-Rex Co Limited Now Hooker-Rex Pty Limited	Vacant Land / Residential
1977 to 1978	Courtyard Apartments Pty Limited	Residential
1978 to date	# Birss Nominees Pty Limited	Residential

Note: In establishing the inferred use of the sites, information has also been drawn from other sources, see below.

4.2 Historical Aerial Photography

Aerial photographs were examined to identify any changes to the landscape which may include potentially contaminating land activities or significant environmental features. Seven aerial photographs were examined from the years 1949, 1964, 1969, 1979, 1989, 2002 and 2012. Copies are included in Appendix C. A summary of the findings is given below.

1949: The site appears to be vacant apart from Beach Road running north south located just west from the site boundary. Sparse vegetation is visible in the south-western portion of the site. The marina break wall is located north east from the site running in a north west / south east direction and a road (Beach Road) is visible to the west of the site.

1964: The site appears relatively unchanged from the previous aerial photograph with the exception of a minor track through the central portion of the site (potentially a pedestrian access track to the beach). Some residential development is visible to the west of the site and additional roads are visible to the south of the site.

1969: The site appears relatively unchanged from the previous aerial. Additional residential development is evident to the south and west of the site.

1979: Substantial development appears to have occurred across the site, mainly in the northern portion, with numerous structures and roads visible. Additional residential development is evident to the south and west of the site.

1989: Further development is visible within the site with the majority of the site now developed. A tennis court appears to have been constructed towards the centre of the southern site boundary. The land to the south east of the site appears disturbed and levelled,

2002: The site appears relatively unchanged from the previous aerial photograph. Some of the structures within the site boundary appear different from the previous aerial photography. A paved car park area is visible to the south east of the site in the land that appeared disturbed and levelled in the 1989 aerial.

2012: The site and surrounding land appear relatively unchanged from the previous aerial photograph.

4.3 NSW EPA Public Registers

A search undertaken on 31 August 2017 for current Statutory Notices issued under the *Contaminated Land Management Act* 1997 and *Protection of the Environment Operations Act* 1997, available on the NSW EPA website showed that there were no notices or licenses issued for the site.

4.4 SafeWork NSW Search

A search of the SafeWork NSW Stored Chemical Information Database (SCID) was intended to be undertaken. However, authorisation to undertake the search was not provided by the client's agent and as such a SafeWork NSW search was not conducted for the site. Given the previously undeveloped nature of the site it is considered unlikely that the storage of dangerous goods would have occurred at the site.

4.5 Council Records

A search of Eurobodalla Shire Council (Council) records for the site was conducted by Council staff with the results provided electronically on the 30 August 2017. The following summarises the files provided by Council:

- Building Application 750/77 for brick toilet block – Approved 23 May 1978
- Building Application 750/78 for brick additions to dwelling – Approved 25 October 1978
- Building Application 630/82 for brick dwelling, garage and office – Approved 8 September 1982
- Development Application 6440/87 for land use – use of existing kitchen as a kiosk – Approved 14 November 1987
- Development Application 6507/87 for a swimming pool – Approved 26 November 1987
- Building Application 407/97 for amenities block and swimming pool – Approved 27 November 1996
- Development Application 291/96 for landfill – Approved 6 May 1997
- Building Application 327/98 got commercial building additions and alteration – Approved 19 November 1997
- Development Application 147/97 for change of use of kiosk to restaurant – Approved 14 July 1997
- Development Application 152/01 for restaurant additions was approved 13 November 2000
- Development Application 1239/03 for alterations to function room – Approved 7 August 2003
- Modification M1239/03 for additions and alterations to function room – Approved 27 October 2003
- Development Application 125/11 for a boundary adjustment - Approved 14 April 2011

- Complying Development Certificate 9002/07 for subdivision of land (land dedication) – Issued 11 August 2006

4.6 Section 149 (2&5) Certificates

The Section 149 Planning Certificate for the site was requested form the client agent. However, a Section 149 Planning Certificate was not provided. Given the previously undeveloped nature of the site it is considered unlikely that the Section 149 certificate would have included information relevant to this investigation.

5. Site Walkover

A site walkover was undertaken by DP personnel on 24 August 2017. Site photographs taken during the site walkover are provided in Appendix E. The following main site features were noted:

- The northern portion of the site was primarily vacant and grass covered with the exception of a minor brick structure (refer to Photographs 1 and 2, Appendix E);
- A fragment of fibrous cement was observed on the site surface near to the location of Pit 1 (refer to Photograph 3, Appendix E);
- Evidence of filling having occurred was observed with a retaining wall present on the northern boundary of the site with the bay (refer to Photograph 2, Appendix E);
- The southern portion of the site comprised numerous minor structures and facilities (including shelters, a tennis court, a volleyball court and a playground) associated with the site's use as a resort (refer to Photographs 4 to 6, Appendix E); and
- A concrete drain was observed running in a north-south direction through the central portion of the site (refer to Photograph 7, Appendix E).

6. Preliminary Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e. it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

6.1 Potential Contamination Sources and Contaminants of Concern

Based on the findings of the site history investigation and site walkover it is considered that the site has a low risk for significant widespread contamination to exist. However, it is also considered that localised contamination may potentially be present at the site through the filling of areas, with material of unknown origin and from the former agricultural usage (grazing or agistment) of the site.

Based on the findings of the site history and site walkover, the potential sources (S) of contamination comprise:

- S1 - Potential filling from unknown source.
- S2 - Anthropogenic items observed at surface.
- S3 - Hazardous building materials associated with former site structures

Common contaminants of concern associated to the above identified potential sources include heavy metals, TRH, BTEX, PAH, PCB, OCP, OPP, phenols and asbestos.

6.2 Potential Receptors

Receptors (R) that potentially could be influenced by the potential contaminants at this site include:

Human health receptors:

- R1 - Construction workers during the development.
- R2 - End users (residential, visitors and recreational users of public open space).
- R3 - Adjacent users (residential).

Environmental receptors:

- R4 - Groundwater.
- R5 - Surface Water (Hanging rock creek and into the Batemans bay marina).
- R6 – Flora and Fauna.

6.3 Potential Pathways

Potential pathways (P) for contaminants to come into contact with identified receptors, with consideration to the site's proposed end use, current condition, and geological, topographical and hydrogeological characteristics, include:

- P1 - Direct contact with soil (ingestion and dermal).
- P2 - Inhalation of dust and/or vapours.
- P3 - Leaching of contaminants and vertical migration into groundwater.
- P4 - Surface water run-off from hardstand areas during heavy rainfall.
- P5 - Lateral migration of groundwater providing base flow to watercourses.
- P6 - Direct contact of contaminated ground with ecological receptors.

6.4 Summary of Preliminary CSM

A 'source–pathway–receptor' approach has been used to assess the potential risks to human and environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways.

The possible pathways between the sources and receptors are provided in Table 2.

Table 2: Potential Complete Pathways

Source	Transport Pathway	Receptor	Action Recommended	Screening Criteria
S1 - Potential filling from unknown source. S2 - Anthropogenic items observed at surface. S3 - Hazardous building materials associated with former site structures	P1 - Ingestion and dermal contact P2 - Inhalation of dust / vapours	R1 - Current Users (Residential) R2 – Construction and Maintenance Workers R3 - End users (Residential)	An intrusive investigation is required to assess possible contamination including chemical testing of the soils.	Soil site assessment criteria (SAC) as discussed in Section 8
	P2 - Inhalation of dust / vapours	R4 - Adjacent users (Residential)		
	P5 - Leaching of contaminants	R6 – Groundwater	An intrusive investigation is required to assess possible contamination initially including chemical testing of the soils.	Soil SAC as an indicator of potential groundwater issues
	P3 - Surface water run-off P4 - Lateral migration of groundwater	R5 - Surface water	Nearest surface water body is Batemans Bay to the north and east of the site.	Soil SAC as an indicator of potential surface water issues
	P6 - Contact with terrestrial ecology	R7 - Terrestrial ecology	An intrusive investigation is required to assess possible contamination including chemical testing of the soils.	Soil SAC as discussed in Section 8

7. Sampling and Analysis Plan

7.1 Sample Location, Density and Pattern

Based on the preliminary nature of the investigation, and in order to address the objectives of this PSI, it was considered that a limited sampling plan was appropriate to provide comment on the compatibility of the site (from a contamination perspective) for the proposed land use.

The sampling was conducted with reference to Schedule B2 Guideline on Site Characterisation of the National Environment Protection Council's *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013 (NEPC, 2013).

Sampling for contaminated land investigation purposes was undertaken from the ten soil sample locations (Pits 1 - 10) undertaken during the concurrent DP geotechnical investigation (DP project 89333.00, reported separately). The 10 sampling locations were requested by the client, and placed in a general grid-based pattern across the site. Test pits were used to maximise visual inspection of subsurface profile and soil contamination sampling of any fill and *in situ* natural material. The sampling locations for this PSI are shown on Drawing 1, Appendix B.

7.2 Sample Depths

Soil samples were collected for soil logging and laboratory analysis from near surface, at signs of potential contamination (including filling) and the shallowest natural stratum encountered. From the 10 geotechnical investigation test pits a total of 48 soil samples were obtained, representing four to five samples per test pit. Replicate samples were analysed at a rate of 10% of the total number of primary samples, for QC purposes. Sample depths ranged from 0.1 m to 2.5 m bgl.

The test pit logs detailing all of the samples collected are provided in Appendix F.

7.3 Sample Procedure

Environmental sampling was conducted with reference to standard operating procedures described in the DP *Field Procedures Manual* which included:

- The use of disposable gloves for the collection of soil samples from freshly excavated soils. The gloves were replaced between each sample;
- Labelling of the sample containers with individual and unique identification including Project No., Sample I.D. and depth;
- Placement of the containers into a chilled, enclosed and secure container for transport to the laboratory;
- Use of chain-of-custody documentation so that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to hand-over to the laboratory; and
- Collection of approximately 10% replicate samples for QA/QC purposes.

7.4 Analytical Rationale

Fifteen primary soil samples and two intra-laboratory replicate sample obtained from filling and surface soils were submitted to a NATA accredited laboratory (Envirolab Services Pty Ltd) for analysis of contaminants of concern, which were chosen based on the potential for contamination identified in the preliminary CSM for the site (as discussed in Section 6). The filling samples were selected based on the type and depth of the ground conditions encountered.

8. Site Assessment Criteria

Based on the information provided by the client, it is understood that the proposed development at the site will be for tourism / recreational purposes with potential future residential development. Therefore, a residential land use with accessible soils has been assumed for the selection of appropriate criteria.

The Site Assessment Criteria (SAC) applied in the current investigation are informed by the CSM which identified human and ecological receptors to potential contamination on the site (refer to Section 6). Analytical results were assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013). NEPC (2013) is endorsed by the NSW EPA under the CLM Act 1997. Petroleum based health screening levels for

direct contact have been adopted from the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) *Technical Report no.10 Health screening levels for petroleum hydrocarbons in soil and groundwater* (2011) as referenced by NEPC (2013).

8.1 Health Investigation and Screening Levels

The generic Health Investigation Levels (HIL) and Health Screening Levels (HSL) for a residential land use with accessible soils are considered to be appropriate for the assessment of contamination at the site given the site current and potential future land use. The adopted soil HIL and HSL for the potential contaminants of concern are presented in Table 3.

Table 3: HIL and HSL in mg/kg unless otherwise indicated

Contaminants		HIL - A and HSL - A Direct Contact	HSL - A Vapour Intrusion[4]
Metals	Arsenic	100	-
	Cadmium	20	-
	Chromium (VI)	100	-
	Copper	6000	-
	Lead	300	-
	Manganese	3000	-
	Mercury (inorganic)	40	-
	Nickel	400	-
	Zinc	7400	-
PAH	Benzo(a)pyrene TEQ[1]	3	-
	Naphthalene	1400	3
	Total PAH	300	-
TRH	$C_6 - C_{10}$ (less BTEX) [F1]	4400	45
	$>C_{10}-C_{16}$ (less Naphthalene) [F2]	3300	110
	$>C_{16}-C_{34}$ [F3]	4500	-
	$>C_{34}-C_{40}$ [F4]	6300	-
BTEX	Benzene	100	0.5
	Toluene	14000	160
	Ethylbenzene	4500	55
	Xylenes	12000	40
Phenol	Pentachlorophenol (used as an initial screen)	100	-
OCP	Aldrin + Dieldrin	6	-
	Chlordane	50	-
	DDT+DDE+DDD	240	-
	Endosulfan	270	-
	Endrin	10	-
	Heptachlor	6	-
	HCB	10	-
	Methoxychlor	300	-
OPP	Chlorpyrifos	160	-
PCB [2]		1	-

1. sum of carcinogenic PAH
2. non dioxin-like PCBs only.
3. The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.
4. The vapour intrusion HSL have been calculated for a sand based on sandy soils encountered (Section 9.1) and an assumed depth to contamination 0 m to <1 m.

8.2 Ecological Investigation Levels

Ecological Investigation Levels (EIL) and Added Contaminant Limits (ACLs), where appropriate, have been derived in NEPC (2013) for only a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn.

The adopted EIL, were derived using the *Interactive (Excel) Calculation Spreadsheet* (NEPC website http://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox#hils) are shown in the following Table 4. The Calculation Spreadsheet is included in Appendix I.

Table 4: EIL in mg/kg

Analyte		EIL	Comments
Metals	Arsenic	100	Adopted parameters pH = 8.7 (range 7.2 to 9.7); CEC = 0 $cmol_c/kg$ (range 3.2 to 14 $cmol_c/kg$); assumed clay content = 0%; "Aged" (>2 years) source of contamination low for traffic volumes in NSW
	Copper	20	
	Nickel	5	
	Chromium III	8	
	Lead	1100	
	Zinc	75	
PAH	Naphthalene	170	
OCP	DDT	180	

8.3 Ecological Screening Levels

Ecological Screening Levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The ESL adopted are shown in the following Table 5.

Table 5: ESL in mg/kg

Analyte		ESL	Comments
TRH	C6 – C10 (less BTEX) [F1]	180*	All ESLs are low reliability apart from those marked with * which are moderate reliability
	>C10-C16 (less Naphthalene) [F2]	120*	
	>C16-C34 [F3]	1300	
	>C34-C40 [F4]	5600	
BTEX	Benzene	65	
	Toluene	105	
	Ethylbenzene	125	
	Xylenes	45	
PAH	Benzo(a)pyrene	0.7	

1. The ESL have been calculated for a fine soil based on the findings that silty clay is the predominant soil type (Section 9.1) and urban residential and public open space

8.4 Management Limits

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

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

The management limits adopted from Schedule B1 of NEPC (2013) are shown in the following Table 6.

Table 6: Management Limits in mg/kg

Analyte		Management Limit	
TRH	C6 – C10 (F1) #	700	The management limits have been calculated for a coarse soil based on sand being the predominant soil type (Section 10.1) and residential, parkland and public open space
	>C10-C16 (F2) #	1000	
	>C16-C34 (F3)	2500	
	>C34-C40 (F4)	10000	

Separate management limits for BTEX and naphthalene are not available hence these have not been subtracted from the relevant fractions to obtain F1 and F2

8.5 Asbestos in Soil

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through substantial physical damage. Bonded Asbestos-Containing Materials (ACM) in sound condition represents a low human health risk, whilst both Fibrous Asbestos (FA) and Asbestos Fines (AF) materials have the potential to generate, or be associated with, free asbestos fibres. Consequently, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.
A detailed asbestos assessment was not undertaken as part of these works as asbestos was not identified as a contaminant of concern at the time of writing the proposal for the PSI. Therefore the presence or absence of asbestos in soil was limited to one 500mL asbestos sample bag collected at regular intervals.

One potential asbestos fragment was identified, which was submitted to a NATA accredited lab for identification.

9. Results

9.1 Field Work Methodology

The investigation comprised the excavation of ten test pit (Pits 1 – 10) excavated to depths ranging from 1.6 – 2.5 m bgl with a Kubota U35-3 hydraulic excavator variably fitted with bladed and toothed buckets 300 mm wide. Supervision, logging and sampling of 'disturbed' samples to assist strata identification and for laboratory testing was carried out by a geotechnical engineer. Dynamic penetrometer tests using a sand penetrometer (AS 1289 6.3.3) were undertaken at the pit locations.

The test locations are shown on Drawing 1 in Appendix B. The surface levels to Australian Height Datum (AHD) and coordinates to Map Grid of Australia (MGA Zone 56) shown on the test pit logs were determined using a differential GPS unit, for which an accuracy of ± 20cm.

9.2 Field Work Observations

Details of the subsurface conditions encountered during the field investigation are given on the logs in Appendix F, which should be read in conjunction with the notes defining classification methods and descriptive terms in Appendix A.

The subsurface testing encountered variable conditions underlying the site, with the succession of strata and groundwater for Areas A and B summarised below.

Area A: Summary of Subsurface Conditions (Pits 1 – 4)

Topsoil Filling:	Fine to medium-grained sand with some anthropogenic material to depths in the range 0.1 – 0.4 m;
Filling: (Dredge Fill)	Fine to medium-grained sand to depths ranging from 1.2- 1.9 m;
Estuarine Sediment:	Silty sand and fine to medium-grained sand of typically loose to medium dense consistency above the watertable, becoming loose below the watertable, to termination depths in the range of 2.1 – 2.5 m.

Free groundwater was encountered at depths in the range of 1.8 – 2.4 m (RL -0.1 to RL 0.2) in Area A.

Area B: Summary of Subsurface Conditions (Pits 5 – 10)

Filling:	Variable composition and relative density including sand, silty sand, sandy clayey gravel, silty clay, silty gravelly clay, topsoil and building rubble to depths in the range of 0.3 – 1.2 m;
Littoral (Beach) Sand:	Fine to medium-grained sand with variable shell content, of initially medium dense consistency grading to loose consistency below the watertable, to termination depths in the range of 1.6 – 2.4 m.

Free groundwater was encountered at depths in the range of 1.1 – 2.1 m (RL -0.1 to RL 0.3) in Area B.

It is noted that excavations were immediately backfilled following logging and sampling which precluded longer term monitoring of groundwater levels. Groundwater levels are transient and will vary over time due to soil permeability, tidal cycles and preceding climatic conditions.

Nine of the ten test pit excavations collapsed shortly after groundwater was encountered.

Anthropogenic materials (brick, concrete, plastic) were encountered in Pit 1, Pit 3 and Pit 5. A fragment of fibrous cement was observed on the surface of the site near Pit 1 and was collected for laboratory analysis for the presence or absence of asbestos.

9.3 Analytical Results

All reported chemical analytical results for TRH C_6-C_9, TRH C_{10}-C_{16}, TRH C_{34}-C_{40}, BTEX, OCP, OPP and PCB were less than the laboratory's practical quantitation limit (PQL) for each of these potential contaminants.

Concentrations of arsenic, cadmium, chromium (total), copper, lead, mercury, nickel and zinc, TRH C_{16}-C_{34} (Pit 1 at a depth of 0.1 m only) and PAH (Pit 4 at a depth of 0.1 m only) were reported above the laboratory's PQL, but below the adopted SAC.

Bonded chrysotile and amosite ACM was identified in the surface fragment sampled.

No ACM, FA or AF were detected in any of the soil samples analysed.

The soil laboratory test results are summarised in Table H1, Appendix H along with the adopted SAC.

The laboratory certificates of analysis, chain-of-custody documentation and sample receipt are included in Appendix I.

In order to confirm the quality of the assessment data, the seven-step data quality objective process has been completed in accordance with Appendix B, Schedule B2 of NEPC (2013). The full DQO are included in the Data Quality Assessment included in Appendix J.

The QA/QC assessment is also included in the Data Quality Assessment provided in Appendix J. The results of the QA/QC assessment indicate that there are no issues precluding the use of the analytical results in the assessment.

9.4 Preliminary Waste Classification

A preliminary waste classification has been undertaken for the encountered soils using the results attained as part of the PSI.

NSW EPA *Waste Classification* Guidelines, 2014 (EPA, 2014) contain a six step procedure for determining the type of waste and the waste classification. Part of the procedure, for materials not classified as special waste or pre-classified waste, is a comparison of analytical data initially against contaminant threshold (CT) values specific to a waste category. Alternatively, the data can be assessed against specific contaminant concentration (SCC) thresholds when used in conjunction with toxicity characteristic leaching procedure (TCLP) thresholds.

The POEO Act defines virgin excavated natural material (VENM) as:

'natural material (such as clay, gravel, sand, soil or rock fines):

(a) that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities and

(b) that does not contain any sulfidic ores or soils or any other waste

and includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved for the time being pursuant to an EPA Gazettal notice.'

Virgin excavated natural material (VENM) is a waste that has been pre-classified as general solid waste (non-putrescible).

Additional advice is provided on the EPA web site [http://www.epa.nsw.gov.au/waste/virgin-material.htm] entitled 'Virgin Excavated Natural Material'. This advice states:

- Generators of VENM must assess the past and present activities on the site. The possibility that a previous land use has caused contamination of a site must be considered when assessing whether an excavated material is VENM. Land uses that could result in contaminants being present in an excavated material are listed on the web site. The list is not exhaustive and an excavated material may still be contaminated even where none of these activities have previously occurred on a site. Activities not directly related to a site may also lead to contamination, including diffuse sources of pollution such as contaminated groundwater that migrates under a site, or dust settling out from industrial emissions. Generators of VENM must consider these factors.
- Generators of excavated material should review the applicable Acid Sulfate Soil Risk Maps to determine the probability of acid sulfate soils being present at the site at which VENM excavation is proposed. The waste cannot be classified as VENM if the Acid Sulfate Soil Risk Maps identify a high probability of occurrence of acid sulfate soils or potential acid sulfate soils, unless it has undergone chemical assessment in accordance with the Acid Sulfate Soils Assessment Guidelines and the updated Acid Sulfate Soils Laboratory Method Guidelines Version 2.1 - June 2004.
- By definition, VENM cannot contain any other waste, or be 'made' from processed soils. Excavated material that has been processed in any way cannot be classified as VENM.
- Classification of excavated material as VENM requires certainty that all aspects of the definition are met. Chemical testing may be required to ascertain whether an excavated material is contaminated with manufactured chemicals or process residues, or whether it contains sulfidic ores or soils.

As a means of assessing the presence of manufactured chemicals or process residues, the analytical data for samples of natural soils were compared against published background concentrations, as shown in the attached Table 4.

The following Table 7 presents the results of the six step procedure outlined in EPA (2014) for determining the type of waste and the waste classification. This process applies to the filling (including topsoil) at the site, which do not meet the definition of VENM.

Table 7: Six Step Classification Procedure

Step	Comments	Rationale
1. Is the waste special waste?	**Potentially**	**Asbestos-containing materials (ACM) was observed on the site surface.** **Indicators of potential further ACM (i.e. anthropogenic items) were observed in the subsurface filling.**
2. Is the waste liquid waste?	No	The filling comprised a soil matrix.
3. Is the waste "pre-classified"?	No	The filling material is not pre-classified with reference to EPA (2014).
4. Does the waste possess hazardous waste characteristics?	No	The filling was not observed to contain or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances, corrosive substances, coal tar, batteries, lead paint or dangerous goods containers.
5. Determining a wastes classification using chemical assessment	Conducted	Refer to Table J1, Appendix J.
6. Is the waste putrescible or non-putrescible?	No	The filling does not contain materials considered to be putrescible [a].

NOTE: a wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forest and crop materials, and natural fibrous organic and vegetative materials (EPA, 2014).

As shown on Table H1, Appendix H, all contaminant concentrations for the analysed samples were within the contaminant thresholds (CT1s), for General Solid Waste (GSW).

It is considered that further assessment of the potential for asbestos to be present is required. Subject to the results of further investigation the filling material described in Section 9.2 may be classifiable as General Solid Waste (non-putrescible).

The following Table 8 presents the results of the assessment of natural soils at the site with reference to the VENM definition and EPA advice.

Table 8: VENM Classification Procedure

Item	Comments	Rationale
1. Is the material natural?	Yes	Natural materials logged in the test pits as described in Section 9.2. These materials underlie the filling at the site.
2. Is the material impacted by manufactured chemicals or process residues?	No	There were no visual indicators of chemical contamination of the materials in the test bores. Contaminant concentrations were within typical background levels (Table H1).
3. Are the materials acid sulphate soils?	No	DP's geotechnical investigation included a preliminary acid sulfate soils assessment and did not identify any acid sulfate soils.
4. Are there current or previous land uses that have (or may have) contaminated the materials?	No	Previous land uses may have impacted on surface soils overlying the materials (potential imported filling). Low chemical concentrations indicate no likely impact on the natural materials.

As shown in the attached Table H1, all contaminant concentrations for the analysed soil samples were within the typical background concentrations. Based on the outcomes presented in Table 8, the natural soils described in Section 9.2 are preliminarily classified as **VENM**.

Given the preliminary nature of the assigned waste classification, which was based on limited sampling, it is recommended that the waste classification be confirmed by a qualified environmental consultant *ex situ* prior to and during bulk excavation.

Part 5.6, Section 143 of The Protection of the Environment Operations Act 1997 states that it is an offence for waste to be transported to a place that cannot lawfully be used as a facility to accept that waste. It is the duty of the owner and transporter of the waste to ensure that the waste is disposed of appropriately. DP does not accept liability for the unlawful disposal of waste materials from any site. DP accepts no responsibility for the material tracking, loading, management, transport or disposal of waste from the site. Before disposal of the material to a licensed landfill is undertaken, the waste producer will be required to obtain prior consent from the landfill.

10. Conclusion and Recommendations

Based on the findings of the PSI it is considered that there is a low likelihood of substantial widespread contamination at the site. There is, however, potential for asbestos contamination to exist at the site given that ACM was observed on the site surface and anthropogenic items (brick, concrete, plastic) were encountered in the subsurface filling at some of the test pit locations.

It is recommended that a detailed site investigation for asbestos (in accordance with NEPC, 2013) be undertaken in areas of elevated risk to assess the potential for asbestos contamination to exist at the site. The detailed site investigation would target areas of the site where anthropogenic materials were observed in the subsurface filling, and will include a sampling grid for asbestos across the remainder of the site in line with the recommendations of NEPC (2013).

Subject to the findings of the detailed site investigation the fill material observed may be compatible with onsite reuse from the contaminated land perspective.

The site in general is considered to be compatible with the proposed land uses, however may require some form of management where elevated asbestos concentrations are found through the abovementioned investigation.

11. References

1. Standard Australia Limited (2011) AS 2870 – 2011 Residential Slabs and Footings, SAI Global Limited, Sydney, Australia.
2. Troedson A, Hashimoto R, Jaworska J, Malloch K, Cain L (2004) *New South Wales Coastal Quaternary Geology – Digital Dataset*, New South Wales Department of Primary Industries - Mineral Resources.
3. NSW DECC (2008) *1:25 000 Acid Sulfate Soils Risk Mapping Digital Dataset*, New South Wales Department of Environment and Climate Change.

12. Limitations

Douglas Partners (DP) has prepared this report for this project at 49 Beach Road, Batemans Bay in accordance with DP's proposal dated 25 August 2017 and acceptance received from Mr Joss Engelbretsen from Aspen Group dated 25 August 2017. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Aspen Group for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations

or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the (geotechnical / environmental / groundwater) components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

About this Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Sampling Methods

Douglas Partners

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

Douglas Partners

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Rock Strength

Rock strength is defined by the Point Load Strength Index ($Is_{(50)}$) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 2007. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index $Is_{(50)}$ MPa	Approximate Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	M	0.3 - 1.0	6 - 20
High	H	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EH	>10	>200

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
Moderately weathered	MW	Staining and discolouration of rock substance has taken place
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects
Fresh	Fr	No signs of decomposition or staining

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and longer sections
Unbroken	Core lengths mostly > 1000 mm

Rock Descriptions

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Douglas Partners

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

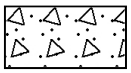
Symbols & Abbreviations

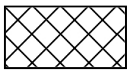
Graphic Symbols for Soil and Rock

General

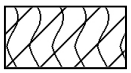

Asphalt

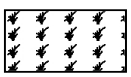

Road base

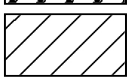

Concrete


Filling

Soils


Topsoil

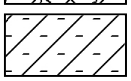

Peat


Clay


Silty clay

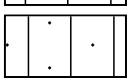

Sandy clay

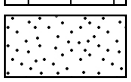

Gravelly clay

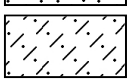

Shaly clay

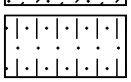

Silt


Clayey silt


Sandy silt

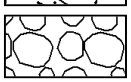

Sand


Clayey sand


Silty sand


Gravel

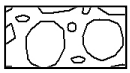

Sandy gravel


Cobbles, boulders

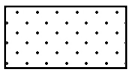

Talus

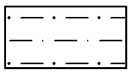
Sedimentary Rocks

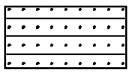

Boulder conglomerate

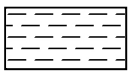

Conglomerate


Conglomeratic sandstone

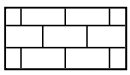

Sandstone


Siltstone

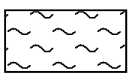

Laminite

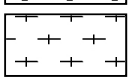

Mudstone, claystone, shale

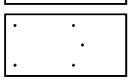

Coal


Limestone

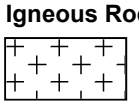
Metamorphic Rocks

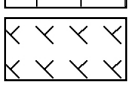

Slate, phyllite, schist

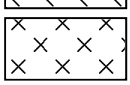

Gneiss

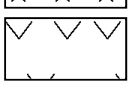

Quartzite

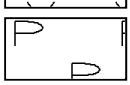
Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Appendix B

Drawing 1

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aspen Group		
OFFICE: Wollongong	DRAWN BY: GRR	
SCALE: 1:2,000 @ A3	DATE: 1.09.2017	

TITLE: **Test Locations**
Pre-Purchase Due Diligence
49 Beach Road, Batemans Bay

MGA

PROJECT No:	89333.00
DRAWING No:	1
REVISION:	A

Appendix C

Historical Title Deed Search

scottASHWOOD PTY.LTD
An InfoTrack Company

ABN: 42 166 543 255
Ph: 02 9099 7400
Fax: 02 9232 7141
(Ph: 0412 199 304)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

Summary of Owners Report

LPI **Sydney**

Address: - Batemans Bay Coachhouse Marina Resort, Batemans Bay

Description: - Lot 12 D.P. 124295 and Lot 101 D.P. 850637

As regards Lot 12 D.P. 124295

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
01.12.1921 (1921 to 1955)	Wilfred Percy Bill (Freeholder)	Book 1244 No. 687 Now Vol 5873 Fol 139
11.04.1955 (1955 to 1977)	Australian Securities Pty Limited Then Australian Subdivisions Pty Limited Then Hooker-Rex Co Limited Now Hooker-Rex Pty Limited	Vol 5873 Fol 139 Now Vol 13147 Fol 209
07.10.1977 (1977 to 1978)	Courtyard Apartments Pty Limited	Vol 13147 Fol 209
05.04.1978 (1978 to date)	# Birss Nominees Pty Limited	Vol 13147 Fol 209 Now 12/124295

# Denotes Current Registered Proprietor

Easements: - NIL

Leases: -

- 02.09.1929 to William Henry Robb (Butcher) – term of 5 years from 01.07.1929

scottASHWOOD PTY.LTD
An InfoTrack Company

ABN: 42 166 543 255
Ph: 02 9099 7400
Fax: 02 9232 7141
(Ph: 0412 199 304)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

As regards Lot 101 D.P. 850637

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
01.12.1921 (1921 to 1955)	Wilfred Percy Bill (Freeholder)	Book 1244 No. 687 Now Vol 5873 Fol 139
11.04.1955 (1955 to 1969)	Australian Securities Pty Limited Then Australian Subdivisions Pty Limited Then Hooker-Rex Co Limited Now Hooker-Rex Pty Limited	Vol 5873 Fol 139 Now 9525 Fol 184
10.08.1969 (1969 to 1992)	Minister for Public Works	9525 Fol 184 Now 1/202853
23.06.1992 (1992 to 1996)	Maritime Services Board of NSW Now Marine Ministerial Holding Corporation	1/202853 Now 101/850637
25.07.1996 (1996 to date)	# Birss Nominees Pty Limited	101/850637

# Denotes Current Registered Proprietor

Leases: -

- 02.09.1929 to William Henry Robb (Butcher) – term of 5 years from 01.07.1929

Easements: -

- 02.06.1966 (K 760073) Easement to Drain Water 3.05 wide
- 10.08.1967 (K 882121) Rights of Carriageway 20.115 & 29.53 wide
- 10.10.1995 (D.P. 265674) Easement to Drain Water 3.5 wide
- 10.10.1995 (D.P. 265674) Easement for Support variable width
- 10.10.1995 (D.P. 265674) Easement for Sewerage purposes 5 wide, 3 wide and variable width
- 10.10.1995 (D.P. 265674) Easement to Drain Water 10 wide

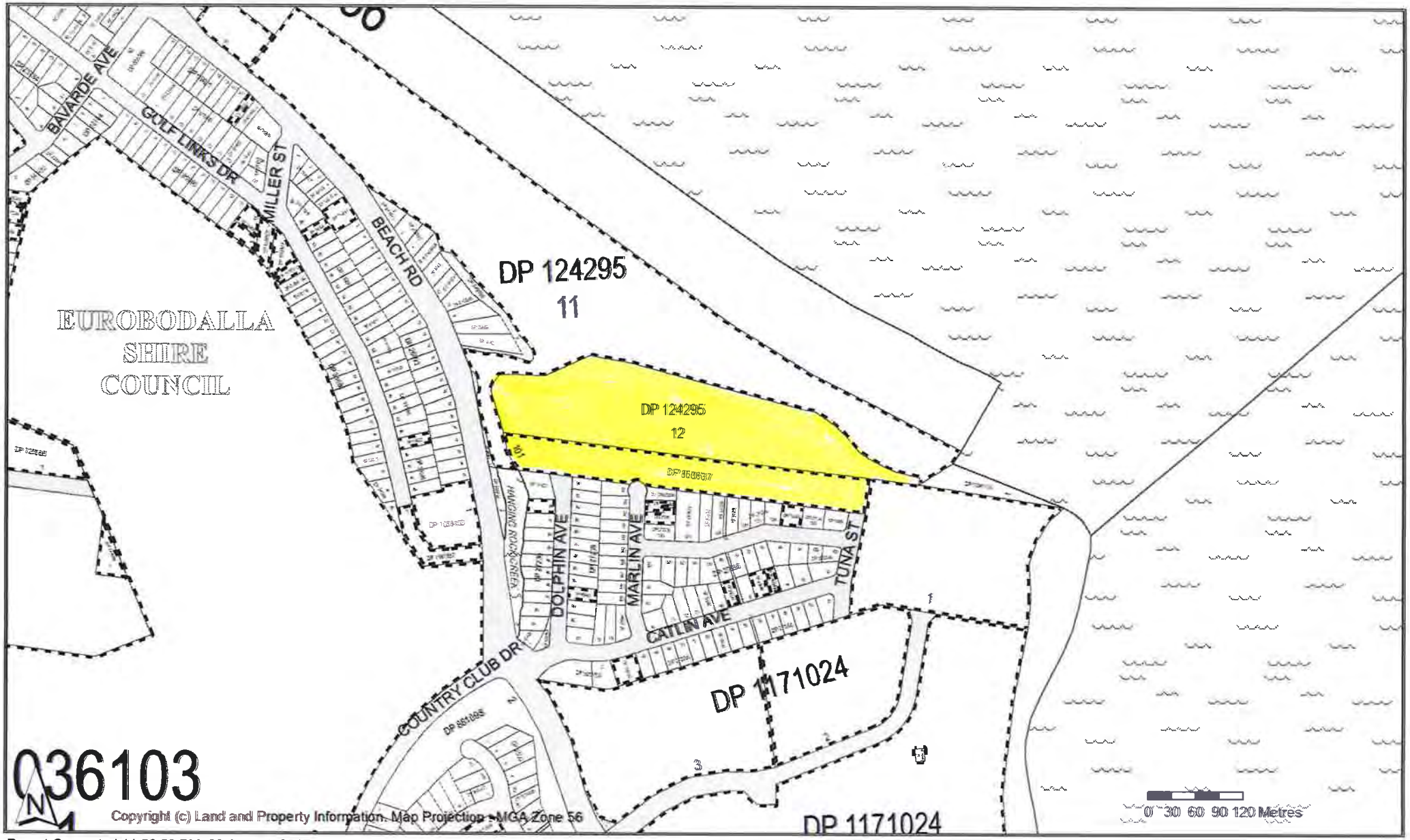
Yours Sincerely
Mark Groll
30 August 2017

Land & Property Information

Cadastral Records Enquiry Report

Requested Parcel : Lot 12 DP 124295 **Identified Parcel :** Lot 12 DP 124295

Locality : BATEMANS BAY **LGA :** EUROBODALLA **Parish :** BATEMAN **County :** ST VINCENT



Report Generated 11:56:50 PM, 29 August, 2017

This information is provided as a searching aid only. While every endeavour is made to ensure the current cadastral pattern is accurately reflected, the Registrar General cannot guarantee the information provided. For all ACTIVITY PRIOR to SEPT 2002 you must refer to the RGs Charting and Reference Maps.

PLAN FORM 2

Plan Drawing only to appear in this space

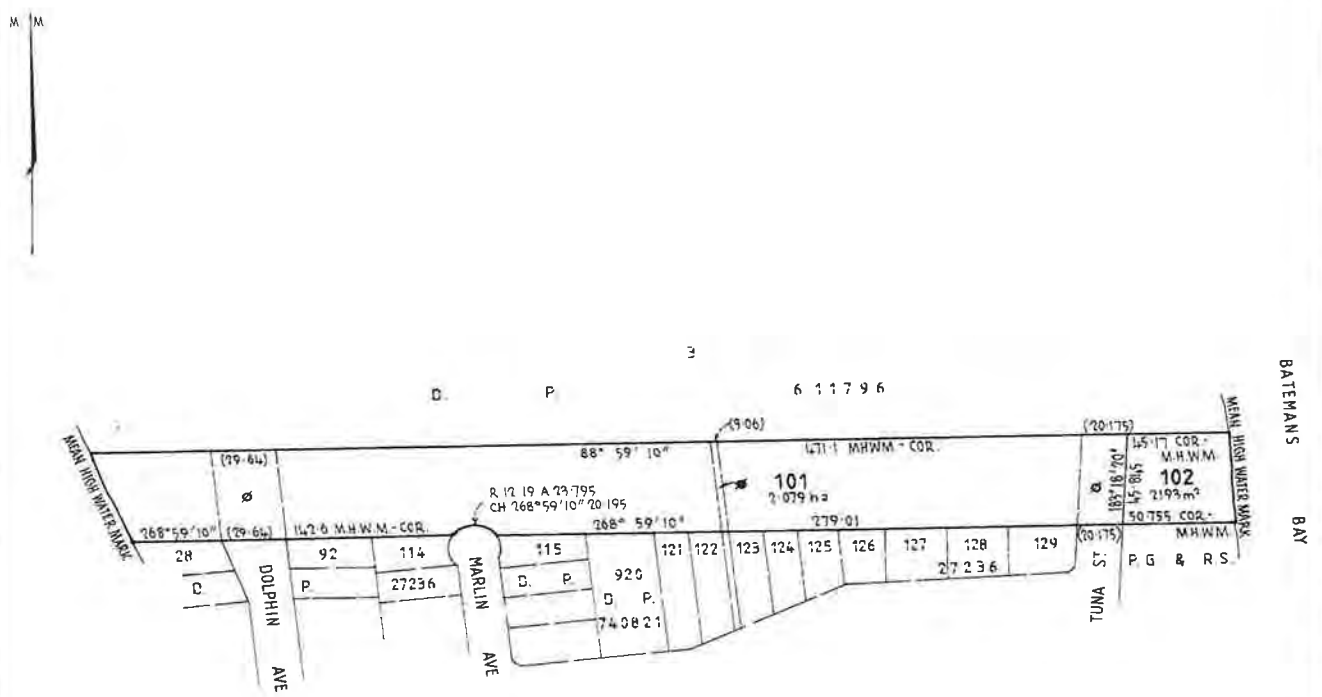
*OFFICE USE ONLY

DP 850637

SIGNATURE AND SEALS ONLY

J. Ireland

SURVEY MANAGER
MSB WATERWAYS AUTHORITY



20·115 & 29·53 WIDE
RIGHT OF CARRIAGEWAY A (K 882121)

3·05 WIDE
EASEMENT TO DRAIN WATER A (K 760073)

Crown Lands Office Approval

PLAN APPROVED ..... Authorised Officer

Land District .....

Paper No .....

Field Book ..... pages .....

Council's Certificate

I hereby certify that –

(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and

*(b) the requirements of † Part 3 Division 2 of the Water Board Act 1987, or † Part 5 Division 7 of the Hunter Water Board (Corporatisation) Act 1991,

have been complied with by the applicant in relation to the proposed ..... (Insert "new road", "subdivision" or "consolidated lot") set out herein

Subdivision No. .....

Date .....

(Signature) ..... General Manager/Authorised Person

Council File No. .....

*This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the areas of operations of the Water Board and the Hunter Water Corporation Ltd.

†Delete if inapplicable

SURVEYOR'S REFERENCE 10227/1

RP1188

Registered: 27.6.1995

C.A.

Title System TORRENS

Purpose: SUBDIVISION

Ref Map: EUROBODALLA SH 5

Last Plan: DP202853*

PLAN OF SUBDIVISION OF LOT 1 D P 202853

Lengths are in metres Reduction Ratio 1:500

LGA EUROBODALLA

Locality: BATEMANS BAY

Parish: BATEMAN

County: ST VINCENT

This is sheet 1 of my plan in sheets
(Delete if inapplicable)

I, RALPH C. BULLOCK
of 13 BEACH RD, BATEMANS BAY 2536

a surveyor registered under the Surveyors Act, 1929 as amended, hereby certify that the survey represented in this plan is accurate and has been made in accordance with the Survey Practice Regulation 1990 and was completed on

*

Signature R. Bullock 19/5/95
Surveyor registered under the Surveyors Act, 1929, as amended
Datum Line of AZIMUTH
*Insert date of survey.

Plans used in preparation of survey/compilation
DP 202853

PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants

NO02AIB

NELL 45

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 Table of mm 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

RP1188

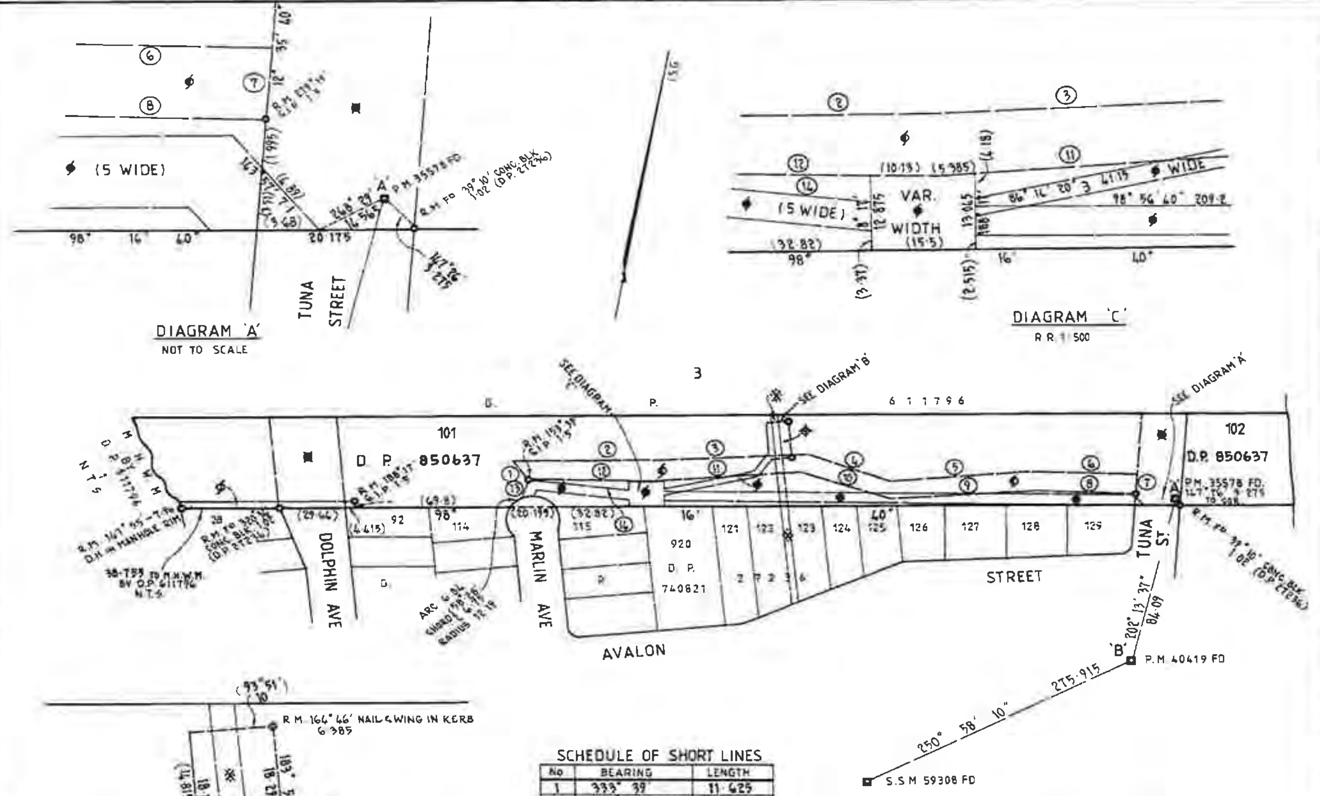
PLAN FORM 2

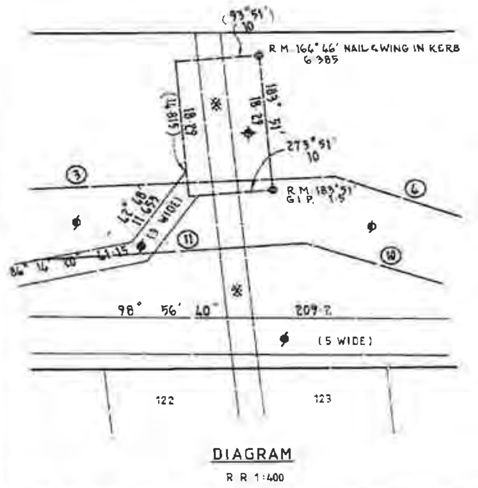
SIGNATURE AND SEALS ONLY

J Ireland
SURVEY MANAGER
WATERWAYS AUTHORITY

C Vassarotti
WITNESS
C VASSAROTTI

Plan Drawing only to appear in this space





SCHEDULE OF SHORT LINES

No	BEARING	LENGTH
1	333° 39'	11·625
2	98° 10' 40"	41·81
3	96° 07' 20"	10·05
4	118° 24' 20"	39·445
5	96° 03'	42·65
6	100° 11' 20"	47·61
7	192° 56'	10·025
8	279° 58' 20"	45·1
9	275° 08'	64·69
10	297° 09' 40"	42·71
11	274° 27' 40"	66·32
12	279° 21'	55·31
13	24° 01'	9·765
14	104° 59' 20"	45·485

MARK	ISG CO-ORDINATES		ZONE	ACC
	EASTING	NORTHING		
P.M. 35578	227 108·856	1 045 388·081	56/1	2
P.M. 40419	227 077·042	1 045 310·233	56/1	2
S.S.M. 59308	226 816·205	1 045 220·277	56/1	2
SOURCE: SCIMS 31 / 8 / 94				

COMBINED SCALE FACTOR 1 000

- EASEMENT TO DRAIN WATER 3 5 WIDE
- EASEMENT FOR SUPPORT VARIABLE WIDTH
- EASEMENT FOR SEWERAGE PURPOSES 5 WIDE, 3 WIDE & VARIABLE WIDTH
- EASEMENT TO DRAIN WATER 10 WIDE
- EASEMENT TO DRAIN WATER ~~DRAINAGE EASEMENT~~ 3·05 WIDE (K 760073)
- RIGHT OF CARRIAGEWAY (K 882121)

Crown Lands Office Approval

PLAN APPROVED .... Authorised Officer
Land District ....
Paper No ....
Field Book .... pages

Council's Certificate

I hereby certify that –
(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and
*(b) the requirements of † Part 3 Division 2 of the Water Board Act 1987, or † Part 5 Division 7 of the Hunter Water Board (Corporatisation) Act 1991.
have been complied with by the applicant in relation to the proposed........
(insert "new road", "subdivision" or "consolidated lot") set out herein
Subdivision No ....
Date ....
(Signature) .... General Manager/Authorised Person
Council File No ....
*This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the areas of operations of the Water Board and the Hunter Water Corporation Ltd.
†Delete if inapplicable

SURVEYOR'S REFERENCE 10562

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

*OFFICE USE ONLY

DP 265674

Registered [stamp] 10|10|1995.

C A

Title System TORRENS

Purpose EASEMENT

Ref Map EUROBODALLA SH 5

Last Plan (D.P. 202853*)
D.P. 850637

PLAN OF EASEMENT TO DRAIN WATER 3·5 WIDE, EASEMENT FOR SUPPORT, EASEMENT FOR SEWERAGE PURPOSES & EASEMENT TO DRAIN WATER 10 WIDE WITHIN LOT 101 D.P. 850637

Lengths are in metres. Reduction Ratio 1:1500

LGA EUROBODALLA
Locality: BATEMANS BAY
Parish: BATEMAN
County: ST VINCENT

This is sheet 1 of my plan in .... sheets
(Delete if inapplicable)

I RALPH C BULLOCK
of 13 BEACH RD, BATEMANS BAY 2536
a surveyor registered under the Surveyors Act, 1929 as amended, hereby certify that the survey represented in this plan is accurate and has been made in accordance with the Survey Practice Regulation 1990 and was completed on
9th November 1994
Signature R Bullock
Surveyor registered under the Surveyors Act, 1929, as amended
Datum Line of Azimuth: 'A'–'B'

Plans used in preparation of survey/compilation
D.P. 202853
D.P. 27236
D.P. 850637

PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

PURSUANT TO SEC 88B OF THE CONVEYANCING ACT 1919 IT IS INTENDED TO CREATE:
(1) EASEMENT TO DRAIN WATER 3·5 WIDE
(2) EASEMENT FOR SUPPORT VARIABLE WIDTH
(3) EASEMENT FOR SEWERAGE PURPOSES 5 WIDE, 3 WIDE & VARIABLE WIDTH
(4) EASEMENT TO DRAIN WATER 10 WIDE

Y O O F I A

NELL 45

RP 1192

No. 36075

New South Wales.

R.P. 2.

APPLICATION TO BRING LANDS UNDER THE PROVISIONS OF THE REAL PROPERTY ACT.

FEE SIMPLE.[a]

[a] This form may be modified to suit the case of a leasehold title.

CAUTION.—Applicants are reminded that by virtue of the provisions of the Crimes Act ... penalties of perjury are attached to a false declaration concerning any matter or procedure under the Act, and that the greatest care is therefore necessary in framing (or reading over, if the form be filled up by an Attorney) every particular statement herein.
It is further provided by Section 126 of the Real Property Act, 1900, ... a Certificate through any fraud, error, omission, misrepresentation, or misdescription will, notwithstanding ... Certificate, remain liable for damages to any person thereby prejudiced. And any person who fraudulently procures ... fraudulently procuring, or is privy to the fraudulent procurement of any Certificate of Title, is declared guilty of a misdemeanour, and liable to a penalty not exceeding £500, or imprisonment not exceeding three years; and any Certificate thereby procured is rendered void as between all parties or privies to the fraud.

Assurance	
Lodgment	1 0 0
Certificate	1 5 0
Advertising	
Office Copy Plan	1 10 0 / 5 0
Total	£4 0 0

I[b] WILFRED PERCY BILL of Bateman's Bay in the State of New South Wales Freeholder

do solemnly and sincerely declare, that[c] I am seized for an Estate in fee simple of[d] ALL THOSE parcels of land situate in the Parish of Bateman County of St. Vincent containing an area of 98 acres 3 roods 15 perches (ex. 0 acres 1 rood 4½ perches) being the land shown in the plan intended to be lodged herewith marked "A".

which land is the whole of Portion 28 originally granted to Patrick Corrigan by Crown grant under the hand of the Governor of the Colony dated the Twenty fourth day of September 1860 and part of portion 4 originally granted

60/1658

~~which land (including all improvements) is of the value of[e] and no more, and is[f] of[g]~~ originally granted to[h] Edward Corrigan by Crown grant, under the hand of the Governor of the Colony, dated the first day of June 1854 together with accreted land adjoining Portion 4.

And I further declare, that I verily believe there does not exist any lease or agreement for lease of the said land, for any term exceeding a tenancy for one year, or from year to year,[k]

Also, that there does not exist any mortgage, lien, writ of execution, charge or encumbrance, will or settlement, or any deed or writing, contract, or dealing (other than such lease or tenancy as aforesaid), giving any right, claim, or interest in or to the said land, or any part thereof, to any other person than myself[l] except the document numbered 21 in the Schedule hereto

and I further declare, that there is no person in possession or occupation of the said land or any part thereof adversely to my Estate or Interest therein, and that the said land is now[m] in my occupation except as follows:- Lot 1 shown in document numbered 21 in the Schedule:- occupied by my daughter Phyllis Ina De Haviland. Lot 2 shown in such document occupied by Frank Hawke as her weekly tenant. **Lots 3 to 10 inclusive are occupied by my said daughter.**

and that the owners and occupiers of adjacent lands are as follows[n]:—

State whether on North, South, East, or West.	Name.	State whether owner or occupier.	Address.
	Part of the land is bounded by the Clyde River and Bateman's Bay as shown on the said plan lodged herewith, and by the roads shown on such plan. All the rest of the land adjoining the land in the application is owned and occupied by me.		

Certificate of Title Vol 5835 Fol 202 issued (for part) 3/6/48

Certificate of title Vol. 5873 Fol. 139 issued 16/9/48 (for residue)

Margin notes:
[b] Here state Christian and surname (or names) in full with residence and occupation.
[c] "I am" or if the declaration is made by an attorney "C.D. of is" (as the case may be).
[d] Here give description of the property in full. If the land is shown on a plan lodged with the application or is fully described in a deed, it will be sufficient to insert a reference to the area, town, parish, and county and words indicating that the land is shown on the plan or described in the deed in question. Unless the Registrar-General has previously dispensed with a plan of survey, an accurate plan, prepared and certified by a surveyor specially licensed under the Act, must accompany the application. If there be any rights of way or other rights or easements affecting the premises the particulars should be stated. If the space for description be insufficient, it may be completed by annexure which must however be identified as part of the declaration, by being signed by the declarant and attesting witness.
[e] The full unimproved value should be stated.
[f] State whether "the whole" or "part."
[g] Insert allotment with reference to number and section on plan, if any, or number of portion.
[h] Name of grantee.
[k] If there be any Lease, add the words "except as follows" and insert particulars thereof.
[l] If there be any mortgage, lien, etc., add the words "except as follows" and insert particulars thereof.
[m] Insert "unoccupied," or "in the occupation of," adding names and addresses of tenants in full. State also nature of tenancy, if not under some lease before mentioned. Where the applicant is not in actual occupation, but has a caretaker or manager in charge, the name of such caretaker or manager should be stated, together with the nature of his occupancy.
[n] Here insert names and residences of adjacent owners and occupiers on all sides.

And I further declare, that the annexed Schedule, to which my signature is affixed, and which is to be taken as part of this Declaration, contains a full and correct list * _____ of all settlements, deeds, documents, or instruments, maps, plans and papers relating to the land comprised in this application, so far as I have any means of ascertaining the same, distinguishing such as being in my possession or under my control, are herewith lodged and indicating where or with whom, so far as known to me any others thereof are deposited. Also, that there does not exist any fact or circumstance whatever material to the title, which is not hereby fully and fairly disclosed to the utmost extent of my knowledge, information, and belief; and that there is not, to my knowledge and belief, any action or suit pending affecting the said land, nor any person who has or claims any estate, right, title or interest therein, or in any part thereof, otherwise than by virtue and to the extent of some lease or tenancy hereby fully disclosed †

* The declaration may be qualified to the extent to which Applicant's title has been previously passed by the Registrar General by inserting the words "Commencing with Conveyance dated..... registered ....." or as the case may be. Otherwise all documents from the Crown Grant onwards must be entered in the Schedule.

† If there be any exception add the words "except as follows" and insert necessary particulars.

And I make this solemn Declaration, conscientiously believing the same to be true.

DATED at Batemans Bay this twenty-ninth day of March 1946

(RULE UP ALL BLANKS BEFORE SIGNING.)

Made and subscribed by the abovenamed this 29th day of March 1946 in the presence of ‡ H. A. R. Cameron J.P.

Signature of Applicant } W. P. Bill

‡ If made in New South Wales this declaration must be attested by the Registrar General or Deputy, or by a Notary Public, or by a Justice of the Peace, or Commissioner for Affidavits. If made outside the State it should be made according to the law of the State where made, before a person authorised by that law to take declarations. If the signature be by mark, the attestation must state that the document was read over to the declarant, and that he appeared fully to understand the contents. This applies also to the subjoined direction, particularly if a different person be nominated to receive certificate.

To the Registrar-General,—

I, WILFRED PERCY BILL the above declarant, do hereby apply to have the land described in the above declaration brought under the provisions of the Real Property Act, and request you to issue the Certificate of Title in the name of * myself.

DATED at Batemans Bay this twenty-ninth day of March 1946.

Witness to Signature— H. A. R. Cameron J.P.

(Signature of Applicant) W. P. Bill

* If to Applicant, say "myself"; if to other person write name at full length, with address and occupation.
If to two or more, state whether as joint tenants or tenants in common; if as tenants in common state shares. If to an infant, the age should be stated, and verified by Certificate of Birth, or by Statutory Declaration.
If to a married woman, the name of the husband, together with his residence and occupation, should be stated.

* N.B.—The Schedule below and Certificate indorsed on fourth page should be also signed.

In no case can any alterations, however trifling, be allowed to be made after the application has been once declared, unless all the parties re-sign and re-declare the same. If it is discovered that any alterations are necessary, the applicant may make a statutory declaration setting out in what manner he desires the application to be altered, which declaration will then (unless the Registrar General considers that a fresh application ought to be made) be read as one with the application.

(RULE UP ALL BLANKS BEFORE SIGNING.)

SCHEDULE REFERRED TO.*

(TO BE SIGNED BY APPLICANT IMMEDIATELY BELOW THE LAST DOCUMENT SCHEDULED.)

To include not only Title Deeds, Probates, Letters of Administration, etc., but also the Surveyor's Plan or Statement in lieu thereof.

* For the particulars which this Schedule must comprise, see concluding part of Declaration, to which particular attention is directed, as any omission or misstatement will render applicant liable to the penalties of false Declaration.

No.	Date.	Nature of Instrument.	Parties.	Registration. Book.	Registration. No.	When and by whom Lodged.
1		Plan by	Anthony Barrett Cochran			lodged herewith.
2	1913	Abstract of Title	of the English Scottish and Australian Bank Limited			lodged herewith
3	24 Sep 1860	Crown Grant	grantee: Patrick Corrigan			lodged herewith
4	7 Sep 1860	Will	Patrick Corrigan			
5	26 July 1869	Letters of Administration c.t.a.	of Estate of Patrick Corrigan deceased.			

Should any transaction affecting the land in this application be entered into or any alterations in the buildings or fences be made subsequent to the date of the application, but prior to the issue of the Certificate of Title, the Registrar General should be informed immediately, and all documents evidencing such transaction should be lodged.

SCHEDULE REFERRED TO—(*continued*).*

(TO BE SIGNED BY APPLICANT, IF UTILISED, IMMEDIATELY BELOW THE LAST DOCUMENT SCHEDULED.

No.	Date.	Nature of Instrument.	Parties.	Registration. Book.	Registration. No.	When and by whom Lodged.
6	16 Mar. 1870	Conveyance	Joseph Corrigan to Francis Guy	118	700	lodged herewith
7	1 June 1854	Crown Grant	grantee:- Edward Corrigan			lodged herewith
8	6 Jan. 1859	Memorandum	Edmund Corrigan to Henry Clay Burnell & Henry Clarke			
9	31 Oct. 1860	Assignment of Judgment debt and security	Henry Clarke to Henry Clay Burnell			
10	10 Nov. 1860	Sequestration Order	In estate of Edmund Corrigan			
11	27 May 1861	Conveyance (with Certificate as to appointment of Official Assignee endorsed)	John Morris to Henry Clay Burnell	72	669	lodged herewith.
12	14 Aug 1862	Conveyance	Henry Clay Burnell to Saul Samuel	88	559	lodged herewith
13	22 July 1872	Conveyance	Saul Samuel to Francis Guy	133	313	lodged herewith.
14	9 Aug 1894	Mortgage	Francis Guy to The English Scottish & Australian Bank Ltd.	549	189	lodged herewith.
15	20 Oct 1896	Assignment for benefit of Creditors	Francis Guy 1st part, Robert Walker, James Henry Young and William Henry Hoskings (Trustees) of 2nd part, and the several firms and persons whose names appear in the first column of second Schedule thereto and all other (if any) the creditors of the Assignor, 3rd part	590	530	
16	20 July 1897	Conveyance and Assignment	Francis Guy, 1st part, Robert Walker, James Henry Young and William Henry Hoskings (Trustees) 2nd part, and The English Scottish & Australian Bank Ltd 3rd Part	603	595	Permanently deposited Packet No. 2075
17	19 May 1909	Power of Attorney	The English Scottish & Australian Bank Ltd to Charles William Wren	884	531	~~lodged herewith~~
18	26thFeb 1913	Statutory Declaration	by John Corrigan			lodged herewith
19	11 Mar. 1913	Conveyance	The English Scottish and Australian Bank Ltd. 1st part, Charles William Wren, 2nd part and Duncan Forbes Mackay 3rd part	991	684	lodged herewith
20	1 Dec. 1921	Conveyance	Duncan Forbes Mackay to Wilfred Percy Bill	1244	687	lodged herewith.
21	6 May 1941	Agreement endorsed on sketch by Fitzgerald & Cochran	Wilfred Percy Bill (Applicant) with Phyllis Mary De Haviland			lodged herewith
22		Statutory Declaration as to search for Deposited Deeds				lodged herewith.

Recd 1.3.6 7. 11.12.13.14 18 to 22

W. P. Bill

See indorsement overleaf.

H'with Docs 2.3.6.7, 11, 12, 13, 14, 18 to 22.

6 MAY 19[illegible]

23. 17-1-47 Copy of [illegible] to Batemans Bay District Hospital } [illegible]
24. 5-4-47 Contract for Sale to F. M. Bell
25. 1. 12. 47 Decln by F. W. Ladmore & annexure "A" re [illegible]
26. 1. 12. 47 " A. G. Patrech " " " " " } Lt47/76401
27. 1. 12. 47 " [illegible] " " " " "
28. 1. 12. 47 " A. H. Annetts " " " " "
29. 1. 12. 47 " J. L. Patrech " " " " "
30. Letter U.S. Dept of Public Works to Solrs for Appt. LT 48/[illegible]
31. 28.5.48 Further Decln by Appt. LT 48/[illegible]
32. 7.9.48 Stat decln of W. P. Bell
33. 8.7.48 Copy of letter from A. G. de L. Arnold & Co. to the Dept. of Public Works
34. 11. 8. 50 " " " " " " "

Doc in DP Pkt 2075 marked re this applcn
Papers 47 M 12070 sent to Records.
Hath Docs 2, 3, 6, 7, [illegible] 11-14, 18-20, 22, 23, 25-34 incl
Doc 23 is available for delivery to A. G. de L. Arnold & Co
Other docs to remain with case
[illegible] 14/5/53.

I certify that the within application is correct for the purposes of the Real Property Act, 1900.

Received Document 23.
A. G. de L. Arnold & Co
per [illegible] Foley. 27/5/53.

(Signature) W. P. Bell

† Section 117 requires that this Certificate be signed by Applicant or his Solicitor and renders liable any person falsely or negligently certifying, to a penalty of £50; also, to damages recoverable by parties injured. If by Solicitor, he should insert:—" And that I am the Solicitor of the within-named Applicant," and should add his own address to his signature. The signature should be that of the Solicitor himself, and not of his firm.

(RULE UP ALL BLANKS BEFORE SIGNING, EXCEPT SPACE IN SCHEDULE BELOW APPLICANT'S SIGNATURE.)

FEES.

PAYMENT OF THESE MUST ACCOMPANY THE APPLICATION.

	£	s.	d.
Certificate of Title ...	1	5	0
Office Copy of Plan (when a Plan is furnished) ...	0	5	0
Preparation of Plan (when a Plan is not furnished)	0	7	6
Advertisement ...	1	10	0
Assurance, ½d. in the £ on declared value ...	....		
Lodgment fee ...	1	0	0

State to whom all correspondence relating to this Application should be sent, with address, as under, viz.:—

Recd. Plan
98 a 3r 15p.
[illegible] 3/5/46

Name A. G. de L. ARNOLD & Co

Occupation Solicitors

Post Town 17 Castlereagh St.
Sydney

15. EXTRA FEES PA 36075
No. of Diagram [illegible]
Extra Folios

15. EXTRA FEES PA 36075
Diagram [illegible] 10/-
Extra Folios [illegible]

T. H. Tennant, Acting Govt. Printer.

13147209

[redacted]ICATE OF TITLE

NEW SOUTH WALES

[redacted] PROPERTY ACT, 1900

Appln. No.36075

Prior Title Vol.7120 Fol.208

Vol. 13147 Fol. 209

EDITION ISSUED

23 9 1976

(Page 1) Vol. 13147 Fol. 209

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.

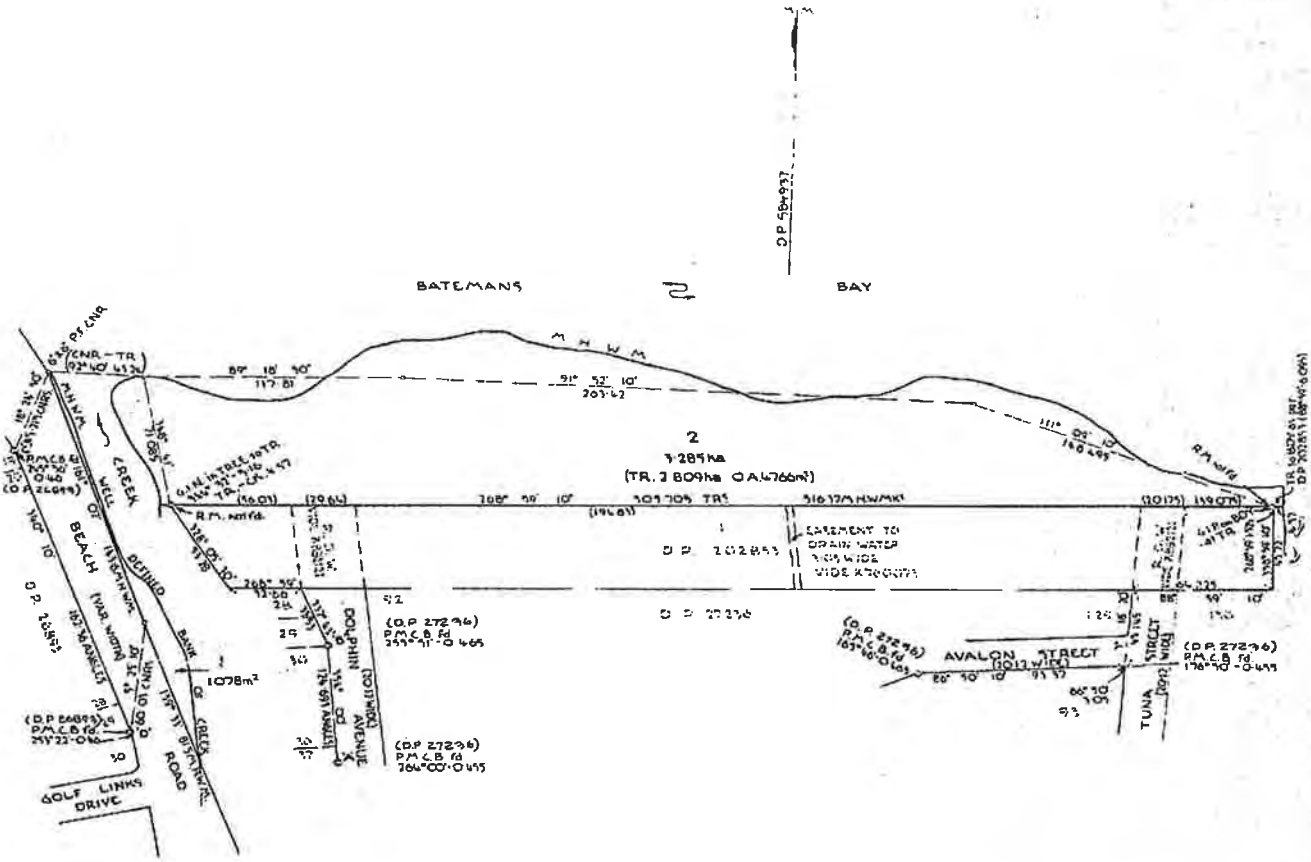
CANCELLED

Registrar General.

SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 2 in Deposited Plan 584937 at Bateman's Bay in the Shire of Eurobodalla Parish of Bateman and County of St.Vincent being part of Portion 4 granted to Edward Corrigan on 1-6-1854.

FIRST SCHEDULE

~~HOOKER REX PTY. LIMITED.~~

GRY

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown Grant above referred to.
2. Rights of Carriageway created by Transfer No.K882121 appurtenant to the land above described affecting the pieces of land shown as "Site of Proposed Right of Way" in Deposited Plan 202853.

RCZ

Vol. 13147 Fol. 209

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
~~Courtyard Apartments Pty. Limited.~~	~~Transfer~~	~~Q394812~~	~~——~~	~~7-10-1977~~	
Birss Nominees Pty. Limited	Transfer	Q628796	——	5-4-1978	

CANCELLED

SEE ATTD FORM

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		
~~Mortgage~~	~~Q628797~~	——	~~to Kyle Park Pty. Limited~~	~~5-4-1978~~		Discharged	S165867	
~~Mortgage~~	~~Q628798~~	——	~~to Courtyard Apartments Pty. Limited~~	~~5-4-1978~~		Discharged	S165868	
~~Caveat~~	~~R938527~~	——	~~by Jean Sayer~~	~~28-7-1980~~		Withdrawn	S165866	
~~Mortgage~~	~~S165869~~	——	~~to Commercial & General Acceptance Limited~~	~~19-11-1980~~		Discharged	V282736	
~~Mortgage~~	~~S321073~~	——	~~to The Commercial Banking Company of Sydney Limited~~	~~25-2-1981~~		Discharged	T186701	
T186702	Mortgage to The Commercial Banking Company of Sydney Limited. Registered 16-8-1982.							
~~T612873~~	~~Mortgage to Custom Credit Holdings Limited. Registered 29-6-1983.~~					Discharged	V282737	
~~V282738~~	~~Mortgage to National Australia Savings Bank Limited. Registered 27.8.1984.~~							

(Page 2 of 2 pages)

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

Q394812-7
Q628796
7M
8M
R938527P
D.P.611796
NB
S165866M
— 67DM
— 68DM
— 69M
C.T. 31.12.80
S321073M R
C.T 9.7.82
T186701 DM
T612673M R
V282736 DM
37DM
38M
NB
D.P.77589(5)

Historical Title

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
29/8/2017 11:52PM

FOLIO: 2/584937

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 13147 FOL 209

Recorded	Number	Type of Instrument	C.T. Issue
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
8/9/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
8/5/1992	E87264	DISCHARGE OF MORTGAGE	
8/5/1992	E87265	DISCHARGE OF MORTGAGE	
8/5/1992	E87266	MORTGAGE	EDITION 1
29/1/1997	Z536491	REQUEST	
30/1/1997	DP124295	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

batemans bay PRINTED ON 29/8/2017

Historical Title

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
29/8/2017 11:52PM

FOLIO: 12/124295

First Title(s): OLD SYSTEM
Prior Title(s): 2/584937

Recorded	Number	Type of Instrument	C.T. Issue
30/1/1997	DP124295	DEPOSITED PLAN	FOLIO CREATED CT NOT ISSUED
31/1/1997	2697039	DISCHARGE OF MORTGAGE	
31/1/1997	2697040	MORTGAGE	EDITION 1
4/9/1998	5247337	DISCHARGE OF MORTGAGE	
4/9/1998	5247338	MORTGAGE	EDITION 2
20/6/2002	8703034	DISCHARGE OF MORTGAGE	
20/6/2002	8703035	MORTGAGE	EDITION 3
14/3/2003	9449747	VARIATION OF MORTGAGE	EDITION 4
29/3/2004	AA525728	VARIATION OF MORTGAGE	EDITION 5
1/6/2006	AC353778	VARIATION OF MORTGAGE	EDITION 6
20/7/2007	AD285443	VARIATION OF MORTGAGE	EDITION 7
4/8/2008	AD869686	VARIATION OF MORTGAGE	EDITION 8
18/9/2008	AE221374	VARIATION OF MORTGAGE	EDITION 9
12/12/2013	AI236537	TRANSFER OF MORTGAGE	EDITION 10
7/3/2016	AK250079	DISCHARGE OF MORTGAGE	
7/3/2016	AK250080	MORTGAGE	EDITION 11

*** END OF SEARCH ***

batemans bay PRINTED ON 29/8/2017

Title Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 12/124295

SEARCH DATE	TIME	EDITION NO	DATE
29/8/2017	11:52 PM	11	7/3/2016

LAND

LOT 12 IN DEPOSITED PLAN 124295
AT BATEMANS BAY
LOCAL GOVERNMENT AREA EUROBODALLA
PARISH OF BATEMAN COUNTY OF ST VINCENT
TITLE DIAGRAM DP124295

FIRST SCHEDULE

BIRSS NOMINEES PTY. LIMITED

SECOND SCHEDULE (4 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 K882121 RIGHT OF CARRIAGEWAY APPURTENANT TO THE LAND ABOVE DESCRIBED AFFECTING THE PART(S) OF THE LAND SHOWN IN DP202853
3 DP124295 RIGHT OF CARRIAGEWAY 12 WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
4 AK250080 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

[redacted]

M

NEW SOUTH WALES

(For Grant and title reference prior to first edition see Deposited Plan.)

IFICATE OF TITLE

ERTY ACT, 1900, as amended.

09525184

Vol. 9525 Fol. 184

1st Edition issued 20-9-1963.

Vol. 9525 Fol. 184 (Page 1)

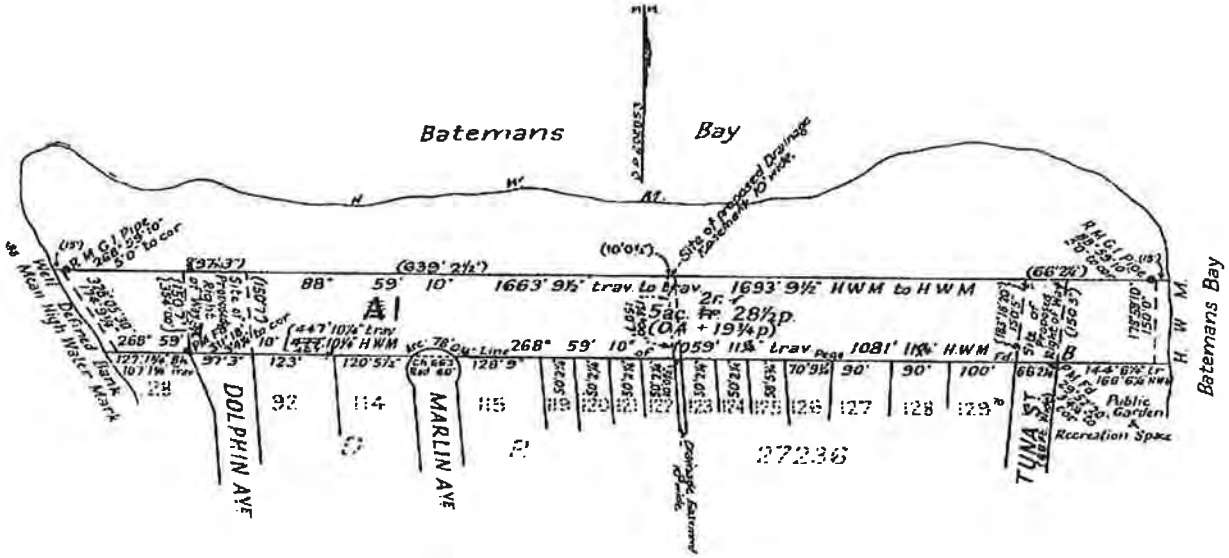
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness B Bailey

CANCELLED Registrar-General.

SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND



ESTATE AND LAND REFERRED TO.

Estate in Fee Simple in Lot 1 in Deposited Plan 202853 in the Shire of Eurobodalla Parish of Bateman and County of St. Vincent.

FIRST SCHEDULE (Continued overleaf)

~~HOOKER REX PTY. LIMITED.~~

Registrar General.

SECOND SCHEDULE (Continued overleaf)

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

Registrar General.

Vol. 9525 Fol. 184

70923 1 62 5M 1600 V. C. N. BLIGHT, GOVERNMENT PRINTER

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar-General
The minister for Public Works	Transfer	K832121	10.8.1967	5.2.1968	

CANCELLED

SEE AUTO FOLIO

CT 28/7/67

K760073 T/G

K882121 T
Ray R (?)

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION
W Transfer	K760073	2-6-1966	Easement to Drain Water affecting that part of the land within described shown as "Site of proposed drainage easement 10' wide" in the plan hereon.	24-11-1967	Jamieson	
RC Transfer	K882121	10.8.1967	Right of carriageway affecting those parts of the land within described shown as "Site of proposed Right of way" in the plan hereon.	5.2.1968	Jamieson	

FORM No. 184A

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

Historical Title

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
29/8/2017 11:52PM

FOLIO: 1/202853

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 9525 FOL 184

Recorded	Number	Type of Instrument	C.T. Issue
4/6/1987		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
16/5/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
23/6/1992	E551699	TRANSFER	EDITION 1
28/6/1995	DP850637	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

batemans bay PRINTED ON 29/8/2017

RP13

[redacted]

TRANSFER

Real Property Act, 1900

E 551699 X

Office of State Revenue use only

Instrument not liable to Stamp Duty
payment of Registration or other fees
Public Works Department
per

(A) **LAND TRANSFERRED**

Show no more than 20 References to Title.
If appropriate, specify the share transferred.

whole.

NOW BEING ..... OF LAND COMPRISED IN FOLIO 202853

Vol. 9525 Fol. 184

(B) **LODGED BY**

L.T.O. Box	Name, Address or DX and Telephone
	BOX 5237 Legal Officer [redacted] Public Works Dept State Office Block Phillip Street Sydney. 2000 REFERENCE (max. 15 characters):

(C) **TRANSFEROR** ...The Minister for Public Works.....

(D) acknowledges receipt of the consideration of ...$1.00.....

and as regards the land specified above transfers to the transferee an estate in fee simple

(E) subject to the following **ENCUMBRANCES** 1. ..... 2. ..... 3. .....

(F) **TRANSFEREE**

(G) T

Maritime Services Board of NSW

as joint tenants/tenants in common

(H) We certify this dealing correct for the purposes of the Real Property Act, 1900. **DATE OF EXECUTION** .....

Signed in my presence by the transferor who is personally known to me.

.....
Signature of Witness

PETER DRURY
Name of Witness (BLOCK LETTERS)

MCKELL BUILDING RAWSON PL SYDNEY
Address of Witness

GRAHAM KENNETH HARVEY
COMMERCIAL PROPERTY MANAGER
AS DELEGATE OF MINISTER FOR
PUBLIC WORKS

.....
Signature of Transferor

~~Signed in my presence by the transferee who is personally known to me.~~

SIGNED BY ME WAYNE GILBERT AS DELEGATE OF THE MARITIME SERVICES BOARD OF NEW SOUTH WALES AND I CERTIFY THAT I HAVE NO NOTICE OF ANY REVOCATION OF SUCH DELEGATION. SIGNED IN THE PRESENCE OF:

.....
Signature of Witness

.....
Name of Witness (~~BLOCK LETTERS~~)

.....
Address of Witness

G.R. Gilbert

SEAL MARITIME SERVICES BOARD OF NEW SOUTH WALES COMMON

.....

☞ INSTRUCTIONS FOR FILLING OUT THIS FORM ARE AVAILABLE FROM THE LAND TITLES OFFICE

CHECKING (office use only) 3A

Historical Title

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
29/8/2017 11:52PM

FOLIO: 101/850637

First Title(s): OLD SYSTEM
Prior Title(s): 1/202853

Recorded	Number	Type of Instrument	C.T. Issue
28/6/1995	DP850637	DEPOSITED PLAN	FOLIO CREATED EDITION 1
10/10/1995	DP265674	DEPOSITED PLAN	EDITION 2
25/7/1996	2143195	APPLICATION	
25/7/1996	2143196	TRANSFER	
25/7/1996	2143197	MORTGAGE	EDITION 3
4/9/1998	5247336	DISCHARGE OF MORTGAGE	
4/9/1998	5247338	MORTGAGE	EDITION 4
20/6/2002	8703034	DISCHARGE OF MORTGAGE	
20/6/2002	8703035	MORTGAGE	EDITION 5
14/3/2003	9449747	VARIATION OF MORTGAGE	EDITION 6
29/3/2004	AA525728	VARIATION OF MORTGAGE	EDITION 7
1/6/2006	AC353778	VARIATION OF MORTGAGE	EDITION 8
20/7/2007	AD285443	VARIATION OF MORTGAGE	EDITION 9
4/8/2008	AD869686	VARIATION OF MORTGAGE	EDITION 10
18/9/2008	AE221374	VARIATION OF MORTGAGE	EDITION 11
12/12/2013	AI236537	TRANSFER OF MORTGAGE	EDITION 12
7/3/2016	AK250079	DISCHARGE OF MORTGAGE	
7/3/2016	AK250080	MORTGAGE	EDITION 13

*** END OF SEARCH ***

batemans bay

PRINTED ON 29/8/2017

2 of 3

97-01T

TRANSFER

Real Property Act, 1900

nly

2143196 C

07/05/1996 $2.00 990001610 JG
42252 101/850637 TFR
MARINE MINISTERIAL BIRSS NOMINEES P/L
$190000.00 $0.00 400 042513

(A) **LAND TRANSFERRED**

Show no more than 20 References to Title.
If appropriate, specify the share transferred.

FOLIO IDENTIFIER 101/850637

RELODGED
15 JUL 1996
3.45
LAND TITLES OFFICE

(B) **LODGED BY**

L.T.O. Box	Name, Address or DX and Telephone
28A	GALLOWAY & CO. Phone: 233-1011 Fax 232-[illegible] DX 340, L.T.O. Delivery 28 REFERENCE (max. 15 characters): DELVES-BIRSS

(C) **TRANSFEROR** MARINE MINISTERIAL HOLDING CORPORATION

(D) acknowledges receipt of the consideration of $190,000.00

and as regards the land specified above transfers to the Transferee an estate in fee simple

(E) subject to the following **ENCUMBRANCES** 1. ..... 2. ..... 3. .....

(F) **TRANSFEREE**

T **TS** (s713 LGA) **TW** (Sheriff)	BIRSS NOMINEES PTY LIMITED A.C.N. 001 496073

(G) **TENANCY:**

(H) We certify this dealing correct for the purposes of the Real Property Act, 1900. **DATED** 1st May 1996

~~Signed in my presence by the Transferor who is personally known to me.~~

SIGNED BY ME MATTHEW TAYLOR AS DELEGATE OF THE MARINE MINISTERIAL HOLDING CORPORATION AND I CERTIFY THAT I HAVE NO KNOWLEDGE OF ANY REVOCATION OF SUCH DELEGATION. SIGNED BEFORE ME:

~~Signature of Witness~~

~~Name of Witness (BLOCK LETTERS)~~

~~Address of Witness~~
A.P. MORRISON
Solicitor
207 Kent St Sydney

Signature of Transferor

Signed in my presence by the Transferee who is personally known to me.

Signature of Witness

Name of Witness (BLOCK LETTERS)

Address of Witness

Signature of Transferee's solicitor
TREVOR JAMES WAIN

INSTRUCTIONS FOR FILLING OUT THIS FORM ARE AVAILABLE FROM THE LAND TITLES OFFICE

CHECKED BY (office use only)

Title Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 101/850637

SEARCH DATE	TIME	EDITION NO	DATE
29/8/2017	11:52 PM	13	7/3/2016

LAND

LOT 101 IN DEPOSITED PLAN 850637
AT BATEMANS BAY
LOCAL GOVERNMENT AREA EUROBODALLA
PARISH OF BATEMAN COUNTY OF ST VINCENT
TITLE DIAGRAM DP850637

FIRST SCHEDULE

BIRSS NOMINEES PTY LIMITED (T 2143196)

SECOND SCHEDULE (8 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 K760073 EASEMENT TO DRAIN WATER 3.05 WIDE AFFECTING THE PART OF THE LAND ABOVE DESCRIBED SHOWN SO BURDENED IN THE TITLE DIAGRAM
3 K882121 RIGHTS OF CARRIAGEWAY 20.115 & 29.53 WIDE AFFECTING THE PARTS OF THE LAND ABOVE DESCRIBED SHOWN SO BURDENED IN THE TITLE DIAGRAM
4 DP265674 EASEMENT TO DRAIN WATER 3.5 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP265674
5 DP265674 EASEMENT FOR SUPPORT VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED IN DP265674
6 DP265674 EASEMENT FOR SEWERAGE PURPOSES 5 WIDE ,3 WIDE & VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED IN DP265674
7 DP265674 EASEMENT TO DRAIN WATER 10 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP265674
8 AK250080 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

batemans bay PRINTED ON 29/8/2017

Appendix D

Historical Aerial Photographs - TBA

Douglas Partners Geotechnics / Environment / Groundwater	Project No. 89333.00	Historical Aerial Photograph - 1949	Drawing No. 1
	Date: 6 Sep 2017	Contamination and Geotechnical Investigation Client: Aspen Group	Revision 0

Douglas Partners Geotechnics / Environment / Groundwater	Project No. 89333.00	Historical Aerial Photograph - 1964	Drawing No. 2
	Date: 6 Sep 2017	Contamination and Geotechnical Investigation Client: Aspen Group	Revision 0

Douglas Partners Geotechnics / Environment / Groundwater	Project No. 89333.00	Historical Aerial Photograph - 1969	Drawing No. 3
	Date: 6 Sep 2017	Contamination and Geotechnical Investigation Client: Aspen Group	Revision 0

Douglas Partners Geotechnics / Environment / Groundwater	Project No. 89333.00	Historical Aerial Photograph - 1979	Drawing No. 4
	Date: 6 Sep 2017	Contamination and Geotechnical Investigation Client: Aspen Group	Revision 0

Douglas Partners Geotechnics / Environment / Groundwater	Project No. 89333.00	Historical Aerial Photograph - 1989	Drawing No. 5
	Date: 6 Sep 2017	Contamination and Geotechnical Investigation Client: Aspen Group	Revision 0

Douglas Partners Geotechnics | Environment | Groundwater	Project No. 89333.00	Historical Aerial Photograph - 2006	Drawing No. 6
	Date: 6 Sep 2017	Contamination and Geotechnical Investigation Client: Aspen Group	Revision 0

Douglas Partners Geotechnics / Environment / Groundwater	Project No. 89333.00	Historical Aerial Photograph - 2012	Drawing No. 7
	Date: 6 Sep 2017	Contamination and Geotechnical Investigation Client: Aspen Group	Revision 0

Appendix E

Site Photographs

Photo 1 – View of northern portion of the site and minor brick structure.

Photo 2 – View of northern portion of site and retaining wall.

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photos** **Pre Purchase Due Diligence** **49 Beach Road, Batemans Bay**	PROJECT: PLATE No: REV:	89333.00 1 0
	CLIENT: Aspen Group	DATE:	September 2017

Photo 3 – View of fibrous cement fragment found near Pit 1.

Photo 4 – View of shelter and playground equipment in southern portion of site.

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photos** **Pre Purchase Due Diligence** **49 Beach Road, Batemans Bay**	PROJECT: PLATE No: REV:	89333.00 2 0
	CLIENT: Aspen Group	DATE:	September 2017

Photo 5 – View of volley ball court in southern portion of the site.

Photo 6 – View of playground in southern portion of the site.

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photos** **Pre Purchase Due Diligence** **49 Beach Road, Batemans Bay**	PROJECT: PLATE No: REV:	89333.00 3 0
	CLIENT: Aspen Group	DATE:	September 2017

Photo 7 – View of concrete drain in central portion of the site.

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photos** **Pre Purchase Due Diligence** **49 Beach Road, Batemans Bay**	PROJECT: PLATE No: REV:	89333.00 4 0
	CLIENT: Aspen Group	DATE:	September 2017

Appendix F

Test Pit Logs

TEST PIT LOG

CLIENT: Aspen Group
PROJECT: Pre-Purchase Due Deligence
LOCATION: 49 Beach Road, Batemans Bay

SURFACE LEVEL: 1.7 AHD
EASTING: 245888
NORTHING: 6043760

PIT No: 1
PROJECT No: 89333.00
DATE: 30/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.2	FILLING - dark grey, slightly silty, fine-grained sand with abundant organic material, shells and rootlets, and some gravel (brick, concrete, plastic), damp (TOPSOIL)		D E	0.1		PID : 0.4 ppm		
	0.4	FILLING - grey, fine to medium-grained sand with some shells, gravel and cobbles (brick), damp		D E	0.5		PID : 0.4 ppm		
1		FILLING - grey, fine to medium-grained sand with some silt, damp		D E	1.0		PID : 0.1 ppm		1
	1.2	SAND - dark grey, slightly silty, fine-grained sand with some organic material, damp to wet (ESTUARINE)		D E	1.5		PID : 0.0 ppm	▼	
0		- becoming wet below 1.8m							
-1	2.0			D E	2.0		PID : 0.0 ppm		2
	2.1	SAND - grey, brown and beige, fine to medium-grained sand with abundant shells, damp (ESTUARINE)							
		Pit discontinued at 2.1m (Collapse of pit precluded further excavation)							

View looking at spoil from Pit 1 excavation.

RIG: Kubota U35-3 with 300mm bladed bucket

LOGGED: GRR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed 1.8 m

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Aspen Group
PROJECT: Pre-Purchase Due Deligence
LOCATION: 49 Beach Road, Batemans Bay

SURFACE LEVEL: 2.3 AHD
EASTING: 245953
NORTHING: 6043771

PIT No: 2
PROJECT No: 89333.00
DATE: 30/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.1	FILLING - grey, slightly silty, fine-grained sand with some shells, traces of rootlets, humid (TOPSOIL)		D E	0.1		PID : 0.2 ppm		
		FILLING - grey, fine to medium-grained sand with some shells, humid		D E	0.5		PID : 0.4 ppm		
				D E	1.0		PID : 0.0 ppm		
				D E	1.5		PID : 0.1 ppm		
	1.8	SILTY SAND - dark grey, silty, fine-grained sand with organic material and shells, moist (ESTUARINE)		D E	2.0		PID : 0.1 ppm		
	2.4							▼	
	2.5	SAND - brown and beige, fine to medium-grained sand with some shells, wet (ESTUARINE)							
		Pit discontinued at 2.5m (Limit of Investigation)							

View looking at Pit 2 excavation.

RIG: Kubota U35-3 with 300mm bladed bucket

LOGGED: GRR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed 2.4 m

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Aspen Group
PROJECT: Pre-Purchase Due Deligence
LOCATION: 49 Beach Road, Batemans Bay

SURFACE LEVEL: 2.3 AHD
EASTING: 246087
NORTHING: 6043756

PIT No: 3
PROJECT No: 89333.00
DATE: 30/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
2	0.2	FILLING - grey and brown, fine to medium-grained sand with some gravel (concrete), shells and abundant rootlets, humid (TOPSOIL)		D E	0.1		PID : 0.6 ppm		
		FILLING - grey, brown, fine to medium-grained sand with shells (10% w/w), humid to damp		D E	0.5		PID : 0.4 ppm		
1				D E	1.0		PID : 0.2 ppm		1
				D E	1.5		PID : 0.1 ppm		
0	1.9	SILTY SAND - loose, dark grey and grey, silty fine to medium-grained sand, abundant shells, moist to wet (ESTUARINE)		D E	2.0		PID : 0.2 ppm		2
	2.3	- becoming brown and beige below 2.2 m						▼	
		Pit discontinued at 2.3m (Collapse of pit precluded further excavation)							

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

View looking at Pit 3 excavation. Note collapse of the left wall.

RIG: Kubota U35-3 with 300mm bladed bucket

LOGGED: GRR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed 2.3 m

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Aspen Group
PROJECT: Pre-Purchase Due Deligence
LOCATION: 49 Beach Road, Batemans Bay

SURFACE LEVEL: 2.2 AHD
EASTING: 246198
NORTHING: 6043724

PIT No: 4
PROJECT No: 89333.00
DATE: 30/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
2	0.3	FILLING - grey and brown, slightly silty, fine to medium-grained sand with some rootlets, humid (TOPSOIL)		D E	0.1		PID : 0.1 ppm		
		FILLING - grey and light brown, fine to medium-grained sand with some shells, damp		D E	0.5		PID : 0.2 ppm		
1				D E	1.0		PID : 0.3 ppm		1
		- becoming moist below 1.7 m		D E	1.5		PID : 0.0 ppm		
	1.9	SAND - dark grey, slightly silty, fine to medium-grained sand with some shells, wet (ESTUARINE)		D E	2.0		PID : 0.1 ppm	▼	2
0	2.2	Pit discontinued at 2.2m (Collapse of pit precluded further excavation)							

View looking at Pit 4 excavation. Note collapse (undercutting) of right wall.

RIG: Kubota U35-3 with 300mm bladed bucket

LOGGED: GRR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed 2.0 m

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Aspen Group
PROJECT: Pre-Purchase Due Deligence
LOCATION: 49 Beach Road, Batemans Bay

SURFACE LEVEL: 2.2 AHD
EASTING: 246309
NORTHING: 6043612

PIT No: 5
PROJECT No: 89333.00
DATE: 30/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.4	FILLING - light grey and grey, slightly sandy, silty, gravelly clay, humid		D E	0.1		PID : 0.6 ppm		
	0.6	- becoming brown, red brown and light grey below 0.3 m FILLING - dark grey, sligthly clayey, silty, fine to medium-grained sand, damp		D E	0.5		PID : 0.8 ppm		
	1.1	FILLING - brown, gravelly, medium to coarse-grained sand with some cobbles, damp - concrete rubble at 0.7 m		D E	1.0		PID : 0.3 ppm		
		SAND - loose to medium dense, brown and beige, fine to medium-grained sand with shells (20% w/w), damp (LITTORAL)		D E	1.5		PID : 0.2 ppm		
		- becoming wet below 2.0 m		D E	2.0		PID : 0.2 ppm	▼	
	2.4	Pit discontinued at 2.4m (Collapse of pit precluded further excavation)							

View looking at Pit 5 excavation.

RIG: Kubota U35-3 with 300mm toothed bucket

LOGGED: GRR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed 2.1 m

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Aspen Group
PROJECT: Pre-Purchase Due Deligence
LOCATION: 49 Beach Road, Batemans Bay

SURFACE LEVEL: 1.9 AHD
EASTING: 246261
NORTHING: 6043614

PIT No: 6
PROJECT No: 89333.00
DATE: 30/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		FILLING - brown and grey, silty clay with some gravel and cobbles, damp		D E	0.1		PID : 0.4 ppm		
	0.3	SAND - medium dense to dense, brown and grey, slightly silty, fine to medium-grained sand with some shells, damp (LITTORAL)		D E	0.5		PID : 0.6 ppm		
1	1			D E	1.0		PID : 0.2 ppm		1
		- becoming wet below 1.6 m		D E	1.5		PID : 0.1 ppm	▼	
0	2			D E	2.0		PID : 0.1 ppm		2
	2.1	Pit discontinued at 2.1m (Collapse of pit precluded further excavation)							

View looking at Pit 6 excavation. Note left wall collapse.

RIG: Kubota U35-3 with 300mm toothed bucket

LOGGED: GRR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed 1.6 m

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Aspen Group
PROJECT: Pre-Purchase Due Deligence
LOCATION: 49 Beach Road, Batemans Bay

SURFACE LEVEL: 1.4 AHD
EASTING: 246191
NORTHING: 6043637

PIT No: 7
PROJECT No: 89333.00
DATE: 30/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.4	FILLING - brown, silty clay with some gravel and cobbles, damp		D E	0.1		PID : 0.1 ppm		
		SAND - medium dense to dense, light brown, fine to medium-grained sand with some shells, damp (LITTORAL)		D E	0.5		PID : 0.2 ppm		
		- becoming wet below 1.0 m		D E	1.0		PID : 0.2 ppm	▼	
	1.6			D E	1.5		PID : 0.0 ppm		
		Pit discontinued at 1.6m (Collapse of pit precluded further excavation)							

View looking at Pit 7 excavation.

RIG: Kubota U35-3 with 300mm toothed bucket

LOGGED: GRR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed 1.1 m

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Aspen Group
PROJECT: Pre-Purchase Due Deligence
LOCATION: 49 Beach Road, Batemans Bay

SURFACE LEVEL: 2.0 AHD
EASTING: 246122
NORTHING: 6043628

PIT No: 8
PROJECT No: 89333.00
DATE: 30/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
2		FILLING - light red, brown, slightly silty, sandy, clayey fine to medium gravel, damp		D E	0.1		PID : 0.3 ppm		5 10 15 20
				D E	0.5		PID : 0.2 ppm		
1	1			D E	1.0		PID : 0.3 ppm		1
	1.2	SAND - grey, brown, slightly silty, fine to medium-grained sand with some shells, damp (LITTORAL)		D E	1.5		PID : 0.1 ppm		
0	1.9	SAND - loose, dark grey, fine to medium-grained sand with some shells, wet (LITTORAL)		D E	2.0		PID : 0.0 ppm	▼	2
	2	Pit discontinued at 2.2m (Collapse of pit precluded further excavation)							

View looking at Pit 8 excavation.

RIG: Kubota U35-3 with 300mm toothed bucket

LOGGED: GRR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed 2.0 m

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Aspen Group
PROJECT: Pre-Purchase Due Deligence
LOCATION: 49 Beach Road, Batemans Bay

SURFACE LEVEL: 1.7 AHD
EASTING: 246011
NORTHING: 6043648

PIT No: 9
PROJECT No: 89333.00
DATE: 30/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.3	FILLING - brown and grey, silty, fine to medium-grained sand with abundant rootlets, damp (TOPSOIL)		D E	0.1		PID : 0.1 ppm		
		SAND - medium dense, brown, fine to medium-grained sand with some silt, damp (POSSIBLE FILLING)		D E	0.5		PID : 0.0 ppm		
	1			D E	1.0		PID : 0.0 ppm		1
				D E	1.5		PID : 0.0 ppm	▼	
	1.9	- becoming wet below 1.8m							
	2	SAND - brown, fine to medium sand with some shells, wet		D E	2.0		PID : 0.1 ppm		2
	2.2	(LITTORAL)							
		Pit discontinued at 2.2m (Collapse of pit precluded further excavation)							

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

View looking at Pit 9 excavation.

RIG: Kubota U35-3 with 300mm toothed bucket

LOGGED: GRR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed 1.8 m

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Aspen Group
PROJECT: Pre-Purchase Due Deligence
LOCATION: 49 Beach Road, Batemans Bay

SURFACE LEVEL: 1.9 AHD
EASTING: 245953
NORTHING: 6043650

PIT No: 10
PROJECT No: 89333.00
DATE: 30/8/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		FILLING - brown, slightly silty, fine-grained sand with traces gravel and rootlets, damp (TOPSOIL)		D E	0.1		PID : 0.0 ppm		
	0.4	SAND - medium dense to dense, brown, fine to medium-grained sand with some shells, damp (LITTORAL)		D E	0.5		PID : 0.1 ppm		
	1	- becoming medium dense below 0.9m		D E	1.0		PID : 0.1 ppm		
				D E	1.5		PID : 0.1 ppm		
	2	- becoming dark brown and wet below 2.0 m		D E	2.0		PID : 0.0 ppm	▼	
	2.2	Pit discontinued at 2.2m (Collapse of pit precluded further excavation)							

View looking at Pit 10 excavation.

RIG: Kubota U35-3 with 300mm toothed bucket

LOGGED: GRR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed 2.1 m

REMARKS:

☒ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

Appendix G

EIL Calculation Spreadsheet

NEPC
National Environment Protection Council

Ecological Investigation Level Calculation Spreadsheet

Developed by CSIRO for the National Environment Protection Council

DISCLAIMER

This work has been prepared in good faith exercising due care and attention. However, no representation or warranty, express or implied, is made as to the relevance, accuracy, completeness or fitness for purpose of this work in respect to any particular user's circumstances. Users of this work should satisfy themselves concerning its application to, and where necessary seek expert advice about, their situation. The Environment Protection and Heritage Council, the National Environment Protection Council and the NEPC Service Corporation shall not be liable to any persons or entity with respect to liability, loss or damage caused or alleged to have been caused directly or indirectly by this work.

Instructions on how to use the Ecological Investigation Level Calculation Spreadsheet

1. Select the ‘Data input and EILs’ worksheet.
2. Within the ‘Inputs’ box click on the cell containing the name of a contaminant (cell B5) and a drop-down menu symbol will appear. Click on the drop-down menu symbol and select the contaminant appropriate to your investigation. The name of the selected contaminant will then automatically appear in the contaminant cell (B5).
3. Depending on the contaminant selected in step 2 the ‘Inputs’ box will be modified.
4. In the cases of arsenic, DDT, lead and naphthalene being selected the ‘Inputs’ box will be cleared of all other cells and no further information is required. The EILs for fresh (present in soil for < 2 years) and aged (present in soil for ≥ 2 years) contamination for these contaminants in the three land-uses are presented in the ‘Outputs’ box.
5. When chromium (III), copper, nickel, or zinc is selected then other cells within the ‘Inputs’ box will appear and each of these cells require information to be added.
6. To obtain EILs for fresh copper contamination you will need to enter a value for the cation exchange capacity, soil pH, soil organic carbon content and either the measured background concentration or the soil iron content. If you do not enter a value into all the necessary cells then a fresh EIL can not be calculated and '# Num!' will appear in the EIL output cells. To obtain EILs for aged copper contamination you will need to enter a value for cation exchange capacity, soil pH, soil organic carbon content and either the measured background concentration or the name of the state where the site is located (or the nearest state) and whether the traffic volume is high or low. If you do not enter a value into all the necessary cells then an aged EIL can not be calculated and '# Num!' will appear in the EIL output cells. After you have entered each value press the ‘enter’ button. If you do not have a measured background concentration ensure that this cell (B16) is empty (not having a number, including 0). This cell can be emptied by using the 'delete' or 'backspace' keys. Do not use any other buttons to clear the cells.
7. To obtain EILs for fresh nickel contamination you will need to enter a value for the cation exchange capacity and either a measured background concentration or the soil iron content. If you do not enter a value into all the necessary cells then a fresh EIL can not be calculated and '# Num!' will appear in the EIL output cells. To obtain EILs for aged nickel contamination you will need to enter a value for the cation exchange capacity and either a measured background concentration or the name of the state where the site is located (or the nearest state) and whether the traffic volume is high or low. If you do not enter a value into all the necessary cells then an aged EIL can not be calculated and '# Num!' will appear in the EIL output cells. After you have entered each value press the ‘enter’ button. If you do not have a measured background concentration ensure that this cell (B16) is empty (not having a number, including 0). This cell can be emptied by using the 'delete' or 'backspace' keys. Do not use any other buttons to clear the cells.
8. To obtain EILs for fresh chromium III contamination you will need to enter a value for the soil clay content and either a measured background concentration or the soil iron content. If you do not enter a value into all the necessary cells then a fresh EIL can not be calculated and '# Num!' will appear in the EIL output cells. To obtain EILs for aged chromium III contamination you will need to enter a value for the soil clay content and either a measured background concentration or the name of the state where the site is located (or the nearest state) and whether the traffic volume is high or low. If you do not enter a value into all the necessary cells then an aged EIL can not be calculated and '# Num!' will appear in the EIL output cells. After you have entered each value press the ‘enter’ button. After you have entered each value press the ‘enter’ button. If you do not have a measured background concentration ensure that this cell (B16) is empty (not having a number, including 0). This cell can be emptied by using the 'delete' or 'backspace' keys. Do not use any other buttons to clear the cells.
9. To obtain EILs for fresh zinc contamination you will need to enter a value for the cation exchange capacity, soil pH and either a measured background concentration or the soil iron content. If you do not enter a value into all the necessary cells then a fresh EIL can not be calculated and '# Num!' will appear in the EIL output cells. To obtain EILs for aged zinc contamination you will need to enter a value for cation exchange capacity, soil pH and either a measured background concentration or the name of the state where the site is located (or the nearest state) and whether the traffic volume is high or low. If you do not enter a value into all the necessary cells then an aged EIL can not be calculated and '# Num!' will appear in the EIL output cells. After you have entered each value press the ‘enter’ button. If you do not have a measured background concentration ensure that this cell (B16) is empty (not having a number, including 0). This cell can be emptied by using the 'delete' or 'backspace' keys. Do not use any other buttons to clear the cells.

Background information on the EIL Calculation Spreadsheet

This spreadsheet is to be used to calculate the Ecological Investigation Levels (EILs) that are to be used in the National Environment Protection (Assessment of Site Contamination) Measure when assessing a contaminated site. The EILs are numerical limits that are designed to protect soil and terrestrial flora and fauna (including pets and wildlife) and soil microbial processes from experiencing substantial deleterious effects caused by contaminants. Ecological Investigation Levels are the ecological equivalents of the investigation levels that aim to protect human health (HILs) and groundwater (GILs). Measured concentrations of contaminants in the soil at a site are compared to the appropriate EILs and if they exceed the EILs then further investigation in the form of an ecological risk assessment that conforms to Schedule B5a (NEPC, 2011) should be conducted.

This spreadsheet uses the methodology set out in Heemsbergen et al. (2008) and Schedule B(5)b (NEPC, 2011) to calculate EILs for contaminated sites that have three land-uses: (1) national parks and areas of high conservation value; (2) urban residential and open public space; and (3) commercial and industrial land.

The toxicity data used and the actual calculations of the EILs for arsenic, chromium III, copper, DDT, lead, naphthalene, nickel and zinc are presented in Warne et al (2009) and Schedule B(5)c (NEPC, 2010). However, it should be noted that the example EIL values presented in Warne et al. (2009) have been rounded off during their calculation and therefore the values presented in that report will not match exactly with those derived by the EIL calculation spreadsheet. The EIL values calculated by the spreadsheet ALWAYS take precedence over those presented in Warne et al. (2009).

The method for deriving the EILs was developed in order to overcome all of the major limitations of the previous EILs (NEPM, 1999). The exact method used to calculate each EIL varied according to

(1) the physicochemical properties of the contaminant – which modified the key exposure pathways that were considered;

(2) whether the toxicity data could be expressed in terms of added contaminant concentrations (obtained by subtracting the background concentration from the total contaminant concentration). When such data were available a limit of how much contaminant could be added to soil before ecotoxicological effects commenced was determined – termed the Added Contaminant Level (ACL). Either a measured or predicted ambient background concentration (ABC) was then added to the ACL to obtain the EIL (see below)

EIL = ACL + ABC

The advantage of this 'added risk' method is that the EILs can never be less than the ambient background concentration.

When the toxicity data could not be expressed in terms of added concentration then the EIL was expressed as a total concentration, and it does not consider the ambient background concentration at the site.

(3) whether high quality empirical relationships were available that could predict the toxicity of contaminants using soil physicochemical properties. When these were available soil-specific EILs could be derived (where soils with different properties will have their own unique EIL). When these relationships were not available generic EILs (where a single numerical EIL applies to all Australian soils of a particular land-use) were derived.

(4) whether an ageing leaching factor (ALF) was available. The vast majority of toxicity data is derived from laboratory-based experiments that use freshly spiked contaminants. The two characteristics that differ between such laboratory experiments and field-based experiments are ageing and leaching of contaminants. Toxicity data from laboratory-based experiments were used to derive EILs for fresh contamination (i.e. when the contaminant has been present in the soil for less than 2 years). When ALFs were available they were used to adjust laboratory-based toxicity data to field-based data that was combined with actual field data to derive EILs for aged contamination (i.e. where the contaminant has been present in the soil for 2 or more years).

References

Heemsbergen D, Warne MStJ, McLaughlin MJ, Kookana R. 2008. A Proposed Australian Methodology to Derive Ecological Investigation Levels in Contaminated Soils. CLW Science Report. Prepared for the NEPM Review Team. 76p.

NEPC (National Environment Protection Council). 1999. National Environment Protection (Assessment of Site Contamination) Measure 1999. Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater. NEPC, Adelaide, Australia.16p.

NEPC (National Environment Protection Council). 2011. National Environment Protection (Assessment of Site Contamination) Measure. Schedule B(5)a. Guideline on Risk Assessment. National Environment Protection Council, Adelaide, South Australia. 42p.

NEPC (National Environment Protection Council). 2011. National Environment Protection (Assessment of Site Contamination) Measure. Schedule B(5)b. Guidelines on the Australian methodology to derive Ecological Investigation Levels in contaminated soils. National Environment Protection Council, Adelaide, South Australia. 85p.

NEPC (National Environment Protection Council). 2011. National Environment Protection (Assessment of Site Contamination) Measure. Schedule B(5)c. Soil quality guidelines for arsenic, chromium III, copper, DDT, lead, naphthalene, nickel and zinc. National Environment Protection Council, Adelaide, South Australia. 185p.

Warne MStJ, Heemsbergen DA, McLaughlin MJ, Kookana RS. 2009. Proposed soil quality guidelines for arsenic, chromium (III), copper, DDT, lead, naphthalene, nickel and zinc. CSIRO Land and Water Science Report 44/09. 195p.

Inputs
Select contaminant from list below
As
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Arsenic generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	40
Urban residential and open public spaces	50	100
Commercial and industrial	80	160

Inputs
Select contaminant from list below
DDT
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	DDT generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	3	3
Urban residential and open public spaces	180	180
Commercial and industrial	640	640

Inputs
Select contaminant from list below
Naphthalene
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Naphthalene generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	10	10
Urban residential and open public spaces	170	170
Commercial and industrial	370	370

Inputs
Select contaminant from list below
Pb
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Lead generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	110	470
Urban residential and open public spaces	270	1100
Commercial and industrial	440	1800

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

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	20
Urban residential and open public spaces	20	20
Commercial and industrial	20	20

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

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	25	5
Urban residential and open public spaces	25	5
Commercial and industrial	25	5

Inputs
Select contaminant from list below
Cr_III
Below needed to calculate fresh and aged ACLs
Enter % clay (values from 0 to 100%)
0
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cr III soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	75	8
Urban residential and open public spaces	75	8
Commercial and industrial	75	8

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

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	35	75
Urban residential and open public spaces	35	75
Commercial and industrial	35	75

Appendix H

Laboratory Results Summary

Douglas Partners
Geotechnics | Environment | Groundwater

Table H1: Laboratory Results Summary (All results in mg/kg unless otherwise stated)

Sample ID	Depth	Heavy Metals															PAHs				PCB	OCP									OPP		Asbestos	
		As	Cd	Cr[1]	Cu	Pb	Hg	Ni	Zn	F1	F2	F3	F4	Benzene	Toluene	Ethyl benzene	Xylene	Total PAH	B(a)P	B(a)P TEQ	Napthalene		Aldrin + Dieldrin	Chlordane	DDT + DDD + DDE	Endosulfan	Endrin	Heptachlor	HCB	Methoxychlo	Chlorpyrifos	Total	ID	FA/AF
PQL		<4	<0.4	<1	<1	<1	<0.1	<1	<1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	-	<0.001
1	0.1	7	<0.4	8	10	10	<0.1	3	35	<25	<50	140	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	NAD	<0.001
1	0.5	9	<0.4	5	3	4	<0.1	3	15	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	-	-
2	0.1	9	<0.4	5	3	4	<0.1	3	14	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	NAD	<0.001
BD1	-	9	<0.4	4	2	3	<0.1	3	11	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	0.1	8	<0.4	5	5	4	<0.1	3	16	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	NAD	<0.001
3	0.5	9	<0.4	3	2	2	<0.1	2	7	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	-	-
4	0.1	7	<0.4	7	5	13	<0.1	3	19	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.4	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	NAD	<0.001
5	0.1	5	<0.4	10	9	8	<0.1	4	18	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	NAD	<0.001
5	0.5	6	<0.4	7	6	7	<0.1	4	19	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	-	-
6	0.1	6	<0.4	6	5	18	<0.1	2	37	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	NAD	<0.001
7	0.1	8	<0.4	5	3	7	<0.1	3	18	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	NAD	<0.001
BD2	-	9	<0.4	5	3	7	<0.1	2	17	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	0.5	8	<0.4	6	6	23	<0.1	5	29	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	-	-
8	0.1	6	<0.4	10	9	11	<0.1	6	35	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	NAD	<0.001
9	0.1	8	<0.4	6	5	5	<0.1	3	16	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	NAD	<0.001
10	0.1	7	<0.4	4	2	7	<0.1	1	13	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	NAD	<0.001
10	0.5	11	<0.4	3	1	2	<0.1	2	8	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.2	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	-	-
Frag1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	AD	-
Summary Statistics																																		
Min		5	<0.4	3	1	2	<0.1	1	7	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05	<0.05	<0.5	<0.1	<0.7	<0.1	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.2	-	-
Max		11	<0.4	10	10	23	<0.1	6	37	<25	<50	<100	<100	<0.2	<0.5	<1	<3	0.9	<0.05	<0.5	0.6	<0.7	<0.1	<0.2	<0.3	<0.3	<0.2	<0.2	<0.1	<0.1	<0.2	<1.3	-	-
Mean		7.8	<0.4	5.8	4.6	7.9	<0.1	3.1	19.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Standard Deviation		1.5	0.0	2.0	2.6	5.5	0.0	1.2	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95% UCL		-	-	6.7	-	-	-	3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Site Assessment Criteria																																		
HIL-A		100	20	100	6000	300	40	400	7400	-	-	-	-	-	-	-	-	300	-	3	-	1	6	50	240	270	10	6	10	300	160		Absence/presence	
HSL-A Direct Contact		-	-	-	-	-	-	-	-	4400	3300	4500	6300	100	14000	4500	12000	-	-	-	1400	-	-	-	-	-	-	-	-	-	-	-	-	-
HSL-A Vapour Intrusion		-	-	-	-	-	-	-	-	45	110	-	-	0.5	160	55	40	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Management Limit		-	-	-	-	-	-	-	-	700	1000	2500	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EIL		100	-	8	20	1100	-	5	75	-	-	-	-	-	-	-	-	-	-	-	170	-	-	-	180	-	-	-	-	-	-	-	-	-
ESL		-	-	-	-	-	-	-	-	180	120	1300	5600	65	105	125	45	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

-	Not tested/not available
*	HIL for pentachlorophenol adopted as an initial screen
BD1-BD2	Replicate sample of sample listed directly above
PQL	Practical quantification limit
NAD	No asbestos detected at reporting limit of 0.1g/kg
AD	Chrysotile and amosite asbestos detected
1	Total chromium used as an initial screen
HIL	NEPC, *National Environment Protection (Assessment of Site Contamination) Measure 1999* (Amended 2013), Schedule B1, Table 1A (1) Health investigation levels for soil contaminants, Residential A.
HSL	NEPC, *National Environment Protection (Assessment of Site Contamination) Measure 1999* (Amended 2013), Schedule B1, Table 1A (3) Soil health screening levels for vapour intrusion, for low-high density residential, sand at depth of 0 to <1m.
Management Limits	NEPC, *National Environment Protection (Assessment of Site Contamination) Measure 1999* (Amended 2013), Schedule B1, Table 1B (7) Management Limits for TPH fractions F1-F4 in soil, residential, parkland and public open space.
EIL	EILs calculated using ABC and ACL
ESL	NEPC, *National Environment Protection (Assessment of Site Contamination) Measure 1999* (Amended 2013), Schedule B1, Table 1B (6) ESLs for TPH fractions F1 - F4, BTEX and benzo(a)pyrene in soil, urban residential and public open space.
F1	Calculated as being TRH C_6-C_{10} minus BTEX
F2	Calculated as being TRH >C_{10}-C_{16} minus Napthalene
F3	TRH >C16-C34
F4	TRH >C34-C40

Appendix I

Laboratory Chain of Custody Documents, Sample Receipt Advice and Certificate of Analysis

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY

Project Name: BATEMANS BAY, Pre-Purchase Due Diligence		**To:** Envirolab Services
Project No: 89333.00	**Sampler: GRR**	12 Ashley St Chatswood 2067
Project Mgr: Kenton Horsley	**Mob. Phone: 0418256163**	**Attn:** Tania Notaras
Email: kenton.horsley@douglaspartners.com.au		**Phone:** (02) 9910 6200 **Fax**: (02) 9910 6201
Date Required: 2-Day		**Email**: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W – water)	Container type (G – glass P - plastic)	Analytes: Combo 8A (NEPM ASB)	Combo 6	Combo 1m	Asbestos ID						Notes/preservation
1/0.1	1	30.08.17	S	G&P	X									
1/0.5	2	30.08.17	S	G&P		X								
1/1.0	3	30.08.17	S	G&P										
1/1.5	4	30.08.17	S	G&P										
1/2.0	5	30.08.17	S	G&P										
2/0.1	6	30.08.17	S	G&P	X									
2/0.5	7	30.08.17	S	G&P										
2/1.0	8	30.08.17	S	G&P										
2/1.5	9	30.08.17	S	G&P										
2/2.0	10	30.08.17	S	G&P										
2/2.5	11	30.08.17	S	G&P										
3/0.1	12	30.08.17	S	G&P	X									
3/0.5	13	30.08.17	S	G&P		X								

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

Job No: 174652
Date Received: 31/8/17
Time Received: 17:10
Received by: RW
Temp: Cool/Ambient 15.5°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

Lab Report No:		
Send Results to: Douglas Partners Pty Ltd	**Address:** PO Box 486, Unanderra NSW 2526	**Phone**: (02) 4271 1836 **Fax:** (02) 4271 1897
Relinquished by: KGH	**Transported to laboratory by: Clippers**	
Signed:	**Date & Time: 31/8/17 9am**	**Received By:** ELS Rebecca 31/8/17 17.10 RW

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY

Project Name: BATEMANS BAY, Pre-Purchase Due Diligence		**To:** Envirolab Services
Project No: 89333.00	**Sampler: GRR**	12 Ashley St Chatswood 2067
Project Mgr: Kenton Horsley	**Mob. Phone: 0418256163**	**Attn:** Tania Notaras
Email: kenton.horsley@douglaspartners.com.au		**Phone:** (02) 9910 6200 **Fax**: (02) 9910 6201
Date Required: 2-Day		**Email**: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W – water)	Container type (G – glass P - plastic)	Analytes: Combo 8A (NEPM ASB)	Combo 6	Combo 1m	Asbestos ID						Notes/preservation
3/1.0	14	30.08.17	S	G&P										
3/1.5	15	30.08.17	S	G&P										
3/2.0	16	30.08.17	S	G&P										
4/0.1	17	30.08.17	S	G&P	X									
4/0.5	18	30.08.17	S	G&P										
4/1.0	19	30.08.17	S	G&P										
4/1.5	20	30.08.17	S	G&P										
4/2.0	21	30.08.17	S	G&P										
5/0.1	22	30.08.17	S	G&P	X									
5/0.5	23	30.08.17	S	G&P		X								
5/1.0	24	30.08.17	S	G&P										
5/1.5	25	30.08.17	S	G&P										
5/2.0	26	30.08.17	S	G&P										

Lab Report No:		
Send Results to: Douglas Partners Pty Ltd	**Address:** PO Box 486, Unanderra NSW 2526	**Phone**: (02) 4271 1836 **Fax:** (02) 4271 1897
Relinquished by: KGH		**Transported to laboratory by: Clippers**
Signed:	**Date & Time: 31/8/17 9am**	**Received By:**

Douglas Partners
Geotechnics I Environment I Groundwater

CHAIN OF CUSTODY

Project Name: BATEMANS BAY, Pre-Purchase Due Diligence		**To:** Envirolab Services
Project No: 89333.00	**Sampler: GRR**	12 Ashley St Chatswood 2067
Project Mgr: Kenton Horsley	**Mob. Phone: 0418256163**	**Attn:** Tania Notaras
Email: kenton.horsley@douglaspartners.com.au		**Phone:** (02) 9910 6200 **Fax**: (02) 9910 6201
Date Required: 2-Day		**Email**: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W – water)	Container type (G – glass P - plastic)	Analytes: Combo 8A (NEPM ASB)	Combo 6	Combo 1m	Asbestos ID						Notes/preservation
6/0.1	27	30.08.17	S	G&P	X									
6/0.5	28	30.08.17	S	G&P										
6/1.0	29	30.08.17	S	G&P										
6/1.5	30	30.08.17	S	G&P										
6/2.0	31	30.08.17	S	G&P										
7/0.1	32	30.08.17	S	G&P	X									
7/0.5	33	30.08.17	S	G&P		X								
7/1.0	34	30.08.17	S	G&P										
7/1.5	35	30.08.17	S	G&P										
8/0.1	36	30.08.17	S	G&P	X									
8/0.5	37	30.08.17	S	G&P										
8/1.0	38	30.08.17	S	G&P										
8/1.5	39	30.08.17	S	G&P										

Lab Report No:		
Send Results to: Douglas Partners Pty Ltd	**Address:** PO Box 486, Unanderra NSW 2526	**Phone**: (02) 4271 1836 **Fax:** (02) 4271 1897
Relinquished by: KGH		**Transported to laboratory by: Clippers**
Signed:	**Date & Time: 31/8/17 9am**	**Received By:**

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY

Project Name: BATEMANS BAY, Pre-Purchase Due Diligence		**To:** Envirolab Services
Project No: 89333.00	**Sampler: GRR**	12 Ashley St Chatswood 2067
Project Mgr: Kenton Horsley	**Mob. Phone: 0418256163**	**Attn:** Tania Notaras
Email: kenton.horsley@douglaspartners.com.au		**Phone:** (02) 9910 6200 **Fax**: (02) 9910 6201
Date Required: 2-Day		**Email**: tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W – water)	Container type (G – glass P - plastic)	Analytes: Combo 8A (NEPM ASB)	Combo 6	Combo 1m	Asbestos ID						Notes/preservation
8/2.0	40	30.08.17	S	G&P										
9/0.1	41	30.08.17	S	G&P	X									
9/0.5	42	30.08.17	S	G&P										
9/1.0	43	30.08.17	S	G&P										
9/1.5	44	30.08.17	S	G&P										
9/2.0	45	30.08.17	S	G&P										
10/0.1	46	30.08.17	S	G&P	X									
10/0.5	47	30.08.17	S	G&P		X								
10/1.0	48	30.08.17	S	G&P										
BD1	49	30.08.17	S	G&P			X							
BD2	50	30.08.17	S	G&P			X							
Frag1	51	30.08.17	Frag	P				X						

extra 4 52
2w 5 53

Lab Report No:		
Send Results to: Douglas Partners Pty Ltd	**Address:** PO Box 486, Unanderra NSW 2526	**Phone**: (02) 4271 1836 **Fax:** (02) 4271 1897
Relinquished by: KGH		**Transported to laboratory by: Clippers**
Signed:	**Date & Time: 31/8/17 9am**	**Received By:**

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Unanderra
Attention	Kenton Horsley

Sample Login Details

Your reference	89333.00, Batemans Bay, Pre-Purchase Due Diligence
Envirolab Reference	174652
Date Sample Received	31/08/2017
Date Instructions Received	31/08/2017
Date Results Expected to be Reported	04/09/2017

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	52 soils, 1 material
Turnaround Time Requested	2 days
Temperature on Receipt (°C)	15.5
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticidesin soil	Organophosphorus Pesticides	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils NEPM	Asbestos ID - materials	On Hold
1-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
1-0.5	✓	✓	✓	✓	✓	✓	✓				
1-1.0											✓
1-1.5											✓
1-2.0											✓
2-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
2-0.5											✓
2-1.0											✓
2-1.5											✓
2-2.0											✓
2-2.5											✓
3-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
3-0.5	✓	✓	✓	✓	✓	✓	✓				
3-1.0											✓
3-1.5											✓
3-2.0											✓
4-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
4-0.5											✓
4-1.0											✓
4-1.5											✓
4-2.0											✓
5-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
5-0.5	✓	✓	✓	✓	✓	✓	✓				
5-1.0											✓
5-1.5											✓
5-2.0											✓
6-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
6-0.5											✓
6-1.0											✓
6-1.5											✓
6-2.0											✓
7-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticidesin soil	Organophosphorus Pesticides	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils NEPM	Asbestos ID - materials	On Hold
7-0.5	✓	✓	✓	✓	✓	✓	✓				
7-1.0											✓
7-1.5											✓
8-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
8-0.5											✓
8-1.0											✓
8-1.5											✓
8-2.0											✓
9-00.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
9-0.5											✓
9-1.0											✓
9-1.5											✓
9-2.0											✓
10-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
10-0.5	✓	✓	✓	✓	✓	✓	✓				
10-1.0											✓
BD1	✓	✓					✓				
BD2	✓	✓					✓				
Frag1										✓	
4											✓
5											✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 174652

Client Details

Client	Douglas Partners Unanderra
Attention	Kenton Horsley
Address	Unit 1, 1 Luso Drive, Unanderra, NSW, 2526

Sample Details

Your Reference	**89333.00, Batemans Bay, Pre-Purchase Due Diligence**
Number of Samples	52 soils, 1 material
Date samples received	31/08/2017
Date completed instructions received	31/08/2017

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	04/09/2017
Date of Issue	04/09/2017

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

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

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Paul Ching
Authorised by Asbestos Approved Signatory: Paul Ching

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Jeremy Faircloth, Organics Supervisor
Leon Ow, Chemist
Paul Ching, Senior Analyst
Steven Luong, Chemist

Authorised By

David Springer, General Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		174652-1	174652-2	174652-6	174652-12	174652-13
Your Reference	UNITS	1	1	2	3	3
Depth		0.1	0.5	0.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017	04/09/2017	04/09/2017	04/09/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} 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
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	105	102	105	88	106

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		174652-17	174652-22	174652-23	174652-27	174652-32
Your Reference	UNITS	4	5	5	6	7
Depth		0.1	0.1	0.5	0.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017	04/09/2017	04/09/2017	04/09/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} 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
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	99	102	100	102	101

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		174652-33	174652-36	174652-41	174652-46	174652-47
Your Reference	UNITS	7	8	9	10	10
Depth		0.5	0.1	00.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017	04/09/2017	04/09/2017	04/09/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} 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
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	110	104	107	105	102

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		174652-49	174652-50
Your Reference	UNITS	BD1	BD2
Depth		-	-
Date Sampled		30/08/2017	30/08/2017
Type of sample		Soil	Soil
Date extracted	-	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	96	102

svTRH (C10-C40) in Soil						
Our Reference		174652-1	174652-2	174652-6	174652-12	174652-13
Your Reference	UNITS	1	1	2	3	3
Depth		0.1	0.5	0.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	02/09/2017	02/09/2017	02/09/2017	02/09/2017	02/09/2017
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	150	<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	140	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	140	<50	<50	<50	<50
Surrogate o-Terphenyl	%	83	81	88	87	81

svTRH (C10-C40) in Soil						
Our Reference		174652-17	174652-22	174652-23	174652-27	174652-32
Your Reference	UNITS	4	5	5	6	7
Depth		0.1	0.1	0.5	0.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	02/09/2017	02/09/2017	02/09/2017	02/09/2017	02/09/2017
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{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
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	84	82	80	82	90

svTRH (C10-C40) in Soil						
Our Reference		174652-33	174652-36	174652-41	174652-46	174652-47
Your Reference	UNITS	7	8	9	10	10
Depth		0.5	0.1	00.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	02/09/2017	02/09/2017	02/09/2017	02/09/2017	02/09/2017
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{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
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	88	83	82	90	82

svTRH (C10-C40) in Soil			
Our Reference		174652-49	174652-50
Your Reference	UNITS	BD1	BD2
Depth		-	-
Date Sampled		30/08/2017	30/08/2017
Type of sample		Soil	Soil
Date extracted	-	01/09/2017	01/09/2017
Date analysed	-	02/09/2017	02/09/2017
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	89	88

PAHs in Soil						
Our Reference		174652-1	174652-2	174652-6	174652-12	174652-13
Your Reference	UNITS	1	1	2	3	3
Depth		0.1	0.5	0.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017	04/09/2017	04/09/2017	04/09/2017
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	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<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	<0.05	<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 +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	92	91	92	96	90

PAHs in Soil						
Our Reference		174652-17	174652-22	174652-23	174652-27	174652-32
Your Reference	UNITS	4	5	5	6	7
Depth		0.1	0.1	0.5	0.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017	04/09/2017	04/09/2017	04/09/2017
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	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<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	<0.05	<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 +ve PAH's	mg/kg	0.4	<0.05	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	93	89	91	92	92

PAHs in Soil						
Our Reference		174652-33	174652-36	174652-41	174652-46	174652-47
Your Reference	UNITS	7	8	9	10	10
Depth		0.5	0.1	00.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017	04/09/2017	04/09/2017	04/09/2017
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	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<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	<0.05	<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 +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	93	87	91	90	90

Organochlorine Pesticides in soil						
Our Reference		174652-1	174652-2	174652-6	174652-12	174652-13
Your Reference	UNITS	1	1	2	3	3
Depth		0.1	0.5	0.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
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
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	81	83	89	90	89

Organochlorine Pesticides in soil						
Our Reference		174652-17	174652-22	174652-23	174652-27	174652-32
Your Reference	UNITS	4	5	5	6	7
Depth		0.1	0.1	0.5	0.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
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
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	83	92	81	86	87

Organochlorine Pesticides in soil						
Our Reference		174652-33	174652-36	174652-41	174652-46	174652-47
Your Reference	UNITS	7	8	9	10	10
Depth		0.5	0.1	00.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
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
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	81	83	95	81

Organophosphorus Pesticides						
Our Reference		174652-1	174652-2	174652-6	174652-12	174652-13
Your Reference	UNITS	1	1	2	3	3
Depth		0.1	0.5	0.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
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	%	81	83	89	90	89

Organophosphorus Pesticides						
Our Reference		174652-17	174652-22	174652-23	174652-27	174652-32
Your Reference	UNITS	4	5	5	6	7
Depth		0.1	0.1	0.5	0.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
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	%	83	92	81	86	87

Organophosphorus Pesticides						
Our Reference		174652-33	174652-36	174652-41	174652-46	174652-47
Your Reference	UNITS	7	8	9	10	10
Depth		0.5	0.1	00.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
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	%	100	81	83	95	81

PCBs in Soil						
Our Reference		174652-1	174652-2	174652-6	174652-12	174652-13
Your Reference	UNITS	1	1	2	3	3
Depth		0.1	0.5	0.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
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
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	81	83	89	90	89

PCBs in Soil						
Our Reference		174652-17	174652-22	174652-23	174652-27	174652-32
Your Reference	UNITS	4	5	5	6	7
Depth		0.1	0.1	0.5	0.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
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
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	83	92	81	86	87

PCBs in Soil						
Our Reference		174652-33	174652-36	174652-41	174652-46	174652-47
Your Reference	UNITS	7	8	9	10	10
Depth		0.5	0.1	00.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
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
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	100	81	83	95	81

Acid Extractable metals in soil						
Our Reference		174652-1	174652-2	174652-6	174652-12	174652-13
Your Reference	UNITS	1	1	2	3	3
Depth		0.1	0.5	0.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Arsenic	mg/kg	7	9	9	8	9
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	5	5	5	3
Copper	mg/kg	10	3	3	5	2
Lead	mg/kg	10	4	4	4	2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	3	3	3	2
Zinc	mg/kg	35	15	14	16	7

Acid Extractable metals in soil						
Our Reference		174652-17	174652-22	174652-23	174652-27	174652-32
Your Reference	UNITS	4	5	5	6	7
Depth		0.1	0.1	0.5	0.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Arsenic	mg/kg	7	5	6	6	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	10	7	6	5
Copper	mg/kg	5	9	6	5	3
Lead	mg/kg	13	8	7	18	7
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	4	4	2	3
Zinc	mg/kg	19	18	19	37	18

Acid Extractable metals in soil						
Our Reference		174652-33	174652-36	174652-41	174652-46	174652-47
Your Reference	UNITS	7	8	9	10	10
Depth		0.5	0.1	00.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Arsenic	mg/kg	8	6	8	7	11
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	10	6	4	3
Copper	mg/kg	6	9	5	2	1
Lead	mg/kg	23	11	5	7	2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	6	3	1	2
Zinc	mg/kg	29	35	16	13	8

Acid Extractable metals in soil			
Our Reference		174652-49	174652-50
Your Reference	UNITS	BD1	BD2
Depth		-	-
Date Sampled		30/08/2017	30/08/2017
Type of sample		Soil	Soil
Date prepared	-	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017
Arsenic	mg/kg	9	9
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	4	5
Copper	mg/kg	2	3
Lead	mg/kg	3	7
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	3	2
Zinc	mg/kg	11	17

Moisture						
Our Reference		174652-1	174652-2	174652-6	174652-12	174652-13
Your Reference	UNITS	1	1	2	3	3
Depth		0.1	0.5	0.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017	04/09/2017	04/09/2017	04/09/2017
Moisture	%	15	8.7	5.8	4.8	4.3

Moisture						
Our Reference		174652-17	174652-22	174652-23	174652-27	174652-32
Your Reference	UNITS	4	5	5	6	7
Depth		0.1	0.1	0.5	0.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017	04/09/2017	04/09/2017	04/09/2017
Moisture	%	6.3	11	8.7	5.6	13

Moisture						
Our Reference		174652-33	174652-36	174652-41	174652-46	174652-47
Your Reference	UNITS	7	8	9	10	10
Depth		0.5	0.1	00.1	0.1	0.5
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017	04/09/2017	04/09/2017	04/09/2017
Moisture	%	7.8	12	4.0	3.6	3.1

Moisture			
Our Reference		174652-49	174652-50
Your Reference	UNITS	BD1	BD2
Depth		-	-
Date Sampled		30/08/2017	30/08/2017
Type of sample		Soil	Soil
Date prepared	-	01/09/2017	01/09/2017
Date analysed	-	04/09/2017	04/09/2017
Moisture	%	4.7	15

Misc Soil - Inorg						
Our Reference		174652-1	174652-6	174652-12	174652-17	174652-22
Your Reference	UNITS	1	2	3	4	5
Depth		0.1	0.1	0.1	0.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		174652-27	174652-32	174652-36	174652-41	174652-46
Your Reference	UNITS	6	7	8	9	10
Depth		0.1	0.1	0.1	00.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Date analysed	-	01/09/2017	01/09/2017	01/09/2017	01/09/2017	01/09/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Asbestos ID - soils NEPM						
Our Reference		174652-1	174652-6	174652-12	174652-17	174652-22
Your Reference	UNITS	1	2	3	4	5
Depth		0.1	0.1	0.1	0.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	4/09/2017	4/09/2017	4/09/2017	4/09/2017	4/09/2017
Sample mass tested	g	318.1	471.14	241.86	226.16	579.67
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		174652-27	174652-32	174652-36	174652-41	174652-46
Your Reference	UNITS	6	7	8	9	10
Depth		0.1	0.1	0.1	00.1	0.1
Date Sampled		30/08/2017	30/08/2017	30/08/2017	30/08/2017	30/08/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	4/09/2017	4/09/2017	4/09/2017	4/09/2017	4/09/2017
Sample mass tested	g	384.38	496.82	225.14	463.49	673.22
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - materials		
Our Reference		174652-51
Your Reference	UNITS	Frag1
Depth		-
Date Sampled		30/08/2017
Type of sample		Material
Date analysed	-	4/09/2017
Mass / Dimension of Sample	-	85x65x7mm
Sample Description	-	A)Grey B)Beige fibre cement fragments
Asbestos ID in materials	-	A)Chrysotile asbestos detected Amosite asbestos detected B)No asbestos detected Organic fibre detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
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.

Method ID	Methodology Summary
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. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
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. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
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-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. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	174652-6
Date extracted	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Date analysed	-			04/09/2017	1	04/09/2017	04/09/2017		04/09/2017	04/09/2017
TRH C_6 - C_9	mg/kg	25	Org-016	<25	1	<25	<25	0	80	84
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	1	<25	<25	0	80	84
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	80	81
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	95	85
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	78	86
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	71	83
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	75	90
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	96	1	105	107	2	113	104

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
Date analysed	-			[NT]	36	04/09/2017	04/09/2017		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	[NT]	36	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	[NT]	36	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	36	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	36	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	36	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	36	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	36	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	36	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	36	104	112	7	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	174652-6
Date extracted	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Date analysed	-			02/09/2017	1	02/09/2017	02/09/2017		02/09/2017	02/09/2017
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	1	<50	<50	0	124	104
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	1	<100	<100	0	127	104
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	1	150	110	31	106	105
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	1	<50	<50	0	124	104
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	1	140	<100	33	127	104
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	1	<100	<100	0	106	105
Surrogate o-Terphenyl	%		Org-003	86	1	83	86	4	105	88

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
Date analysed	-			[NT]	36	02/09/2017	02/09/2017		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	[NT]	36	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	[NT]	36	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	[NT]	36	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	[NT]	36	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	[NT]	36	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	[NT]	36	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	36	83	90	8	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	174652-6
Date extracted	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Date analysed	-			04/09/2017	1	04/09/2017	04/09/2017		04/09/2017	04/09/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	98	98
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	104	110
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	102	102
Anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	100	103
Pyrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	103	105
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	111	112
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	<0.05	<0.05	0	111	111
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	94	1	92	93	1	89	89

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
Date analysed	-			[NT]	36	04/09/2017	04/09/2017		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	36	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	36	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	36	87	95	9	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	174652-6
Date extracted	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Date analysed	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
HCB	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	81	78
gamma-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	111	102
Heptachlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	101	96
delta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	98	94
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	97	93
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	100	97
Dieldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	108	103
Endrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	96	90
pp-DDD	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	102	98
Endosulfan II	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	101	89
Methoxychlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	93	1	81	82	1	108	104

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
Date analysed	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	36	81	86	6	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	174652-6
Date extracted	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Date analysed	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	99	100
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	104	96
Dimethoate	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	91	93
Fenitrothion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	110	78
Malathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	115	105
Parathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	114	107
Ronnel	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	109	103
Surrogate TCMX	%		Org-008	93	1	81	82	1	85	96

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
Date analysed	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-008	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-008	[NT]	36	81	86	6	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	174652-6
Date extracted	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Date analysed	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	101	102
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	93	1	81	82	1	85	96

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
Date analysed	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	[NT]	36	81	86	6	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	174652-6
Date prepared	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Date analysed	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Arsenic	mg/kg	4	Metals-020	<4	1	7	8	13	107	106
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	99	88
Chromium	mg/kg	1	Metals-020	<1	1	8	9	12	108	96
Copper	mg/kg	1	Metals-020	<1	1	10	8	22	107	108
Lead	mg/kg	1	Metals-020	<1	1	10	9	11	102	93
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	111	111
Nickel	mg/kg	1	Metals-020	<1	1	3	3	0	101	90
Zinc	mg/kg	1	Metals-020	<1	1	35	29	19	103	86

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
Date analysed	-			[NT]	36	01/09/2017	01/09/2017		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	36	6	6	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	36	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	36	10	9	11	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	36	9	8	12	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	36	11	11	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	36	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	36	6	5	18	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	36	35	31	12	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	174652-6
Date prepared	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Date analysed	-			01/09/2017	1	01/09/2017	01/09/2017		01/09/2017	01/09/2017
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	103	98

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

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.

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, samples requested for asbestos analysis are below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination)Measure, Schedule B1, May 2013.

Sample 174652-51; The supplied sample was sub-sampled (174652-51A & 174652-51B) in order to accurately report the analytical results representative of the entire sample, as per AS4964-2004.

Appendix J

Data Quality Assessment

QA/QC PROCEDURES AND RESULTS

Q1. Data Quality Objectives

The monitoring programme has been devised broadly in accordance with the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended 2013 (NEPC 2013). The DQO process is outlined as follows:

- Stating the Problem;
- Identifying the Decision;
- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors; and
- Optimising the Design for Obtaining Data.

The DQOs have been addressed within the report as shown in Table Q1.

Table Q1: Data Quality Objectives

Data Quality Objective	Report Section Where Addressed
State the Problem	S1: Introduction
Identify the Decision	S10: Conclusion and Recommendations
Identify Inputs to the Decision	S1: Introduction S5: Site Walkover S6:Preliminary Conceptual Site Model S7 Sampling and Analysis Plan S8:Site Assessment Criteria S9: Results
Define the Boundary of the Assessment	S2: Scope of Works S3: Site Description and Regional Geology
Develop a Decision Rule	S6: Preliminary Conceptual Site Model S7: Sampling and Analysis Plan S8: Site Assessment Criteria
Specify Acceptable Limits on Decision Errors	QA/QC: Procedures and Results - Appendix J
Optimise the Design for Obtaining Data	S2: Scope of Work QA/QC: Procedures and Results - Appendix J

Q2. FIELD QUALITY ASSURANCE AND QUALITY CONTROL

1. Field Quality Assurance and Quality Control Procedure

1.1 Sample Documentation

Field QC included sample transportation under Chain-of-Custody procedures. Completed Chain-of-Custody documentation certifying the condition of the samples upon arrival at the laboratory are included with the Laboratory Reports, attached.

1.2 Replicate Analysis

Field QC also comprised collection of two replicate samples during the course of sampling, which were tested for QC purposes.

1.3 Relative Percentage Difference

Consistency of laboratory results was measured by the relative percentage differences (RPDs) for replicate samples, calculated as the difference in analyte concentrations between primary and replicate samples, divided by the average of the two results and expressed as a percentage. Australian Standard AS 4482.1 "*Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*" 2005 indicates that an RPD of ± 30% can be considered acceptable for inorganics, and ± 50% for organics. RPDs for the replicate samples for the current monitoring round are shown in the tables below.

Table QA1: RPD Results

Sample	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	F1	F2	F3
2	<0.4	5	3	4	<0.1	3	14	<25	<50	<100	<100
BD1	<0.4	4	2	3	<0.1	3	11	<25	<50	<100	<100
Difference	0	1	1	1	0	0	3	0	0	0	0
RPD %	0	22	40	29	0	0	24	0	0	0	0

Sample	F4	Benzene	Toluene	Ethyl Benzene	Xylene
2	<0.2	<0.5	<1	<3	<2
BD1	<0.2	<0.5	<1	<3	<2
Difference	0	0	0	0	0
RPD %	0	0	0	0	0

Table QA1 indicate that one (Chromium) of the 16 analytes had an RPD greater than the nominated acceptance range.

Given the actual difference between the chromium was low and the low concentrations of the analyte, it is considered that the precision and accuracy of the laboratory analyses is acceptable. It is therefore considered that the precision and accuracy of the laboratory analyses were acceptable and the data set is useable.

Table QA2: RPD Results

Sample	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	F1	F2	F3
7	<0.4	5	3	7	<0.1	3	18	<25	<50	<100	<100
BD2	<0.4	5	3	7	<0.1	2	17	<25	<50	<100	<100
Difference	0	0	0	0	0	1	1	0	0	0	0
RPD %	0	0	0	0	0	40	6	0	0	0	0

Sample	F4	Benzene	Toluene	Ethyl Benzene	Xylene
2	<0.2	<0.5	<1	<3	<2
BD1	<0.2	<0.5	<1	<3	<2
Difference	0	0	0	0	0
RPD %	0	0	0	0	0

Table QA2 indicate that one (Mercury) of the 16 analytes had an RPD greater than the nominated acceptance range.

Given the actual difference between the mercury was low and the low concentrations of the analyte, it is considered that the precision and accuracy of the laboratory analyses is acceptable. It is therefore considered that the precision and accuracy of the laboratory analyses were acceptable and the data set is useable.

2. Laboratory Quality Assurance and Quality Control

The analytical laboratory is certified by the National Association of Testing Authorities (NATA) and is required to conduct in-house QA/QC procedures. These are normally incorporated into every analytical run and include the following:

2.1 Reagent Blank

A reagent blank sample is prepared and analysed at the beginning of every analytical run following calibration of the analytical apparatus. The laboratory results for reagent blanks for water analyse indicated concentrations of all analytes to be below respective laboratory practical quantitation

(detection) limits, indicating acceptable QA/QC standards. These results are included in the laboratory reports, attached.

2.2 Spike Recovery

This is a sample replicate prepared by adding a known amount of analyte prior to analysis, and then treated exactly the same as all other samples. The recovery result indicates the proportion of the known concentration of the analyte that is detected during analysis. These results are included in the laboratory reports attached. The spike recovery rates were compared with the limits specified by Envirolab Services Pty Ltd. All recorded spike recovery results were within the acceptable limits. It is therefore considered that the results indicate that the analytical results are not significantly affected by matrix interference.

2.3 Surrogate Recovery

This sample is prepared by adding a known amount of surrogate, which behaves similarly to the analyte, prior to analysis to each sample. The recovery result indicates the proportion of the known concentration of the surrogate was detected during analysis. These results are included in the laboratory reports attached. All surrogate recoveries were found to be within Envirolab Services Pty Ltd acceptance limits, indicating that the extraction was effectively and appropriately executed.

2.4 Duplicates

These are additional portions of a sample that are analysed in exactly the same manner as all other samples. The duplicate sample results are considered acceptable and are included in the laboratory results attached.

Overall the field and laboratory data set are considered reliable and representative of the conditions on site in the sampling locations and are suitable for the intended use.

Q3. QA/QC DATA EVALUATION

Data collected throughout the sampling even as part of this PSI is considered to be suitable for inclusion in this report. Field and laboratory analysis QA/QC procedures were followed during sampling and analysis protocols allowing for maximum reliability of results. Results from RPD calculations and internal laboratory QA/QC procedures further demonstrate the reliability of the results for the purposes of this report.