eiaustralia

Contamination | Remediation | Geotechnical

ARDEN CLUBS ON BEHALF OF THE HILLS CLUB

Preliminary Site Investigation with Limited Sampling

The Hills Club, Baulkham Hills NSW

E24782.E01_Rev1
9 October 2020

Document Control

Report Title: Preliminary Site Investigation with Limited Sampling

Report No: E24782.E01_Rev1

Copies	Recipient
1 Soft Copy (PDF – Secured, issued by email)	Mr Tony Pizzolato Arden Clubs on behalf of The Hills Club Unit 3.02, 184 Bourke Rd, Alexandria NSW 2015
2 Original (Saved to Digital Archives)	EI Australia Suite 6.01, 55 Miller Street, Pyrmont NSW 2009

Author	Technical Reviewer
	
LAN YE **Environmental Engineer**	**Sari Eru** **Senior Environmental Consultant**

Revision	Details	Date	Amended By
0	Original - DRAFT	25 September 2020	-
1	Original	9 October 2020	BA

Table of Contents

Schedule of Tables

Appendices

Executive Summary

Background and Objectives

Mr Tony Pizzolato of Arden Clubs on behalf of The Hills Club engaged EI Australia (EI) to conduct a Preliminary Site Investigation with Limited Sampling (PSI) for site characterisation purposes of the land parcel referred to as The Hills Club, Baulkham Hills NSW (herein referred to as the 'the site').

With a street address of 6-18 Jenner Street, Baulkham Hills, the site is located approximately 23 km north west of the Sydney Central Business District (CBD), within the Local Government Area of The Hills Shire Council (see **Figure 1**). The site is covers an area of approximately 13,500m^2 and is currently occupied by an outdoor bowls facility, comprising a clubhouse, three bowling greens and a car park, as depicted in the site plan presented as **Figure 2**. The client wishes to redevelop the site, and preparation of this PSI with limited sampling was required to provide a preliminary assessment of the contamination status of the land, and assist the client in meeting their obligations with regards to the *Environmental Planning and Assessment Act 1979* and the requirements of *State Environmental Planning Policy No. 55: Remediation of Land* .

Scope of Works

The works were completed in accordance with EI fee proposal P17051.5 (dated 27 July 2020), which included:

- Completion of a desktop study, including a review of relevant hydrogeological and soil landscape maps for the project area, search of historical aerial photographs made available for the site, searches of NSW WorkCover, Council Records and EPA Contaminated land records and a land titles search to determine the site history; and
- A detailed site walkover inspection;
- Preliminary intrusive investigations utilising 9 sampling locations, in conjunction with a geotechnical assessment and multiple level soil sampling within fill and natural soils;
- The installation of 3 groundwater monitoring bores drilled to a maximum depth of 9m and one round of groundwater sampling to investigate the potential for groundwater contamination, and migration of contaminants off-site;
- Laboratory analysis of the selected soil and groundwater samples for the identified contaminants of concern; and
- Data interpretation and reporting.

Proposed Development

Redevelopment of the site was proposed, for the construction of four, mixed commercial and residential structures overlying a common, multi-level basement car-park. Soil within the southern part of the site will be retained, for the construction of two bowling greens and associated landscaping.

Key Findings

- The historic use of the site was primarily residential, and owned by private persons from at least 1940, then in 1951 the site was developed into the current bowls club, which remains in use today.
- The Hills Shire Council records and searches of notices for contaminated land indicated that the historic use of the site did not include significant industrial and/or manufacturing activities, storage of chemicals or reportable contamination incidents for the site. Furthermore, no records or indications of underground storage tanks were revealed, and were not expected to be present within the site;
- A search through the List of NSW Contaminated Sites notified to the EPA under Section 60 of the CLM Act 1997 identified a Shell Coles Express Service Station located 110m to the west, being up hydraulic gradient from the subject site;.
- Soil sampling and analysis was conducted at nine (9) borehole locations (BH1M to BH9) within the accessible area of the site. The intrusive investigation was completed in conjunction with a geotechnical investigation, and revealed the presence of bitumen and ash in fill sampled as BH1M and BH6;
- The sub-surface layers of the site comprised fill materials consisting of predominantly silty sand, overlying shale bedrock at depth;
- Soil samples reported Carcinogenic PAHs within fill sampled at BH1M. The concentrations reported exceeded the human health criteria, however were likely to be a result of the asphalt inclusions, and being an inert material, would therefore pose a low risk to human health receptors of the site;
- Asbestos containing material (ACM) was detected as 'fibrous rope material' within fill sampled at BH7, and additional characterisation of the asbestos impacts would be necessary, on completion of site demolition so as to gain access to the site surface;
- Sample locations BH1M and BH7 were located within the basement footprint, to be excavated for basement construction which would remove the reported exceedances;
- Groundwater was encountered at depths between 3.14 – 5.25 mBGL, and was found to migrate in a north-easterly direction, towards Stevenson Creek. Variations in standing water levels were observed, and may be influenced by aquifer confinement;
- Groundwater samples reported concentrations of the heavy metals, chromium, copper, lead, nickel and zinc exceeding the ecological criteria, however were considered to be typical of urban groundwater environments, and did not pose a risk to the site's receptors; and
- Low concentrations of THR F1 and F2, Chloroform, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene were reported in hydraulically down-gradient monitoring wells BH2M and BH4M. The detections of these contaminants may be residual as a result of borehole drilling methods (rock coring) Additional development and sampling of the wells is required to confirm these results.

Conclusions

In view of the above findings and subject to the statement of limitations (**Section 13**), EI have identified a moderate and potentially unacceptable risk posed by contamination to receptors of the proposed development. As such, additional investigation, such as the completion of a detailed site investigation (DSI) will be required to adequately characterise site soils, and provide recommendations of any remediation required (if necessary) to make the site suitable for the proposed mixed use as a residential (minimal access to soil) and recreational bowling facility.

Recommendations

EI consider that the site can be made suitable for the proposed development, subject to the following recommendations:

- Conduct a Hazardous Materials Survey (HMS) of current site structures prior to demolition works;
- A Detailed Site Investigation (DSI) will be required after site building demolition to gain access to the site surface. The DSI should include:
  - A visual inspection of the entire site surface for asbestos;
  - Additional sampling of soil at 14 additional locations to achieve the minimum sampling requirements for a 1.35 hectare site, as required by DECC (1995) Sample Design Guidelines;
  - Sampling locations should assess fill and natural soils at each location, and the analytical results may be utilised for the classification of surplus material designated for offsite disposal;
  - At least three sample locations should be positioned at proposed retained soil area at southern portion of the site to assess the ecological suitability of this material; and
  - An additional round of groundwater monitoring (GME) utilising the 3 existing wells, including the collection of survey data to determine flow direction.
- Any material being imported to the site (i.e. for landscaping purposes) should be assessed for potential contamination in accordance with NSW EPA guidelines as being suitable for the intended use or be classified as virgin material (VENM).

1. Introduction

1.1 Background and Purpose

Mr Tony Pizzolato of Arden Clubs on behalf of The Hills Club engaged EI Australia (EI) to conduct a Preliminary Site Investigation with Limited Sampling (PSI) for site characterisation purposes of the land parcel referred to as The Hills Club, Baulkham Hills NSW. (herein referred to as the 'the site').

With a street address of 6-18 Jenner Street, Baulkham Hills, the site is located approximately 23 km north west of the Sydney Central Business District (CBD), within the Local Government Area of The Hills Shire Council (see **Figure 1**). The site is covers an area of approximately 1.35 hectares (13,500m^2) and is currently occupied by an outdoor bowls facility, comprising a clubhouse, three bowling greens and a car park, as depicted in the site plan presented as **Figure 2**.

1.2 Proposed Development

Architectural drawings (attached in **Appendix C**) were provided to EI as:

- ALTIS Architecture (2020), Project No. 2817.01, Drawing No. SK0010, SK0001, SK0100, SK1101-SK1112, SK2100, SK2101, SK3001, SK3002, SK8000 and SK9002, Issue 1, dated 7 July 2020;

The plans indicate the development will involve the demolition of all existing site structures, followed by bulk excavation to depths of about 13.5m below ground level (mBGL) for the a common three-level basement, and construction of four, multi-storey mixed-use buildings.

The Hills Club propose a Planning Proposal to redevelop their site in Baulkham Hills. The proposal seeks to retain the current RE2 Private Recreation zone under The Hills Local Environmental Plan 2019 and include new uses on the site to support The Club and related activities. The additional uses include:

- A new Community Club with a diverse range of food and beverage offerings, members lounge, restaurant, cafe and dining facilities, multi-functional recreation areas, open air bowling green and an enclosed world championship bowling green with associated facilities, 200 car spaces and loading dock;
- Approximately 275 residential apartments across 4 buildings comprising residential and seniors housing;
- Commercial, retail and other ancillary uses;
- Site through link;
- Basement residential carparking for approximately 500 cars;
- Public domain upgrades; and
- Signage .

With regards to the *National Environmental Protection Measure (Assessment of Site Contamination) 1999, Amendment 2013* (NEPC, 2013) the proposed land use represents a commercial / industrial land use scenario with relation to health screening levels for users of the proposed basement, with a residential (minimal access to soil) land use scenario for the above ground soils, overlying the constructed basement. An area of deep soil will be retained within

the southern part of the site, to the east of the current bowling green. This area will be retained for the construction of two bowling green's and represents a recreational land use scenario.

1.3 Regulatory Framework

The following regulatory framework and guidelines were considered during the preparation of this report:

- The Environmental Planning and Assessment Act 1979 (The EP&A Act);
- The Contaminated Land Management Act 1997 (the CLM Act)
- EPA (2017) Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd Edition);
- EPA (1995) Sampling Design Guidelines*;*
- EPA (2020) *Guidelines for Consultants Reporting on Contaminated Land*, NSW Environmental Protection Authority;
- NEPC (2013) Schedules B(1) Guideline on Investigation Levels for Soil and Groundwater and B(2) Guideline on Site Characterisation; and
- State Environment Protection Policy No 55 - Remediation of Land (SEPP 55) ;

1.4 Project Objectives

The primary objectives of this PSI is to provide a preliminary assessment of the environmental conditions of the site by appraising the potential for site contamination on the basis of field observations, historical land uses, anecdotal, and documentary evidence, accompanied by limited sampling of site soils and groundwater.

The PSI was required to assist the client in meeting their obligations with regards to the EP&A Act, and the requirements of SEPP 55, by assessing the site in accordance with the guidelines in force from time to time under Section 105 of the CLM Act (1997).

1.5 Scope of Works

The works were completed in accordance with EI fee proposal P17051.5 (dated 27 July 2020), which included:

1.5.1 Desktop Study

- a review of relevant hydrogeological and soil landscape maps for the project area;
- a detailed site walkover inspection;
- search of historical aerial photographs archived at the NSW Land and Property Information in order to review previous site use and the historical sequence of land development in the neighbouring area;
- search of NSW WorkCover (SafeWork NSW) records for information relating to possible underground tank approvals and locations;
- site history survey involving a detailed search of Council for information relating to operational site history;
- a land titles search, also conducted through NSW Land and Property Information (nine separate title lots);

- review of existing underground services on site;
- search through the OEH Land Information records to confirm that there are no statutory notices current on the site under the Unhealthy Building Land Act (1990) or the Contaminated Land Management Act (1997);

1.5.2 Limited Soil Sampling

- construction of test boreholes at 9 locations distributed across accessible areas of the site (in conjunction with the geotechnical assessment);
- construction of 3 groundwater monitoring bores drilled to a maximum depth of 9m (or refusal) both up gradient and downgradient of the proposed redevelopment area. Groundwater monitoring bores will be constructed to standard environmental protocols to investigate the potential for groundwater contamination, and migration of contaminants off-site;
- multiple level soil sampling within fill and natural soils and one round of groundwater sampling from the three newly constructed groundwater monitoring bores;
- laboratory analysis of selected soil samples for relevant analytical parameters as determined from the site history survey and field observations during the investigation program.

1.5.3 Data Analysis and Reporting

Following the desktop assessment, site inspection and limited sampling, this PSI report was prepared generally in accordance with the EPA (2020) *Guidelines for Consultants Reporting on Contaminated Land.* This report documents the site characterisation assessment and presents the findings with respect to potential risks to human health, the environment and the aesthetic enjoyment of the land, and provides recommendations that may be necessary to make the land suitable for the proposed development.

2. Site Description

2.1 Property Identification, Location, and Physical Setting

The site identification details and associated information are presented in **Table 2-1**, while the site locality is shown in **Figure 1**.

Table 2-1 Site Identification

Attribute	Description
Street Address	The Hills Club, Baulkham Hills NSW 6-18 Jenner Street, Baulkham Hills NSW 2153
Lot and Deposited Plan (DP)	Lot 39 to Lot 45, Section 2 in DP2489; Lot Z in DP400638; and Lot 4 in DP1108855. (Source: http://maps.six.nsw.gov.au)
Location Description	Approx. 23km north-west of Sydney CBD, bound by residential apartments to the north, George Suttor Reserve and apartment to the south, Old Northern Road to the west and Jenner Street to the east.
Site Coordinates	North-western corner of site (GDA94-MGA56): • Easting: 314131.025 • Northing: 6262694.12 (Source: http://maps.six.nsw.gov.au)
Site Area	Approx. 13,500 m^2 (1.35 hectares)
State Survey Marks	Two State Survey (SS) marks are situated in close proximity to the site. SS88431 (10m southeast) on Jenner Street and SS57509 (31m southeast) on James Street. One permanent Mark PM55875D (91m northwest) on the Old Northern Road. (Source: http://maps.six.nsw.gov.au).
Local Government Authority	The Hills Shire Council
Parish	Castle Hill
County	Cumberland
Current Zoning	RE1: Public Recreational B2: Local Centre RE2: Private Recreation (The Hills Local Environmental Plan 2019)

2.2 Local Land Use

The site is situated within Baulkham Hills local town centre area. The local sensitive receptors within close proximity to the site are also identified in **Table 2-2**.

Table 2-2 Local Land Use

Direction	Land Use Description	Human and/or ecological receptors (distance)
North	Apartments	Residual occupants (adjacent)
South	George Suttor Reserve and apartment	George Suttor Reserve (adjacent) Residual occupants (adjacent)
East	Jenner Street, followed by residential properties	Residual occupants (<20m) O'Regan Reserve (200m)
West	Old Northern Road, followed by commercial properties	Store staff and customers (<20m) Baulkham Hills Shopping Centre (<30m) Harry Carr Reserve (<600m)

2.3 Regional Setting

Local topography, geology, soil landscape and hydrogeological information are summarised in **Table 2-3**.

Table 2-3 Regional Setting

Attribute	Description
Topography	The site is located on the east side of the Old Northern Road within gently (0° to 10°), north easterly dipping topography with site levels varying from approximately R.L. 104 m above Australian Height Datum (mAHD) at the southern portion of the site to R.L. 94 mAHD at the north eastern site corner.
Site Drainage	Consistent with the general slope of the site, stormwater is assumed to flow south towards Norwest Lake via drainage systems discharging to various stormwater easements and the municipal stormwater system.
Regional Geology	The Geological Map of Penrith (Geological Series Sheet 9030, Scale 1:100,000, Edition 1, 1991) published by the Department of Minerals and Energy indicates the residual soils within the site to be underlain by Ashfield Shale, a formation of the Wianamatta Group, comprising dark grey to black claystone, siltstone and fine sandstone-siltstone laminite.
Soil Landscapes	The Soil Landscape Map of Penrith (soil Landscape Series Sheet 9030, Scale 1:100,000, 1989), prepared by the Soil Conservation Service of NSW, indicates that the site is located within the Blacktown landscape area and typically consists of highly plastic and relatively impermeable residual soil.
Acid Sulfate Soil (ASS) Risk	With reference to the Prospect Parramatta Acid Sulfate Soil Risk Map (1:25,000 scale; Murphy, 1997), the subject land lies within the map class description of No Known Occurrence. In such cases, there is a low probability of occurrence of acid sulphate soil (ASS) material within the soil profile and "land management is not likely to be affected by ASSs.
Nearest Surface Water Feature	Stevenson Creek is located approximate 550m to the southwest of the site, being a tributary of Parramatta River and is considered to be a marine water ecosystem for impact assessment purposes.
Anticipated Groundwater Flow Direction	Southeast towards Stevenson Creek.

2.4 Groundwater Bore Records and Local Groundwater Use

An online search of registered groundwater bores was conducted by EI on 3 September 2020 through the NSW Office of Natural Resources (Ref. http://allwaterdata.water.nsw.gov.au/water.stm). EI identified six registered bores within 500 m of the site of the site. A bore location plan and detailed information regarding the listed bores is attached in **Appendix E**. The five closest registered bores within a 500m radius of the site are presented on **Table 2-4** below.

Table 2-4 Groundwater Bores

Bore No.	Date Drilled	Drilled Depth (mBGL)	SWL*/Salinity/Yield	Bore Purpose
GW018457	01/10/1959	52.40	1.2 / Salty / 0.32	Waste Disposal
GW019461	01/10/1959	52.40	1.2 / Salty / 10.10	Waste Disposal
GW112988	18/10/2002	7.91	- / - / -	Monitoring
GW112989	18/02/2002	6.89	- / - / -	Monitoring
GW112990	18/10/2002	9.91	- / - / -	Monitoring

Notes:
- Data not recorded;
* SWL – Standing water level measured in metres Below Ground Level (mBGL),
Salinity – units unspecified,
Yield – measured in L/s.

2.5 Site Walkover Inspection

Site observations were recorded during a site walkover inspection of the site on 3 August 2020. A summary of site observations is detailed below and site photographs taken during the inspection are present in **Appendix D**. Site observations indicated that:

- The site is used for commercial purposes (The Hills Club) and is currently occupied by a commercial building with bitumen and concrete carpark, which cover the southeast portion of the site and three bowling greens, which cover the north and west portion of the site;
- The building and car park appear to be in moderate to good conditions, with very minimal staining, paint flaking and cracking of the building walls;
- No suspicious odours or evidence of gross contamination were observed in any part of the site; and
- No evidence indicative of underground storage tanks (USTs) or an underground petroleum storage system (UPSS) was observed on any part of the site.

3. Previous Investigations

EI was unaware of any previous environmental investigation having been completed at the site; however, this PSI was completed concurrently with a geotechnical assessment, recorded under the following report:

- EI Australia (2020) *Geotechnical Investigation; The Hills Club, Baulkham Hills* (EI Report E24782.G03, dated 1 September 2020).

Relevant findings from this report were as follows:

- Based on the logs for four boreholes (BH1M to BH4M) drilled at the site, subsurface conditions were generalised as (excluding and surface paving):
  - Topsoil fill (0.15 - 4.5m), comprised of silty sand, gravelly sand, and silty clay fill with traces of rootlets; overlying
  - Shale (from 0.2 - 4.5m BGL onwards), very low to very high strength (increasing with depth).
- The standing water level (SWL) in the monitoring wells installed ranging from 3.14m BGL to 5.25m BGL, which equated to 93.25m AHD to 99.96m AHD.

Laboratory analytical testing of representative samples indicated that site fill and shale were acidic (pH: 4.3-5.1), non-saline (EC: 28-80 µS/cm) and non-aggressive to concrete and steel structures.

On review of the groundwater data, it was found that the variation in SWL, the presence of thick, impervious clays and the presence of a fractured rock environment may indicate aquifer confinement, and may not be representative of true groundwater ingress within the site.

4. Site History and Searches

4.1 Site Land Titles Information / Historical Aerial Review

A historical land titles search was conducted through InfoTrack. Copies of relevant documents resulting from this search are presented in **Appendix F**. A summary of all the previous and current registered proprietors (**Table 4-1**)**,** along with information obtained from the available historical aerial photographs, in relation to past potential land uses (**Table 4-2**). The historical aerial photographs reviewed as part of this PSI included:

- 1951: May 1951, RUN 7, NSW 472-80 – Department of Lands NSW;
- 1961: RUN 27W, NSW 1049-5023 – Lands Photo;
- 1982: 10 August 1982, RUN 18, NSW 3242-124 – Lands Photo;
- 1991: 20 September 1991, RUN 7, NSW 4038 – Surveyor General's Department NSW;
- 2002: 16 March 2002, Run 7, NSW 4724 – Land and Property Information NSW;
- 2015: Google Earth; and
- 2018: Google Earth.

Table 4-1 Summary of Owner History

Date of Acquisition and term held	Registered Proprietor(s) & Occupations (where documented)
Lots 39 to 45 Section 2 D.P. 2489	
1924 to 1971	Private owners
1971 to date	# The Hills District Bowling Club Limited
Lot Z D.P. 400638	
1924 to 1996	Private owners
1996 to date	# The Hills District Bowling Club Limited
Lot 4 D.P. 1108855	
1903 to 1934	Minister for Public Works
1903 to 1934	The Railway Commissioners of New South Wales Now Commissioner for Railways
23.10.1934	Surrendered to the Crown
02.11.1934	Reserved from Sale or Lease
02.11.1934	Reserve R 64890 for Public Recreation
1964 to date	# The Hills District Bowling Club Limited

# Denotes Current Registered Proprietor

Table 4-2 Summary of Aerial Photograph History

Aerial Photograph	Site description based on historical aerial photographs	Land use
1951	The western portion of the site appears to be occupied by two bowling greens. The eastern portion of the site was vacant. Surrounding lands appear to be low density residential with orchard and market garden activities.	Commercial
1961	An additional bowling green and a building appear at western portion of the site. Surrounding areas have been redeveloped into low density suburban residential properties.	Commercial
1982	The site appears unchanged. Baulkham Hills Shopping Centre appears to the northwest of the site.	Commercial
1991	The site appears unchanged. The properties to the west of the site appear to be developed into shops.	Commercial
2002	The site generally remains unchanged except an extension was established to the existing building.	Commercial
2015	The site appears unchanged from the previous aerial photograph.	Commercial
2018	The site appears unchanged from the previous aerial photograph.	Commercial

In summary, land titles records and historic aerial photography indicate that the site was generally vacant, acquired for rail purposes (not used) then owned by individual proprietors. Site development into the current bowls club occurred from at least 1951 to the current date.

4.2 Council Information

A summary of relevant documents reviewed (i.e. development applications) based on the council search results is presented in **Table 4-3**. The original copy of the documents can be reviewed at the local council office.

Table 4-3 Summary of Council Documents

Period / Year	Series (Council Reference)	Description
25/03/2002	3496/2002/MC	A Fire Hose Pump Station and Window Replacement to Northern Side of Building
25/03/2002	3083/2002/NC	An addition of fire hose pump station and replacement of windows on the northern side of building.
19/06/2002	4566/2002/HD	Installation of an illuminated club sign
29/07/2002	340/2003/NC	Installation of an illuminated sign
26/03/2003	3120/2003/HB	Alteration of trading times
10/05/2004	2974/2004/LC	Two Rainwater Tanks
28/10/2005	865/2006/HB	Construction of a smokers deck with sails at Baulkham Hills Bowling Club

Period / Year	Series (Council Reference)	Description
30/11/2005	1093/2006/HA	Upgrade of Exitsing Signage
13/01/2006	1207/2006/PC	Construction of a smokers deck with sails at Baulkham Hills Bowling Club
21/06/2006	1093/2006/HA/A	Section 96(2) Modification to upgrade of existing signage - The Hills District Bowling Club Ltd
6/12/2006	1121/2007/HD	A Smokers Balcony within Existing Roof Line - Hills Bowling Club
6/12/2006	935/2007/NC	A Smokers Balcony within Existing Roof Line
29/05/2008	1949/2008/HB	Alterations and additions for an outdoor area for the Hills District Bowling Club
18/08/2008	194/2009/PC	Alterations and additions for an outdoor area for the Hills District Bowling Club
9/07/2009	78/2010/HD	A viewing deck for The Hills District Bowling Club
22/07/2009	87/2010/NC	A viewing deck for The Hills District Bowling Club
6/12/2012	644/2013/HA	Advertising Signage (Illuminated)
22/02/2013	952/2013/PC	Advertising Signage (Illuminated)
19/12/2014	848/2015/HA	Proposed Extension of the Carpark
5/06/2015	848/2015/HA/A	Section 96 (1A) Modification to an Approved Carpark Extension
12/01/2016	970/2016/PC	Proposed Extension of the Carpark

In Summary, no evidence was found regarding any previous manufacturing activities, on-site storage of chemicals, and site contamination related incidents.

4.3 SafeWork NSW Dangerous Goods Register Records

A search of SafeWork NSW records did not identify records pertaining to dangerous goods or UPSS for the site. Correspondence from SafeWork NSW is presented in **Appendix G**.

4.4 EPA Online Records

4.4.1 Contaminated Land - Record of Notices under Section 58 of CLM Act (1997)

An on-line search of the contaminated land public record of EPA Notices was conducted on 3 September 2020. The contaminated land public record is a searchable database of:

- Orders made under Part 3 of the *Contaminated Land Management Act 1997* (CLM Act);
- Notices available to the public under Section 58 of the CLM Act;
- Approved voluntary management proposals under the CLM Act that have not been fully carried out and where the approval of the Environment Protection Authority (EPA) has not been revoked;
- Site audit statements provided to the NSW EPA under section 53B of the CLM Act that relate to significantly contaminated land;
- Where practicable, copies of anything formerly required to be part of the public record; and

- Actions taken by NSW EPA under section 35 or 36 of the *Environmentally Hazardous Chemicals Act 1985* (EHC Act).

The search confirmed that the site known as The Hills Club, Baulkham Hills NSW and surrounding lands within close proximity (within 250 m) were not subject to any regulatory notices relevant to the above legislation.

4.4.2 List of NSW contaminated sites notified to EPA

A search through the List of NSW Contaminated Sites notified to the EPA under Section 60 of the CLM Act 1997 was conducted on 3 September 2020. This list is maintained by NSW EPA and includes properties on which contamination has been identified. Not all notified land is deemed to be impacted significantly enough to warrant regulation by the NSW EPA. The site has not been notified as contaminated to the EPA. A Shell Coles Express Service Station (110m to the west of the site) was on the list, and was located up hydraulic gradient.

4.4.3 POEO Public Register

A search of the Protection of the Environment Operations (POEO) Act public register was conducted on 3 September 2020. The public register contains records related to environmental protection licences, applications, notices, audits, pollution studies, and reduction programmes. The search did not identify any record for the site or sites in proximity (≤ 500 m).

5. Site Characterisation

5.1 Historical Site Use and Generic Risks

Based on the historical information available, the site was used for bowling club (Section 4). The assessment of these risks in relation to this site is outlined in **Table 5-1**.

Table 5-1 Assessment of Potential Contamination Risk

Potential Sources	Impacted Media	Potential Contaminants of Concern	Likelihood for Contamination
Importation of fill of unknown origin and quality placed at the site	Soil	HM, TRH, PAH, BTEX, OC/OP Pesticides, PCB and asbestos	**Low to medium** Filling materials may have been used for levelling purposes during the construction of bowling greens, club building and car park.

Note 1 HM – Heavy Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc) unless otherwise indicated, TRH – Total Recoverable Hydrocarbons, PAH – Polycyclic Aromatic Hydrocarbons, BTEX – Benzene, Toluene, Ethylene and Xylene, OC/OP pesticides - Organochlorine and Organophosphorus Pesticides, PCB - Poly-chlorinated Biphenyls, VOC –Volatile Organic Compounds.

5.2 PFAS Assessment

EPA (2017) requires that PFAS is considered in assessing contamination. EI use the following decision tree (**Table 5-2**) based on EnRisk (2016) for prioritising the potential for PFAS to be present on site and whether PFAS sampling of soil and groundwater is required. Based on the findings presented in Table 5-2, sampling of PFAS was not necessary and the contaminant was not of concern for the current site.

Table 5-2 PFAS Decision Tree

Preliminary Screening	Probability	Justification
Did fire training occur on-site?	Low	The site has being used as a bowling club.
Is an airport or fire station up gradient of or adjacent to the site? [1]	Low	Fire and Rescue NSW Baulkham Hills Fire Station is located approximate 1.7 km to the west of the site. The risk of migration of PFAS contamination to the site is low due to the distance to the site. A Fire Hose Pump Station was installed to the northern side of the club building. However there was no evidence shows that the station was used due to fire on site in the council records.
Have “fuel” fires ever occurred on-site? (e.g. ignition of fuel (solvent, petrol, diesel, kerosene)	Low	The site has being used as bowling club
Have PFAS been used in manufacturing or stored on-site? [2]	Low	PFAS contamination not expected to be associated with the specific land uses of the site.

Note 1 Runoff from fire training areas may impact surface water, sediment and groundwater.
Note 2 PFAS is used wide range of industrial processes and consumer products, including in the manufacture of non-stick cookware, specialised garments and textiles, Scotchguard™ and similar products (used to protect fabric, furniture, leather and carpets from oils and stains), metal plating and in some types of fire-fighting foam (https://www.nicnas.gov.au/chemical-information/factsheets/chemical-name/perfluorinated-chemicals-pfas)

Note 3 If medium or high probability is applicable to any of the preliminary screening questions, the site analytical suite will be optimised to include preliminary sampling and testing for PFAS in soil (ASLP Testing) and water.

5.3 Emerging Chemicals

The NSW EPA uses Chemical Control Orders (CCOs) as a primary legislative tool under the EHC Act (1985) to selectively and specifically control chemicals of concern and limit their potential impact on the environment. CCOs provide the EPA a rapid and flexible mechanism for responding to emerging chemical issues. As with PFAS compounds, EI considered chemicals controlled by CCO's and other potential emerging chemicals for the current site and where identified, the chemical was included within the potential contaminants of concern. The findings of this assessment are outlined in **Table 5-3** below.

Table 5-3 Emerging or Controlled Chemicals

Chemicals of Concern (CCO or emerging)	Decision
Were aluminium smelter wastes used or stored on site (CCO, 1986)?	No
Do dioxin contaminated wastes (CCO, 1986) have the potential to impact the site? [1]	No
Were organotin products (CCO, 1989) used or stored on site? [2]	No
Were polychlorinated biphenyls (PCBs) used or PCB wastes (CCO, 1997) stored on-site? [3]	Yes *Possibly contained within pesticides if used onsite.*
Were scheduled chemical or wastes (CCO, 2004) used or stored [4]	Yes *Possible pesticides used onsite.*
Are other emerging chemicals suspected? [5]	No
If Yes to any questions, has site sampling suite been optimised to include specific sampling for other chemicals of concern in soil, air and water	Yes *Identified COPC in Section 5.5.3*

Note 1 From burning of certain chemicals, smelting or chemical manufacturing or fire on or near the Site.
Note 2 From anti-fouling paints used or removed at boat & ship yards and marinas.
Note 3 From older transformer oils & electrical capacitors
Note 4 Twenty-four mostly organochlorine pesticides and industrial by-products
Note 5 Other chemicals considered as emerging e.g. 1,4 dioxane (associated with some cVOCs).

5.4 Conceptual Site Model

5.4.1 Overview

In accordance with NEPM (2013) *Schedule B2 – Guideline on Site Characterisation* and to aid in the assessment of data collection for the site, EI developed a conceptual site model (CSM) assessing plausible pollutant linkages between potential contamination sources, migration pathways and receptors. The CSM provides a framework for identifying data gaps in the existing site characterisation and future site assessments. Potential contamination sources, exposure pathways and receptors that were considered relevant for this assessment are summarised along with a qualitative assessment of the potential risks posed by complete exposure pathways.

5.4.2 Potential Contamination Sources

On the basis of the PSI findings potential contamination sources for the site were the importation of fill from an unknown source, deposited within the site.

5.4.3 Contaminants of Potential Concern

Based on the findings of the PSI, the contaminants of potential concern (COPC) at the site are considered to be:

- Soil - heavy metals (HM), total recoverable hydrocarbons (TRH), the monocyclic aromatic hydrocarbon compounds *benzene, toluene, ethyl-benzene* and *xylenes* (BTEX), polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOCs – including chlorinated VOCs), organochlorine and organophosphorus pesticides (OCP/ OPP), polychlorinated biphenyls (PCB), and asbestos.

- Groundwater - HM, TRH, BTEX, PAH and VOC (including cVOCs).

5.4.4 Potential Pollutant Linkages

Potential contamination sources, exposure pathways and human and environmental receptors that were considered relevant for this assessment are summarised in **Table 5-4**.

Table 5-4 Conceptual Site Model

Contamination Source	Transport Mechanism	Exposure Pathway	Potential Receptor
Fill soil and deeper natural soils, should onsite contamination be present onsite.	▪ Physical erosion and wind mobilisation during ground disturbance activities (e.g. excavation and earthmoving); and ▪ Leaching of contaminants from impacted soils exposed to water.	▪ Dermal contact; ▪ Ingestion; ▪ Inhalation; and ▪ Uptake (plants).	▪ Site Workers during construction; ▪ Future site users; and ▪ Plants (in proposed landscaped areas)

6. Sampling, Analytical, and Quality Plan (SAQP)

The SAQP plays a crucial role in ensuring that the data collected as part of this, and ongoing environmental works carried out at the site are representative, and provide a robust basis for site assessment decisions. This SAQP includes the following:

- Data quality objectives, including a summary of the objectives of the ESA;
- Investigation methodology including media to be sampled, details of analytes and parameters to be monitored and a description of intended sampling points;
- Sampling methods and procedures;
- Field screening methods;
- Analysis Methods;
- Sample handling, preservation and storage; and
- Analytical QA/QC.

6.1 Data Quality Objectives (DQO)

In accordance with the US EPA (2006) *Data Quality Assessment* and the EPA (2017) *Guidelines for the NSW Site Auditor Scheme*, the process of developing Data Quality Objectives (DQO) was used by the EI assessment team to determine the appropriate level of data quality needed for the specific data requirements of the project. The DQO process that was applied for this assessment is documented in **Table 6-1**.

Table 6-1 Summary of Project Data Quality Objectives

DQO Steps	Details
1. State the Problem Summarise the contamination problem that will require new environmental data, and identify the resources available to resolve the problem; develop a conceptual site model	The site is to be redeveloped as outlined in **Section 1.2**, for mixed land use scenarios representing; ▪ A commercial industrial scenario for users of the basements; and ▪ A residential (minimal access to soil) scenario for the above ground landscaping; and ▪ Recreational scenarios for the bowling green area. Desktop studies identified the potential for soil contamination to exist as a result of various, possible sources, as listed in **Section 5.2**. In light of the available historical information, a conceptual site model has been developed (**Table 5-1**) for the site. The findings of the investigation must provide supportive information on the environmental conditions of the site to determine the site's suitability for the proposed mixed-use redevelopment.
2. Identify the Goal of the Study (Identify the decisions) Identify the decisions that need to be made on the contamination problem and the new environmental data required to make them	Based on the objectives outlined in **Section 1.4,** the following decisions are identified: ▪ Has the site been adequately characterised with sufficient and appropriate sampling coverage (vertical and lateral) to assess for the presence of potential contamination sources? ▪ Has the nature, source and extent of any onsite impacts (soil, groundwater, and/or vapour) been defined? ▪ What influence do site-specific, geologic conditions have on the fate and transport of any impacts that may be identified? ▪ Does the degree of impact coupled with the fate and transport of identified contaminants represent an unacceptable risk to identified human and/or environmental receptors on or offsite? ▪ Does the collected data provide sufficient information to allow the selection and design of an appropriate remedial strategy, assuming remedial action is necessary? If not, what are the remaining data gaps requiring closure?
3. Identify Information Inputs (Identify inputs to decision) Identify the information needed to support any decision and specify which inputs require new environmental measurements	Inputs to the decision making process include: ▪ Proposed development and land use; ▪ Aerial photographs, historical land title records, council records; ▪ National (NEPC 2013) and State-based (NSW EPA, various) environmental guidelines; ▪ Soil and groundwater sample results and observations obtained from intrusive investigation locations, and to verify the presence of onsite contamination and to evaluate the potential risks to sensitive receptors, analysed for the contaminants of potential concern (COPC) presented in **Section 5.5.2**. At the end of the assessment, a decision must be made regarding whether the contamination status of the land is suitable for the proposed redevelopment, or if additional investigation and/or remediation is required to make the site suitable.

DQO Steps	Details
4. Define the Boundaries of the Study Specify the spatial and temporal aspects of the environmental media that the data must represent to support decision	Spatial – The PSI is limited to the site boundaries (**Figure 2**) and the maximum depth of borehole advancement at each sample location. Temporal – The results will be valid on the day samples are collected and will remain valid if no changes to site use occur, and contamination (if present) does not migrate from off-site sources. Constraints of sampling requiring consideration include access restrictions (due to site operations and/or conditions) and presence of both above and underground services / structures.
5. Develop the Analytic Approach (Develop a decision rule) To define the parameter of interest, specify the action level, and integrate previous DQO outputs into a single statement that describes a logical basis for choosing from alternative actions	The decision rules for the investigation are: ▪ What are the characteristics of soil at the site? *Soil boreholes will be advanced to natural, sampled and logged to characterise underlying conditions.* ▪ What are the characteristics of groundwater at the site? *Groundwater monitoring wells will be installed to determine physical characteristics, chemical composition and flow direction of groundwater underlying the site.* ▪ Is the site suitable for the proposed land use? *If the concentrations of contaminants in the soil and groundwater data are below the relevant health-based and ecological criteria for the intended land use; then the site will be deemed suitable for the proposed development.* ▪ Is additional information required to determine the suitability of the site for its proposed use? *Should additional information be required as determined by the conceptual site model (CSM), then appropriate recommendations will be provided.* Decision criteria for analytical data will be defined by the Data Quality Indicators (DQI) presented in **Table 6-2**.
6. Specify Performance or Acceptance Criteria (Specify limits on decision errors) Specify the decision-maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data	Specific limits for this project are to be in accordance with NEPM, appropriate data quality indicators (DQIs) for assessing the useability of the data and EI standard procedures for field sampling and handling. To assess the useability of the data, pre-determined DQIs for completeness, comparability, representativeness, precision and accuracy were adopted, as presented below in **Table 6-2**. If any of the DQIs are not met, further assessment will be necessary to determine whether the non-conformance will significantly affect the useability of the data. Corrective actions may include requesting further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of samples.

DQO Steps	Details
7. Develop the Detailed Plan for Obtaining Data (Optimise the design for obtaining data) Identify the most resource-effective sampling and analysis design for general data that are expected to satisfy the DQOs	Site history indicates the potential for contamination to exist. To achieve the decision rules, the intrusive investigation included: ▪ Nine sampling locations, distributed at accessible area of the site; ▪ Installation and sampling of groundwater wells of the redevelopment area, to determine groundwater quality. ▪ An upper soil profile sample will be collected at each borehole location and tested for contaminants of potential concern, to assess the conditions of the fill layer, and impacts from commercial and industrial activities at ground level. Further sampling would also be carried out at deeper soil layers. Samples will be selected based on field observations (including visual and olfactory evidence, as well as soil vapour screening in headspace samples) with consideration of subsurface stratigraphy. ▪ Representative groundwater samples will be collected and analysed for groundwater characterisation. ▪ Review of the results will be undertaken to determine if further intrusive investigation (i.e. additional sampling) is warranted.

6.2 Data Quality Indicators

To ensure that the investigation data collected was of an acceptable quality, the investigation data set was assessed against the data quality indicators (DQI) outlined in **Table 6-2**, which related to both field and laboratory-based procedures. The assessment of data quality is discussed in **Section 8**.

Table 6-2 Data Quality Indicators

Data Quality Objective	Data Quality Indicator	Acceptable Range
Accuracy	Field – Trip blank (laboratory prepared) Laboratory – Laboratory control spike and matrix spike	< laboratory limit of reporting (LOR) Prescribed by the laboratories
Precision	Field – Blind replicate and spilt duplicate Laboratory – Laboratory duplicate and matrix spike duplicate	< 30 % relative percentage difference (RPD [%]) Prescribed by the laboratories
Representativeness	Field – Trip blank (laboratory prepared) Laboratory – Method blank	< laboratory limit of reporting (LOR) Prescribed by the laboratories
Completeness	Completion (%)	-

6.3 Soil Assessment Criteria

The assessment criteria proposed for this project are outlined in **Table 6-3**. These were selected from available published guidelines that are endorsed by national or state regulatory authorities, with due consideration of the exposure scenarios that are expected for various parts of the site, the likely exposure pathways and the identified potential receptors.

Table 6-3 Adopted Investigation Levels for Soil

Adopted Guidelines	Rationale
NEPM, 2013 Soil HILs, EILs, HSLs, ESLs & Management Limits for TPHs	**Soil Health-based Investigation Levels (HILs)** As the site was proposed for mixed use development with three levels basement, the samples to be assessed against the NEPM 2013 HIL-B thresholds for residential sites with minimal access to soils. **Soil Health-based Screening Levels (HSLs)** As a conservative approach, the NEPM 2013 Soil *HSL A & B – low to high density residential* thresholds for vapour intrusion would be applied to assess for potential human health impacts from residual vapours resulting from petroleum, BTEX & naphthalene. Asbestos HSLs: WADOH (2009) assessment criteria, as presented in NEPM (2013), were not adopted during this investigation. Presence / absence of asbestos (not-detected) were utilised for preliminary screening purposes. **Ecological Investigation Levels (EILs) / Ecological Screening Levels (ESLs)** EILs / ESLs were considered relevant for the retained deep soils of the site. EILs / ESLs only apply to the top 2 m (root zone). The derived EIL criteria presented by EI are based on the addition of site specific Added Contaminant Limit (ACL) criteria and the Ambient Background Concentration (ABC) for an old low traffic suburb. In lack of physiochemical properties for soils across the site, a site specific ACL criteria for heavy metals based on averaged physiochemical properties presented in Chapman and Murphy (1989) for the Blacktown (bt) soil landscape.

Adopted Guidelines	Rationale
	Management Limits for Petroleum Hydrocarbons As a conservative approach, should the ESLs and HSLs be exceeded for petroleum hydrocarbons, soil samples would also assessed against the NEPM 2013 *Management Limits* for the TRH fractions F1 – F4 to assess propensity for phase-separated hydrocarbons (PSH), fire and explosive hazards & adverse effects on buried infrastructure.
CRC Care (2017) High reliability ecological criteria for Benzo(α)pyrene	**High reliability ecological criteria for Benzo(α)pyrene** The CRC Care criteria has been selected for ecological assessment of Benzo(α)pyrene due to its higher reliability than the NEPM assessment level.

6.4 Groundwater Assessment Criteria

In accordance with DEC (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*, groundwater acceptance criteria are based on environmental values considered relevant for groundwater use at the site and surrounding uses of groundwater and surface waters that may be effected by the site. Potential environmental values include:

- Aquatic ecosystems: surface water and groundwater ecosystems;
- Human Uses: these include but are not limited to potable water supply, agricultural water supply (irrigation and stock watering), industrial water use, aquaculture and human consumption of aquatic foods, recreational use (primary and secondary contact with surface waters), and visual amenity of surface waters;
- Human health in non-use scenarios: this includes consideration of health risks that may arise without direct contact between humans and the groundwater, for example, exposure to volatile contaminants above groundwater contaminant plumes; and,
- Buildings and structures: this includes protection from groundwater contaminants that can degrade building materials through contact, for example, the weakening of building footings resulting from chemically aggressive groundwater.

Cultural and spiritual values that are associated with the environment, including groundwater, should also be protected. Cultural and spiritual values may include spiritual relationships, sacred sites, customary uses, the plants and animals associated with the water, drinking water supplies, and recreational activities. In managing groundwater contamination, it is generally considered that cultural and spiritual values will be protected where groundwater quality protects all other relevant environmental values on a site.

Based on a groundwater bore search conducted by EI (Table 2-4) there were 5 registered bores located within a 500 m radius of the site. Several of these bores were registered for waste water and monitoring, and did not identify the use of domestic or recreational groundwater in the surrounding area. As such, the associated exposure risks of these users will be considered in this assessment.

An assessment of the applicability of groundwater environmental values for the site and off-site is provided in **Table 6-4**.

Table 6-4 Adopted Investigation Levels for Groundwater

Beneficial Use	Rationale
Aquatic Ecosystems - Surface water ecosystems and groundwater ecosystems	**Groundwater Investigation Levels (GILs) for Marine Water** NEPM 2013 provides GILs for typical, slightly-moderately disturbed aquatic ecosystems, which are based on the ANZG 2018 Trigger Values (TVs) for the 95% level of protection of aquatic ecosystems; however, the 99% TVs were applied for the bio-accumulative metals *cadmium* and *mercury*. The marine criteria were considered relevant as groundwater is expected to discharge to Parramatta River, via Stevensons Creek located approximately 550 m southwest of the site. Due to the ANZG, 2018 criteria for petroleum hydrocarbons being below the laboratory limit of reporting, the PQL for each TRH fraction was adopted as the GIL for aquatic ecosystems, as per the guidance provided in DEC (2007) Guidelines for the Assessment *and Management of Groundwater Contamination*.
Human Health – Basement User (non-use scenario)	**Health-based Screening Levels (HSLs)** As groundwater at the site will be in contact with the proposed basement, HSL groundwater criteria were applied as a screening tool only, for preliminary assessment. Should TRH F1, F2 or BTEXN be present in groundwater, additional investigation by means of soil vapour assessment may be necessary to adequately quantify the potential risk posed to users of the basement
Recreational Exposure (primary and secondary contact).	There is no planned use of groundwater for recreational use at the site. However, as excavation extends to depths potentially below the SWL of the site, direct contact with groundwater may be realised for construction workers, and trench / maintenance workers for the end use development. Therefore, recreational exposure scenarios were relevant for assessment of groundwater within the site. **Recreational Use Criteria** Investigation levels for recreational use are based on NHMRC (2017) Drinking Water Guidelines. The lowest of the health guideline multiplied by ten, or the aesthetic guideline has been selected. Health guidelines have been multiplied by 10 to account for accidental ingestion of up to 200ml of water during recreational use (compared to 2L ingestion used to generate the drinking water criteria).
Human Use, including: ▪ Potable Water; ▪ Irrigation; ▪ Stock Watering ▪ Industrial Water Use ▪ Aquaculture	There is no planned use of groundwater for the human uses stated. EI checked the NSW Department of Primary Industries Aquaculture Industry Directory 2016 for listings of aquaculture businesses in this, and in neighbouring areas, and did not identify this beneficial use in proximity to the site.
Visual amenity to surface waters	Given the distance of Stevenson Creek from the site, this environmental value is not considered relevant.

7. Assessment Methodology

7.1 Sampling Rationale

With reference to the CSM described in **Section 5.4**, soil and groundwater investigation work was planned in accordance with the following rationale:

- Sampling fill and natural soils from nine test bore locations located at accessible area of the site to characterise in-situ soils;
- Sampling groundwater during a single groundwater monitoring event (GME) at three monitoring wells located close to the up gradient and down gradient site boundaries to assess for potential groundwater impacts; and
- Laboratory analysis of representative soil and groundwater samples for the identified COPC.

For the purposes of this investigation, the adopted soil assessment criteria are referred to as the Soil Investigation Levels (SILs) and the adopted groundwater assessment criteria are referred to as the Groundwater Investigation Levels (GILs). SILs and GILs are presented alongside the analytical results in the corresponding summary tables, which are discussed in Section **9**.Soil Investigation

The soil investigation works conducted at the site are described in **Table 7-1**. Test bore locations are illustrated in **Figure 2, Appendix A**.

Table 7-1 Summary of Soil Investigation Methodology

Activity/Item	Details
Fieldwork	The site investigation was conducted on the 3, 4 and 5 August 2020. BH1M, BH2M, BH3 and BH4M were drilled as part of the EI (2020) geotechnical investigation, and terminated in shale bedrock. BH5 and BH7 were terminated in natural silty clay. BH6, BH8 and BH9 were terminated in fill.
Investigation Method & Depth	• BH1M, BH2M, BH3 and BH4M were drilled using a Hanjin solid flight auger drill rig utilising rock coring drilling methods. Final bore depths ranged from 12.59 m to 19.04 mBGL. BH1M, BH2M and BH4M were converted to groundwater monitoring wells. • BH5 to BH9 were drilled by hand auger. Final bore depths ranged from 0.6 m to 1.6 mBGL.
Soil Logging	Drilled soils were classified in the field with respect to lithological characteristics and evaluated on a qualitative basis for odour and visual signs of contamination. Soil classifications and descriptions were based on Unified Soil Classification System (USCS) and Australian Standard (AS) 4482.1-2005. Bore logs are presented in **Appendix H**.
Field Observations (including visual and olfactory signs of potential contamination)	A summary of field observations compiled during intrusive investigations is provided on borehole logs in **Appendix H**. Field observations are summarised in **Section 9.1.2**.

Activity/Item	Details
Soil Sampling	▪ Soil samples were collected using a dry grab method (unused, dedicated nitrile gloves) & placed into laboratory-supplied, acid-washed, solvent-rinsed glass jars. ▪ Blind field duplicates was separated from the primary samples and placed into glass jars. ▪ A small amount of duplicate was collected from each soil samples and placed into zip-lock bag for Photo-ionisation Detector (PID) screening. ▪ A small amount of duplicate was separated from all fill samples and placed into a zip-lock bag for asbestos analysis.
Decontamination Procedures	Dedicated gloves were used for the collection of each sample. Sampling equipment (i.e. trowel and shovel) was decontaminated between uses by washing in a solution of potable water and Decon 90 then rinsed with potable water.
Sample Preservation	Samples were stored in a chilled chest (with frozen ice packs), whilst on-site and in transit to the laboratory. All samples were submitted and analysed within the required holding period, as documented in laboratory reports discussed in a later section.
Management of Soil Cuttings	Soil cuttings were used as backfill for completed boreholes.
Quality Control & Laboratory Analysis	A number of soil samples were submitted for analysis of previously-identified chemicals of concern by SGS Laboratories (SGS). QA/QC testing comprised intra-laboratory duplicates ('field duplicates') tested blind by SGS and an inter-laboratory field duplicate tested blind by Envirolab Services (Envirolab). All samples were transported under strict COC conditions and COC certificates and laboratory sample receipt documentation were provided to EI for confirmation purposes, as discussed in **Section 8**.

7.2 Groundwater Investigation

The groundwater investigation works conducted at the site are described in **Table 7-2**. Monitoring well locations are illustrated in **Figure 2**, **Appendix A**.

Table 7-2 Summary of Groundwater Investigation Methodology

Activity/Item	Details
Fieldwork	Groundwater monitoring wells were installed and developed on 3 and 4 August 2020, with water level gauging, well purging, field testing, and groundwater sampling conducted on 14 August 2020.
Well Construction	Three test bores were converted to groundwater monitoring wells as follows: BH1M: 8.4 m deep, onsite, up-gradient; BH2M: 11.5 m deep, onsite, down -gradient; and BH4M: 7.5 m deep, onsite, down -gradient. Drilled by Geosense Drilling using a Hanjin DB8 with TC-bit auger followed by NMLC coring in bedrock. Well construction details are tabulated in **Table 9-2** and documented in the bore logs presented in **Appendix H**. All wells were seated in shale and were installed to screen the aquifer within the interval below: ▪ BH1M: 2.4 m to 8.4 mBGL; ▪ BH2M: 5.5 m to 11.5 mBGL; and ▪ BH4M: 4.5 m to 7.5 mBGL.

Activity/Item	Details
Well Construction Standards	Well construction was in general accordance with the standards described in NUDLC, 2012 and involved the following: ▪ 50 mm, Class 18 uPVC, threaded, machine-slotted screen and casing, with slotted intervals in shallow wells set to screen to at least 500 mm above the standing water level to allow sampling of phase-separated hydrocarbon product, if present; ▪ Base and top of each well was sealed with a uPVC cap; ▪ Annular, graded sand filter was used to approximately 300 mm above top of screen interval; ▪ Granular bentonite was applied above annular filter to seal the screened interval; ▪ Drill cuttings were used to backfill the bore annulus to just below ground level; and ▪ Surface completion comprised a steel road box cover set in neat cement and finished flush with the concrete slab level.
Well Development	Well development was conducted for each well directly following installation. This involved agitation within the full length of the water column using a dedicated, HDPE, disposable bailer, followed by removal of water and accumulated sediment using a 12V, HDPE submersible bore pump (Proactive Environmental, model Super Twister). Pumping was continued until no further reduction in suspended sediment was observed (i.e. after removal of several well volumes).
Well Survey (Elevation and location)	Well elevations at ground level were extrapolated from the spot elevations marked on the survey plan provided by the Client (Ref. ALTIS Architecture, Job No. 2817.01, dated 7/7/2020). Well elevations at ground level were extrapolated in metres relative to Australian Height Datum (mAHD).
Well Gauging & Groundwater Flow Direction	Monitoring wells were gauged for standing water level (SWL, depth to groundwater) prior to well purging at the commencement of the GME on 14 August 2020 and all measured SWLs are shown in **Table 9-2**. The groundwater flow direction is inferred to be east.
Well Purging & Field Testing	Newly installed monitoring wells were gauged for standing water level (SWL, depth to groundwater) prior to well purging at the commencement of the GME on 14 August 2020. All measured SWLs are shown in **Table 9-3**. A transparent HDPE bailer was used to visually assess for the presence PSH prior to the commencement of well purging. PSH was not detected in wells during the investigation.
Groundwater sampling	Once three consecutive field measurements were recorded for the purged waters to within ± 10% for DO, ± 3% for EC and ± 0.05 for pH, this was considered to indicate that representative groundwater quality had been achieved and final physico-chemical measurements were recorded. Groundwater samples were then collected using a transparent, dedicated, HDPE bailer. No volatile organic odours were detected during well purging or groundwater sampling.
Decontamination Procedure	▪ Decontamination was not required as sampling equipment was stored and transported prior to use in factory-sealed, plastic sleeves, while each bailer was dedicated to each individual well. ▪ All sample containers were supplied by the laboratory for the particular project and only opened once immediately prior to sampling. ▪ While ice was used to keep the samples cool, all melt water was continuously drained from the Esky to prevent cross-contamination of samples. ▪ The water level probe and water quality kit probes were washed in a solution of potable water and Decon 90 and then rinsed with potable water between measurements/wells.

Activity/Item	Details
Sample Preservation	Samples were stored in a chilled (with ice-bricks) chest, whilst on-site and in transit to the laboratory. All samples were submitted and analysed within the required holding period, as documented in laboratory reports discussed in a later section.
Quality Control & Laboratory Analysis	All groundwater samples were submitted for analysis of previously-identified COPC by SGS Laboratories (SGS). QA/QC testing comprised intra-laboratory duplicates ('field duplicates') tested blind by SGS and an inter-laboratory field duplicate tested blind by Envirolab Services (Envirolab). All samples were transported under strict Chain-of-Custody (COC) conditions and COC certificates and laboratory sample receipt documentation were provided to EI for confirmation purposes.
Sample Transport	After sampling, refrigerated sample chests were transported to SGS Australia Pty Ltd using strict Chain-of-Custody (COC) procedures. Inter-laboratory duplicate (ILD) samples were forwarded to Envirolab Services Pty Ltd (Envirolab) for QA/QC analysis. A Sample Receipt Advice (SRA) was provided by each laboratory to document sample condition upon receipt. Copies of SRA and COC certificates are presented in **Appendix J**.

8. Data Quality Assessment

The assessment of data quality is defined as the scientific and statistical evaluation of environmental data to determine if the data meet the objectives of the project (Ref. US EPA, 2006). Data quality assessment involves an evaluation of the compliance of the field sampling and laboratory analytical procedures and an assessment of the accuracy and precision of these data from the laboratory quality control measurements obtained.

The data quality assessment process for this assessment included a review of analytical procedures to confirm compliance with established laboratory protocols and an assessment of the accuracy and precision of analytical data from a range of quality control measurements. The QC measures generated from the field sampling and analytical program were as follows:

- Suitable records of fieldwork observations including test pit logs;
- Relevant and appropriate sampling plan (density, type, and location);
- Use of approved and appropriate sampling methods;
- Preservation and storage of samples upon collection and during transport to the laboratory;
- Complete field and analytical laboratory sample COC procedures and documentation;
- Sample holding times within acceptable limits;
- Use of appropriate analytical procedures and NATA-accredited laboratories;
- Required LOR (to allow for comparison with adopted IL);
- Frequency of conducting quality control measurements;
- Laboratory blanks;
- Field duplicates;
- Laboratory duplicates;
- Matrix spike/matrix spike duplicates (MS/MSDs);
- Surrogates (or System Monitoring Compounds);
- Analytical results for replicated samples, including field and laboratory duplicates and inter-laboratory duplicates, expressed as Relative Percentage Difference (RPD); and
- Checking for the occurrence of apparently unusual or anomalous results, e.g. laboratory results that appear to be inconsistent with field observations or measurements.

The findings of the data quality assessment in relation to the soil and groundwater investigation at the site are discussed in detail in **Appendix L**. Laboratory QA/QC policies and DQOs are presented in **Appendix M**.

8.1 Quality Overview

On the basis of the field and analytical data validation procedure employed, the overall quality of the analytical data produced for the site was considered to be of an acceptable standard for interpretive use and preparation of a conceptual site model (CSM).

9. Results

9.1 Soil Investigation Results

9.1.1 Site Geology and Subsurface Conditions

The general site geology encountered during the drilling of the soil investigation boreholes may be described as a layer of fill overlaying shale. The geological information obtained during the investigation is summarised in **Table 9-1** and borehole logs from these works are presented in **Appendix H**.

Table 9-1 Generalised Subsurface Profile

Layer	Description	Average Approximate Depth to Top & Bottom of Layer (mBGL)	
		Top	Bottom
Bitumen	Bitumen (BH3 and BH4M).	0.0	0.03
Fill	Silty sand, gravelly sand, and silty clay fill with traces of rootlets, no odour (all boreholes).	0.03	1.48+
Natural Soil	Silty clay, medium plasticity, red or brown mottled pale grey, with some ironstone gravel, no odour. (BH5 and BH7).	0.95	1.2+
Shale	Shale, brown and pale grey then dark grey, no odour (BH1M, BH2M, BH3 and BH4M).	2.23	15.61+

Note 1 **Notes:**
+ Maximum termination depth of borehole

9.1.2 Field Observations

Soil samples were obtained from the boreholes at various depths ranging between 0.1 m to 5.5 mBGL. Anthropogenic inclusions of bitumen were noted within fill encountered at sampling locations BH1M and inclusions of ash was identified within fill at BH1M and BH6. These inclusions are well known to contain significant concentrations of PAH contaminants, and the observations were consistent with the reported presence of these contaminants within fill sampled from BH1 and BH6.

9.2 Groundwater Investigation Results

9.2.1 Monitoring Well Construction

A total of three groundwater monitoring wells were installed onsite. Well construction details for the installed groundwater monitoring wells are summarised in **Table 9-2**.

Table 9-2 Monitoring Well Construction Details

Well ID	Bore Depth (mBGL)	Approx. RL (surface)	Approx. RL (TOC)	Screen Interval (mBGL)	Lithology Screened
BH1M	8.4	103.1*	103	2.4-8.4	Shale
BH2M	11.5	98.5*	98.4	5.5-11.5	Shale
BH4M	7.5	103.8*	103.7	4.5-7.5	Shale

Notes:
mBGL - metres below ground level.
RL - Reduced Level – Assumed elevation in metres relative to Australian Height Datum (m AHD).
TOC - top of well casing).
RL (TOC) - Assumed elevation at TOC in mAHD.
* Ref. ALTIS Architecture, Job No. 2817.01, dated 7/7/2020

9.2.2 Field Observations and Water Test Results

A single GME was conducted on 14 August 2020. On this date, standing water levels (SWLs) were measured within each well prior to well purging, the results of which were recorded with well purge volumes and field-based water test results. A summary of the recorded field data is presented in **Table 9-3** and copies of the completed Field Data Sheets are included in **Appendix I**.

Table 9-3 Groundwater Field Data

Well ID	SWL (mBTOC)	SWL RL (m AHD)	DO (mg/L)	Field pH	Field EC (µS/cm)	Temp(°C)	Redox (mV)	Odours / Turbidity
BH1M	3.04	99.96	0	6.46	1593	22.37	216	None/ low
BH2M	5.15	93.25	0	7.5	1920	21.84	187	None/ medium
BH4M	4.87	98.83	0.15	6.75	801	22.50	203.7	None/ low

Notes:
SWL – Standing Water Level as measured from TOC (top of well casing) prior to groundwater sampling.
mBTOC – metres below top of well casing.
RL (TOC) – Reduced Level, elevation at TOC in metres relative to Australian Height Datum (mAHD).
Redox – Oxidation and reduction potential. Redox reported in **Table 9-4** has been adjusted relative to standard hydrogen electrode (SHE) by adding 205 mV (field probe potential) to field reading, as advised by the test equipment manufacturer). Refer to **Appendix I** for field redox readings pre-adjustment.
L – litres (referring to volume of water purged from the well prior to groundwater sample collection).
EC – groundwater electrical conductivity as measured onsite using portable EC meter.
µS/cm – micro Siemens per centimetre (EC units).
DO – Dissolved Oxygen in units of milligrams per litre (mg/L).
All groundwater parameters (pH, EC and DO) were tested on site.

9.3 Laboratory Analytical Results

9.3.1 Soil Analytical Results

A summary of laboratory results from this investigation showing test sample quantities, minimum/maximum analyte concentrations for primary samples and samples found to exceed the adopted guidelines, is presented in **Table 9-4**. More detailed tabulations of results showing the tested concentrations for individual samples alongside the adopted soil criteria is presented in **Table B1, Appendix B** at the end of this report. Completed documentation used to track soil sample movements and laboratory receipt (i.e. COC and SRA forms) are copied in **Appendix J** and all laboratory analytical reports for tested soil samples are presented in **Appendix K**.

Table 9-4 Summary of Soil Analytical Results

No. of Primary Samples	Analyte	Min. Conc. (mg/kg)	Max. Conc. (mg/kg)	Sample Locations Exceeding Investigation Levels
Priority Metals				
13	Arsenic	1	35	None
13	Cadmium	<0.3	0.5	None
13	Chromium (Total)	2.4	15	None
13	Copper	10	54	None
13	Lead	10	220	None
13	Nickel	1.2	36	None
13	Zinc	5.8	230	None
13	Mercury	<0.05	2.2	None
PAHs				
13	Benzo(α)pyrene	<0.1	5.6	None
13	Carcinogenic PAHs	<0.3	8.1	BH1M_0.7-0.8 (8.1 mg/kg) exceed HIL B (4 mg/kg)
13	Naphthalene	<0.1	<0.1	None
13	Total PAHs	<0.8	63	None
TRHs (including BTEX)				
13	TRH C_6-C_{10} minus BTEX (F1)	<25	<25	None
13	TRH >C_{10}-C_{16} (F2) minus Naphthalene	<25	<25	None
13	TRH >C_{16}-C_{34} (F3)	<90	100	None
13	TRH >C_{34}-C_{40} (F4)	<120	<120	None
13	Benzene	<0.1	<0.1	None
13	Toluene	<0.1	<0.1	None
13	Ethylbenzene	<0.1	<0.1	None
13	Total Xylenes	<0.3	<0.3	None
OCPs				
10	OCPs	<1	4	None
OPPs				
10	OPPs	<1.7	<1.7	None
PCBs				
10	PCBs	<1	<1	None
Asbestos (presence/absence)				
9	Asbestos	ND	Yes	Asbestos found in sample BH7_1.0-1.1

Note:
ND – Not Detected

Priority Metals,

With reference to **Table B1**, all priority metals concentrations were below the corresponding health-based SILs and EILs (**Section 7-2**).

PAHs

As summarised in **Table B1**, all samples tested were reported below the laboratory PQL and the adopted human health SIL and ESL, with exception of Carcinogenic PAHs in fill sample BH1M_0.7-0.8 (8.1 mg/kg) exceed the HIL B (4.0 mg/kg).

TRHs including BTEX

With reference to **Table B1**, TRHs and BTEX concentrations were reported below the laboratory PQL and the adopted human health SIL and ESL.

OCPs, OPPs and PCBs

As illustrated in **Table B1,** the total concentrations of OCPs, OPPs and PCB were reported below the laboratory PQL and the adopted human health SIL.

VOCs

As illustrated in **Table B1,** the concentrations of VOCs were reported below the laboratory PQL.

Asbestos

As summarised in **Table B1**, no detectable asbestos concentrations were identified in any of the tested soil samples, with exception of Chrysotile Asbestos found in fill sample BH7_1.0-1.1. The asbestos was detected within an 8x2x2mm fibrous rope material, and was considered to represent asbestos containing material (ACM) or friable asbestos (FA).

9.3.2 Groundwater Analytical Results

Laboratory analytical results for groundwater samples are summarised in **Table B2, Appendix B**, which also include the adopted GILs. Completed documentation used to track groundwater sample movements and laboratory receipt (COC and SRA forms) are copied in **Appendix J**. Copies of the laboratory analytical reports are attached in **Appendix K**.

Table 9-5 Summary of Groundwater Analytical Results

No. of primary samples	Analyte	Min. Conc. (µg/L)	Max. Conc. (µg/L)	Sample locations exceeding investigation levels
Metals				
3	As	<1	6	None
3	Cd	<0.1	0.3	None
3	Cr	<1	27	BH2M (27 µg/L) (GIL Marine Water: 4.4 µg/L)
3	Cu	1	96	BH1M (5 µg/L); BH2M (96 µg/L) (GIL Marine Water: 1.3 µg/L)
3	Pb	<1	37	BH2M (37 µg/L)

No. of primary samples	Analyte	Min. Conc. (µg/L)	Max. Conc. (µg/L)	Sample locations exceeding investigation levels
				(GIL Marine Water: 4.4 µg/L)
3	Hg	<0.1	<0.1	None
3	Ni	3	24	BH2M (24 µg/L) (GIL Marine Water: 7 µg/L)
3	Zn	28	170	BH1M (69 µg/L); BH2M (170 µg/L); BH4M (28 µg/L). (GIL Marine Water: 15 µg/L)
PAHs				
3	Total PAHs	<1	<1	None
3	Benzo(α)pyrene	<0.1	<0.1	None
3	Naphthalene	<0.1	0.3	None
BTEX				
3	Benzene	<0.5	<0.5	None
3	Toluene	<0.5	1.7	None
3	Ethylbenzene	<0.5	0.5	None
3	o-xylene	<0.5	2.2	None
3	m/p-xylene	<1	6	None
TRHs				
3	F1	<50	66	BH4M (66 µg/L) (GIL Marine Water: 50 µg/L)
3	F2	<60	290	BH2M (290 µg/L) (GIL Marine Water: 60 µg/L)
3	F3	<500	<500	None
3	F4	<500	<500	None
VOCs				
3	Chloroform (THM)	<0.5	7.2	None
3	1,3,5-trimethylbenzene	<0.5	1.5	None
3	1,2,4-trimethylbenzene	<0.5	3.4	None
3	Other VOCs	Not detected	Not detected	None

10. Site Characterisation

10.1 Soil Characterisation

Contaminant concentrations in soils were found to be below the adopted human health-based criteria and ecological criteria for site land use settings, with the exception of the following:

Risk posed to human health:

- Carcinogenic PAHs in fill at BH1M_0.7-0.8 (8.1 mg/kg) exceeded the human health based criteria HIL-B of 4.0 mg/kg; and
- Friable asbestos 'fibrous rope material' was reported in fill samples BH7_1.0-1.1.

BH1M was also identified to contain asphalt fragments, being the likely source of the reported PAH concentrations. Asphalt / bitumen is considered to be a generally inert material, and the PAH contaminants within these materials are typically encapsulated, with low to no leachability potential, therefore the actual risk posed by the PAH contaminants within fill sampled at BH1M was considered to be low. Furthermore, the sample was collected from material located within the proposed basement excavation therefore would be removed, and would not remain within the site.

Asbestos was identified at BH7_1.0-1.1, within fill material, however was located within the proposed basement footprint, and would be removed. The use of boreholes significantly restricts the accessible soil exposed during sampling, and would not be adequate for full assessment of the site for the presence of ACM. Boreholes were necessary for the current sampling event as site structures remained at the surface, restricting access to site soils. Additional investigations of the fill material across the site would be required to determine the extent of ACM within fill across the site, however would require demolition of all above ground structures, to gain access. Furthermore, additional sampling of the deep fill material would be required for waste classification purposes, to enable the offsite disposal of surplus material from the bulk excavation works.

10.2 Groundwater Characterisations

Based on the findings from the groundwater monitoring and sampling event, concentrations of tested analytes (PAHs and BTEX) were all reported below the adopted criteria (GILs).

A number of metals were reported at concentrations below investigation criteria, except for chromium, copper, lead, nickel and zinc, which exceeded criteria at a number of monitoring locations. While exceeding criteria, these concentrations are generally low and at concentrations indicative of background groundwater quality within an urban setting. In light of this, no further consideration is given for the investigation of groundwater.

Total recoverable hydrocarbons (TRH) F1 was detected within groundwater sampled within location BH2M and TRH F2, chloroform, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene were detected in groundwater sampled from the down-gradient monitoring well BH4M.

The reported TRH F2 concentrations were minor, and given the slow recovery of groundwater typically observed within a fractured rock aquifer, the reported results may be influenced by the presence of sediment within the water column, and may not represent the groundwater body itself. As groundwater will be in direct contact with the proposed basement, the reported detections may indicate a potential vapour intrusion risk to users of the basement; therefore additional investigation will be required. The investigations should include further development of the installed wells prior to sampling, to ensure all sediment is removed from each location,

prior to sampling. Should detections of TRH be identified within the second round of sampling, a 'silica gel clean-up' of the submitted sample should be completed, to remove any interference of naturally occurring F2 contaminants. This will ensure that the reported detections are representative of anthropogenic TRH contaminants, being the contaminants of risk to the site receptors.

Detections of trihalomethanes (THMs) including chloroform, are known to be present as a result of drinking water disinfection, and may be present as a result of drilling, which introduced potable water to the borehole annulus, as part of rock coring drilling techniques. Furthermore, the detections of trimethylbenzenes may also be related to the use of lubricants as part of the rock coring methods. Further well development, followed by additional sampling will be necessary to confirm the results reported for Round 1. Should these impacts remain, a soil vapour assessment may be required. Review of Conceptual Site Model

On the basis of investigation findings the CSM discussed in **Section 5** was considered to appropriately identify contamination sources, migration mechanisms and exposure pathways, as well as potential onsite and offsite receptors. Previously known data gaps, as outlined in **Section 5.5** have largely been addressed; however, the following remaining data gaps need to be addressed in subsequent investigation works:

- Assessment of existing site structures onsite for the presence of hazardous building materials;
- A visual inspection of the site surface, post demolition, to assess the presence of ACM;
- Further assessment of groundwater including further well development, analysis of TRH, heavy metals, VOC's pH, hardness and PFAS. Where TRH is detected, samples must undergo a 'silica gel clean-up' to remove any interference of naturally occurring hydrocarbons.
- Given the identified carcinogenic PAHs and asbestos, adequate characterisation of the site would be required, in accordance with DECC (1995) Sample Design Guidelines. An additional 14 sampling locations will be required to achieve compliance with the minimum sampling points required for site characterisation, and should utilise test pitting methods to adequately assess the presence of asbestos,
- Additional sampling points may be used for characterisation of fill for offsite disposal, and should extend to natural soils to assess natural material against the virgin excavated natural material (VENM) exemption;
- Further assessment of soil should include characterisation of soil to be retained within the southern part of the site, including analysis of pH, cation exchange capacity (CEC) and clay content, to evaluate the ecological suitability of the material; and
- The quality of soil to be retained beneath the basement requires further assessment.

11. Conclusions

The property located at The Hills Club, Baulkham Hills NSW was the subject of a Preliminary Site Investigation with Limited Sampling. The investigation was prepared to assess the nature and degree of on-site contamination associated with current and former uses of the property.

Based on the findings of this assessment, it is concluded that:

- Land titles records and historic aerial photography indicated that the site was owned by private persons then was developed into a bowling club since at least 1951 to the current date;
- The Hills Shire Council records indicated that no evidence was found regarding any previous manufacturing activities, on-site storage of chemicals, and site contamination related incidents;
- A search of SafeWork NSW records did not identify records pertaining to the significant storage of dangerous goods or the presence of UST's within the site;
- A search through the record of notices for contaminated land indicated that the site was free of statutory notices issued by the NSW EPA, and was not identified as a contaminated site notified to the EPA.
- A search through the List of NSW Contaminated Sites notified to the EPA under Section 60 of the CLM Act 1997 identified a Shell Coles Express Service Station located 110m to the west of the site, being up hydraulic gradient was on the list.
- POEO search did not identify any record for the site or sites in proximity (≤ 500 m);
- During this investigation the site was in use, occupied by The Hills Club. The site walkover inspection did not identify any evidence of UPSS on site or source of contamination from the neighbouring properties. Bitumen and ash were found in the fill at BH1M and BH6;
- Soil sampling and analysis were conducted at nine (9) borehole locations (BH1M to BH9) within the accessible area of the site. The intrusive investigation was completed in conjunction with a geotechnical investigation, therefore applied a mixed, judgemental and systematic sampling regime, with allowances made for structural obstacles (e.g. buildings, services, and other physical obstructions in use by existing operating businesses) The sampling was considered to be appropriate for preliminary investigation purposes.);
- The sub-surface layers of the site comprised fill materials consisting of predominantly silty sand, overlying shale bedrock at depth;
- Soil samples reported Carcinogenic PAHs within fill sampled at BH1M. The concentrations reported exceeded human health criteria, however were considered to be a result of the presence of asphalt within this location, and would therefore pose a low risk to human health receptors of the site;
- Asbestos containing material was identified within fill sampled at BH7. The analysis was qualitative therefore was not comparable to the adopted Health-based screening levels;
- Sample locations BH1M and BH7 were located within the basement footprint, therefore fill associated with the the reported exceedances would be removed as part of bulk excavation for the basement, and would not remain for the site's end use;

- Visual assessment of the site surface (post demolition) would be required to adequately assess the site surface for the presence of ACM;
- Additional characterisation of the fill and natural soil would be required to facilitate offsite disposal of surplus material resulting from the excavation works;
- Sampling locations did not assess soil to be retained within the southern part of the site, and additional assessment of this material will be required to determine suitability. Once the above ground buildings are removed;
- Groundwater was identified during monitoring between 3.14 – 5.25 mBGL. Standing water levels collected within the site suggest groundwater to migrate in a north-easterly direction, towards Stevenson Creek. The variation in standing water levels observed may represent a confined aquifer, and may not represent true groundwater levels within the site;
- Groundwater samples reported concentrations of the heavy metals, chromium, copper, lead, nickel and zinc exceeding the ecological criteria, however were considered to be typical of urban groundwater environments, and did not pose a risk to the site's receptors; and
- Low concentrations of TRH F1 and F2, Chloroform, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene were reported in hydraulically down-gradient monitoring wells BH2M and BH4M. The detections of these contaminants may be a result of drilling methods (rock coring) used for the geotechnical investigations. Being a fractured rock aquifer, development of the newly installed wells may be inadequate, due to the slow recovery of groundwater typical of such environments. Additional development and sampling of the wells is required to confirm these results.

In view of the above findings and subject to the statement of limitations (**Section 13**), EI have identified a moderate and potentially unacceptable risk posed by contamination to receptors of the proposed development. As such, additional investigation, such as the completion of a detailed site investigation (DSI) will be required to adequately determine the actual risk posed to the site's receptors, and determine if the site is suitable for the proposed mixed use as a residential (minimal access to soil) and recreational bowling facility.

12. Recommendations

EI consider that the site can be made suitable for the proposed development, subject to the following recommendations:

- Conduct a Hazardous Materials Survey (HMS) of current site structures prior to demolition works;
- A Detailed Site Investigation (DSI) will be required after site building demolition to gain access to the site surface. The DSI should include:
  - A visual inspection of the entire site surface for asbestos;
  - Additional sampling of soil at 14 additional locations to achieve the minimum sampling requirements for a 1.35 hectare site, as required by DECC (1995) Sample Design Guidelines;
  - Sampling locations should assess fill and natural soils at each location, and the analytical results may be utilised for the classification of surplus material designated for offsite disposal;
  - At least three sample locations should be positioned at proposed retained soil area at southern portion of the site to assess the ecological suitability of this material; and
  - An additional round of groundwater monitoring (GME) utilising the 3 existing wells, including the collection of survey data to determine flow direction.
- Any material being imported to the site (i.e. for landscaping purposes) should be assessed for potential contamination in accordance with NSW EPA guidelines as being suitable for the intended use or be classified as virgin material (VENM).

13. Statement of Limitations

This report has been prepared for the exclusive use of Arden Clubs on behalf of The Hills Club, who is the only intended beneficiary of EI's work. The scope of the investigations carried out for the purpose of this report is limited to those agreed with Arden Clubs on behalf of The Hills Club on 11 August 2020.

No other party should rely on the document without the prior written consent of EI, and EI undertakes no duty, or accepts any responsibility or liability, to any third party who purports to rely upon this document without EI's approval.

EI has used a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry in Australia as at the date of this document. No other warranty, expressed or implied, is made or intended. Each section of this report must be read in conjunction with the whole of this report, including its appendices and attachments.

The conclusions presented in this report are based on a limited assessment of historical site use and current use of the site. Due to the preliminary nature of this assessment, findings are not based on actual samples collected or testing conducted. EI has relied upon information provided by the Client and other third parties to prepare this document, some of which could not be verified by EI due to the anecdotal or historical nature of the information.

EI's professional opinions are reasonable and based on its professional judgment, experience and training.

EI's professional opinions contained in this document are subject to modification if additional information is obtained through the data searches that have been initiated with government authorities, but for which the requested information is still pending.

Technical opinions may also be amended in the light of further investigation, observations, or validation testing and analysis during remedial activities. In some cases, further testing and analysis may be required, which may result in a further report with different conclusions.

References

ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, August 2018.

Australian Standard (2005) Table E1 – Minimum sampling points required for site characterisation, in Guide to the investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds, Standards Australia, AS 4482.1-2005, p45.

Chapman, G.A. and Murphy, C.L. (1989) Soil Landscapes Series Sheet 9030 of Penrith 1:100 000 sheet, Soil Conservation Service of NSW, Sydney, September 1989.

DEC (2007) Guidelines for the Assessment and Management of Groundwater Contamination, Dept. of Environment and Conservation, New South Wales, DEC 2007/144, June 2007.

DMR (1991) Penrith 1:100,000 Geological Series Sheet 9030 (Edition 1) *Geological Survey of New South Wales*, Department of Mineral Resources.

EI Australia, *Geotechnical Investigation; The Hills Club, Baulkham Hills* (EI Report E24782.G03, dated 1 September 2020);

EPA (2014) Waste Classification Guidelines, NSW EPA, November 2014;

EPA (2017) Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme, NSW EPA, October 2017;

Murphy CL (1997) Acid Sulfate Soil Risk of the Liverpool Sheet Department of Land and Water Conservation, Sydney, Second Edition. Supplied by the Sydney South Coast, Geographical Information Systems Unit;

NEPM (2013) Schedule B1 Guideline on Investigation Levels for Soil and Groundwater, Schedule B2 Guideline on Site Characterisation and Schedule B4 Guideline on site-specific health risk assessments, National Environmental Protection (Assessment of Site Contamination) Measure 1999, National Environmental Protection Council, December 1999, Amendment 2013;

NSW Environment Protection Authority (2020) Guidelines for Consultants Reporting on Contaminated Sites, EPA 2020P2233, 5 May 2020;

SEPP 55 (1997) State Environment Protection Policy 55, Remediation of Land under the Environmental Planning and Assessment Act 1997;

The Hills Local Environmental Plan 2019; and

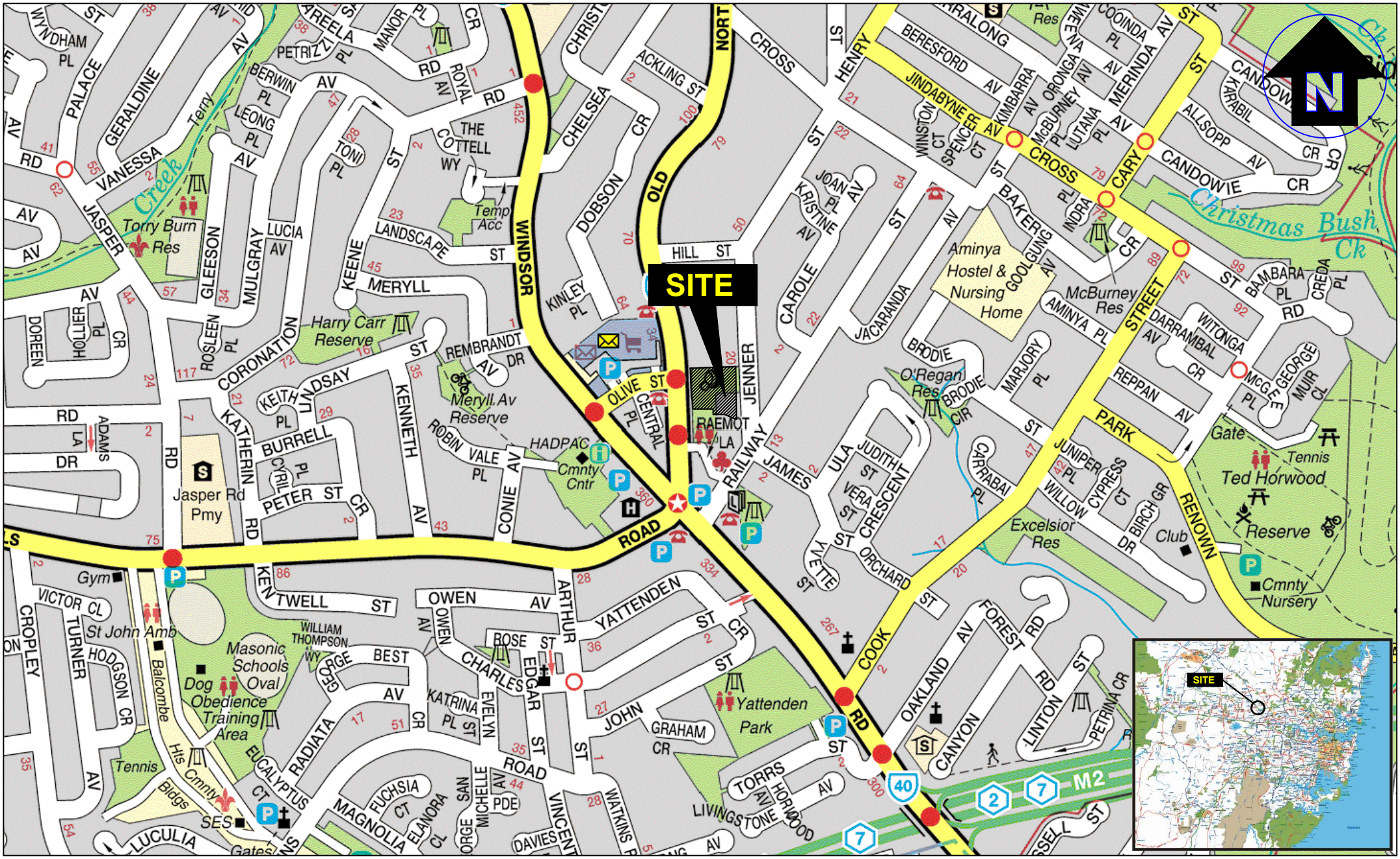
US EPA (2006) Data Quality Assessment: A Reviewers Guide – EPA QA/G-9R. USEPA Office of Environmental Information, EPA/240/B-06/002, February 2006.

Abbreviations

ACM	Asbestos-containing materials
ASS	Acid sulfate soils
ANZECC	Australian and New Zealand Environment Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
B(a)P	Benzo(a)Pyrene (a PAH compound), - B(a)P TEQ Toxicity Equivalent Quotient
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CEC	Cation Exchange Capacity
COC	Chain of Custody
COPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
DA	Development Application
DEC	Department of Environment and Conservation, NSW (see OEH)
DECC	Department of Environment and Climate Change, NSW (see OEH)
DO	Dissolved Oxygen
DP	Deposited Plan
EC	Electrical Conductivity
Eh	Redox potential
EI	EI Australia
EIL	Ecological Investigation Level
ESL	Ecological Screening Level
EPA	Environment Protection Authority
F1	TRH C_6 – C_{10} less the sum of BTEX concentrations (Ref. NEPM 2013, Schedule B1)
F2	TRH >C_{10} – C_{16} less the concentration of naphthalene (Ref. NEPM 2013, Schedule B1)
GIL	Groundwater Investigation Level
GME	Groundwater Monitoring Event
HIL	Health-based Investigation Level
HSL	Health-based Screening Level
HM	Heavy Metal
km	Kilometres
LNAPL	Light, non-aqueous phase liquid (also referred to as PSH)
m	Metres
mAHD	Meters above Australian Height Datum
mBGL	Metres Below Ground Level
mg/L	Milligrams per litre
µg/L	Micrograms per litre
mV	Millivolts
MW	Monitoring well
NATA	National Association of Testing Authorities, Australia
NEPC	National Environmental Protection Council
NSW	New South Wales
OCP	Organochlorine Pesticides
OEH	Office of Environment and Heritage, NSW (formerly DEC, DECC, DECCW)
OPP	Organophosphorus Pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PFAS	Per- and poly-fluoroalkyl substances
PID	Photo-ionisation Detector
pH	Measure of the acidity or basicity of an aqueous solution

PSI	Preliminary Site Investigation
PSH	Phase-separated hydrocarbons (also referred to as LNAPL)
QA/QC	Quality Assurance / Quality Control
RL	Relative Level
SIL	Soil Investigation Levels
SWL	Standing Water Level
TDS	Total dissolved solids (a measure of water salinity)
TRH	Total Recoverable Hydrocarbons (non-specific analysis of organic compounds)
UST	Underground Storage Tank
UPSS	Underground Petroleum Storage System
VOCs	Volatile Organic Compounds (specific organic compounds which are volatile)

Appendix A - Figures



Drawn:	L.C.	
Approved:	-	
Date:	12-08-20	
Scale:	Not To Scale	

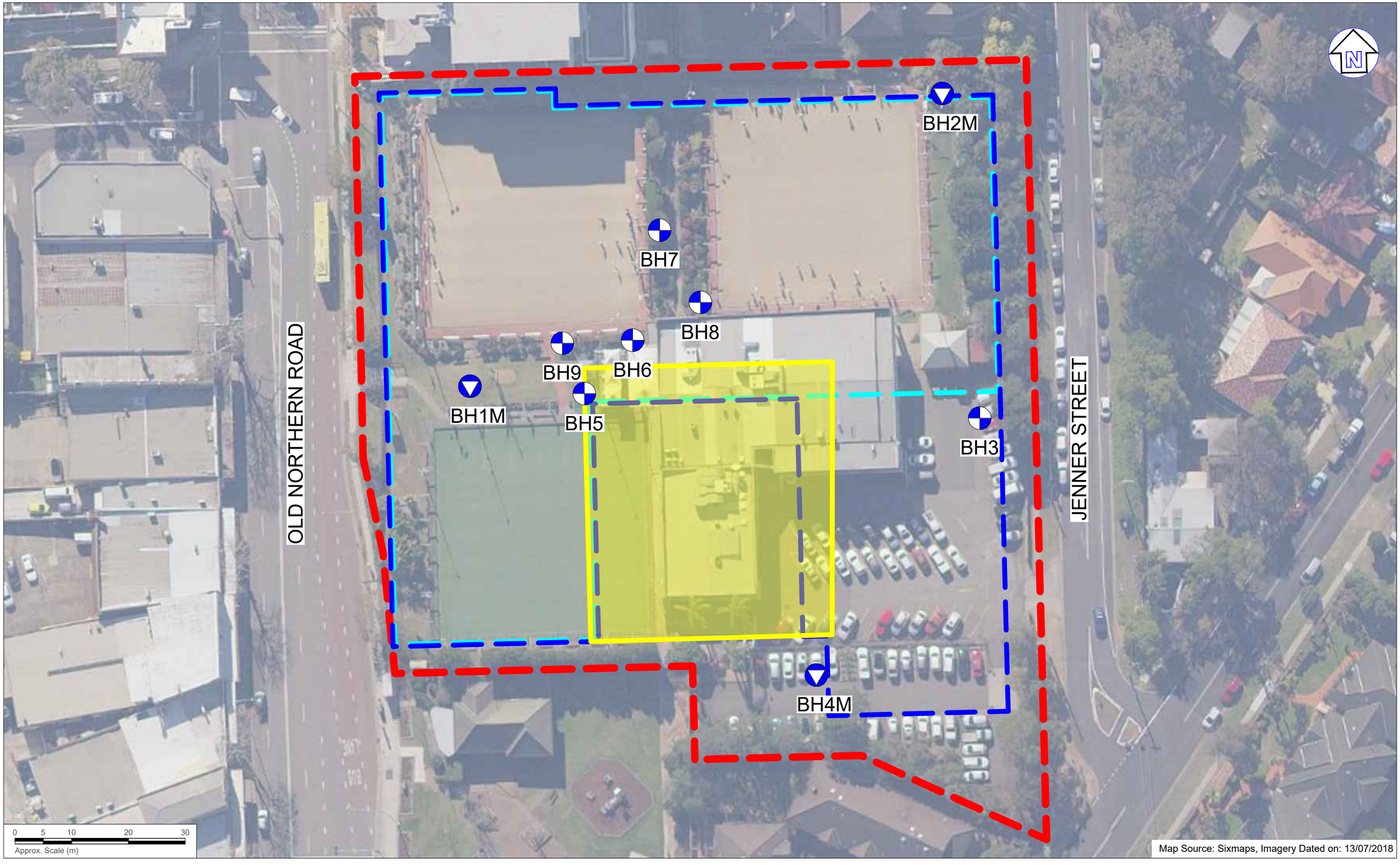
Arden Clubs on behalf of The Hills Club
Preliminary Site Investigation
The Hills Club, Baulkham Hills NSW

Site Locality Plan

Figure: 1

Project: E24782 E01_Rev0

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088



LEGEND

- Approximate site boundary
- Approximate basement 2 boundary
- Approximate basement 3 boundary
- Approximate undercover bowling green boundary
- Approximate borehole location
- Approximate borehole/monitoring well location

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	L.Y.
Approved:	-
Date:	18/09/2020

Arden Clubs on behalf of The Hills Club
Preliminary Site Investigation
The Hills Club, Baulkham Hills NSW

Borehole Location Plan

Figure: 2

Project: E24782.E01

Appendix B - Tables

Table B1 - Summary of Soil Analytical results

E24782 - Baulkham Hill

Sample ID	Material	Date	Heavy Metals								PAHs				BTEX				TRH				VOCs	Pesticides		Total PCBs	Asbestos
			As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	Carcinogenic PAHs (as B(a)P TEQ)	Benzo(a)pyrene	Total PAHs	Naphthalene	Benzene	Toluene	Ethylbenzene	Total Xylenes	F1	F2	F3	F4		OCPs	OPPs		Presence / absence
BH1M_0.7-0.8	Fill	3/08/2020	8	<0.3	8.3	21	42	<0.05	4.6	26	8.1	5.6	63	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	100	<120	N.A.	<1	<1.7	<1	No
BH2M_0.1-0.2	Fill	4/08/2020	9	0.5	6.2	10	20	1.9	4	43	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	4	<1.7	<1	No
BH2M_4.5-4.6	Natural		1	<0.3	2.4	12	12	<0.05	1.4	8.5	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.	N.A.
BH3_0.2-0.3	Fill	5/08/2020	11	<0.3	15	14	23	1	19	43	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	<1	<1.7	<1	No
BH4_0.5-0.6	Fill		1	<0.3	4.8	30	10	<0.05	36	17	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	<1	<1.7	<1	No
BH4_5.0-5.5	Natural		7	<0.3	6	39	25	<0.05	23	150	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<PQL	<1	<1.7	<1	N.A.
BH5_0.1-0.2	Fill		5	<0.3	8.6	20	14	0.68	3.2	39	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	<1	<1.7	<1	No
BH5_0.7-0.8	Natural		9	<0.3	4.9	17	16	<0.05	<0.5	5.8	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.	N.A.
BH6_0.6-0.7	Fill		7	<0.3	13	17	24	0.09	8.2	33	<0.3	<0.1	1.1	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	<1	<1.7	<1	No
BH7_1.0-1.1	Fill		9	<0.3	8.5	54	220	0.13	6.7	230	1.4	1	15	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	<1	<1.7	<1	Yes
BH7_1.5-1.6	Natural		7	<0.3	11	14	23	<0.05	1.2	7	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	N.A.	N.A.	N.A.	N.A.
BH8_0.1-0.2	Fill		35	0.5	10	30	130	0.99	4.7	160	0.8	0.5	9	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	<1	<1.7	<1	No
BH9_0.1-0.2	Fill		9	<0.3	10	18	27	2.2	5.3	36	1.1	0.8	11	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	N.A.	<1	<1.7	<1	No
Statistical Analysis																											
Maximum concentration			35	0.5	15	54	220	2.2	36	230	8.1	5.6	63	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	100	<120	<LOR	4	<1.7	<1	No
SILs																											
HIL B - *Residential*			500	150	500 Cr(VI)	30,000	1,200	120	1,200	60,000	4		400											600		1	
HSL A & B - Low to high density residential Soil texture classification – Sand [1]			Source depths (0 m to <1 m. BGL)											3	0.5	160	55	40	45	110							Presence / Absence
			Source depths (1 m to <2 m. BGL)											NL	0.5	220	NL	60	70	240							
			Source depths (2m to <4 m. BGL)											NL	0.5	310	NL	95	110	440							
			Source depths (4 m+)											NL	0.5	540	NL	170	200	NL							
EILs / ESLs - Urban Residential and Public Open Space [1] [2]			100		408	150	1,100		245	495				170	50	85	70	105	180	120	300	2800		180			
CRC Care - High Reliability Ecological Criteria for Benzo(a)pyrene												33															
Management Limits – *Residential, parkland and public open space* [1]																			700	1,000	2,500	10,000					

Notes:

All results are recorded in mg/kg (unless otherwise stated)

Highlighted values indicates concentration exceeds Human Health Based Soil Criteria (HIL B / HSL A & B)□

Highlighted indicates criteria exceeded

HIL B	NEPC 1999 Amendment 2013 'HIL B' Health Based Investigation Levels applicable for residential exposure settings with minimal opportunities for garden soil access.
HSL A&B	NEPC 1999 Amendment 2013 'HSL A&B' Health Based Screening Levels based on vapour intrusion values applicable for low to high density residential settings.
NA	'Not Analysed' i.e. the sample was not analysed.
NL	'Not Limiting' - The soil vapour limit exceeds the soil concentration at which the pore water phase cannot dissolve any more of the individual chemical.
1	Majority of the fill to be found as sandy material. Therefore, coarse grained soil (sand) values were applied.
2	EIL criteria is derived from a site specific Added Contaminant Limit (ACL) with the Ambient Background Concentration (ABC) for an old NSW and low traffic suburb. In lack of physiochemical properties for soils across the site, a site specific ACL criteria for heavy metals based on averaged physiochemical properties presented in Chapman and Murphy (1989) for the Blacktown (bt) soil landscape.
F1	To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.
F2	To obtain F2 subtract Naphthalene from the >C10-C16 fraction.
F3	(>C16-C34)
F4	(>C34-C40)

eiaustralia
Contamination | Remediation | Geotechnical

Table B2 – Summary of Groundwater Investigation Results

Sample Identification		Date	Heavy Metals								PAHs			BTEX				VOCs				TRHs			
			As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	Total PAHs	Benzo(a)pyrene	Naphthalene	Benzene	Toluene	Ethylbenzene	xylene	Chloroform (THM)	1,3,5-trimethylbenzene	1,2,4-trimethylbenzene	Total VOC	F1	F2	F3	F4
BH1M		14/08/2020	<1	<0.1	<1	5	<1	<0.1	7	69	<1	<0.1	<0.1	<0.5	<0.5	<0.5	<1.5	<0.5	<0.5	<0.5	<10	<50	<60	<500	<500
BH2M			6	0.3	27	96	37	<0.1	24	170	<1	<0.1	<0.1	<0.5	<0.5	<0.5	<1.5	<0.5	<0.5	<0.5	<10	<50	**290**	<500	<500
BH4M			4	<0.1	4	1	2	<0.1	3	28	<1	<0.1	0.3	<0.5	1.7	0.5	8	7.2	1.5	3.4	25	**66**	<60	<500	<500
GILs																									
HSL D for Commercial/Industrial [4]													NL	30000	NL	NL	NL					NL	NL		
HSL - C Recreational / Open Space [4]													NL	NL	NL	NL	NL					NL	NL		
GIL	**Marine Water [3]**			0.7	4.4(Cr IV)	1.3	4.4	0.1 [2]	7	15 [1]			50 [1]	500 [1]	180 [6]	5 [6]						50 [5]	60 [5]	500 [5]	500 [5]
Recreational Water [7]			100	20	50 [8]	1000	100	10	200	3000		0.01		10	8000	3000	6000								

Notes:

All values are µg/L unless stated otherwise

NL = Not Limiting

NA = 'Not Analysed' i.e. the sample was not analysed.

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

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

F3 (>C16-C34)

F4 (>C34-C40)

1 = Figure may not protect key species from chronic toxicity, refer to ANZG 2018 for further guidance

2 = Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer to ANZG 2018 for further guidance

3 = NEPM (2013) Groundwater Investigation Levels for marine water quality, based on ANZG 2018.

4 = NEPM (2013) Table 1A(4) Groundwater HSL C and D for vapour intrusion at the contaminant source depth ranges in clay 2m to <4m, as a conservative approach.

5 = In lack of a criteria the laboratory PQL has been used (DEC, 2007).

6 = Low reliability toxicity data, refer to ANZG 2018

7 = Based on NHMRC (2017) Drinking Water Guidelines. The lowest of the Health Guideline x10 or the Aesthetic Guideline has been chosen as the assessment criteria.

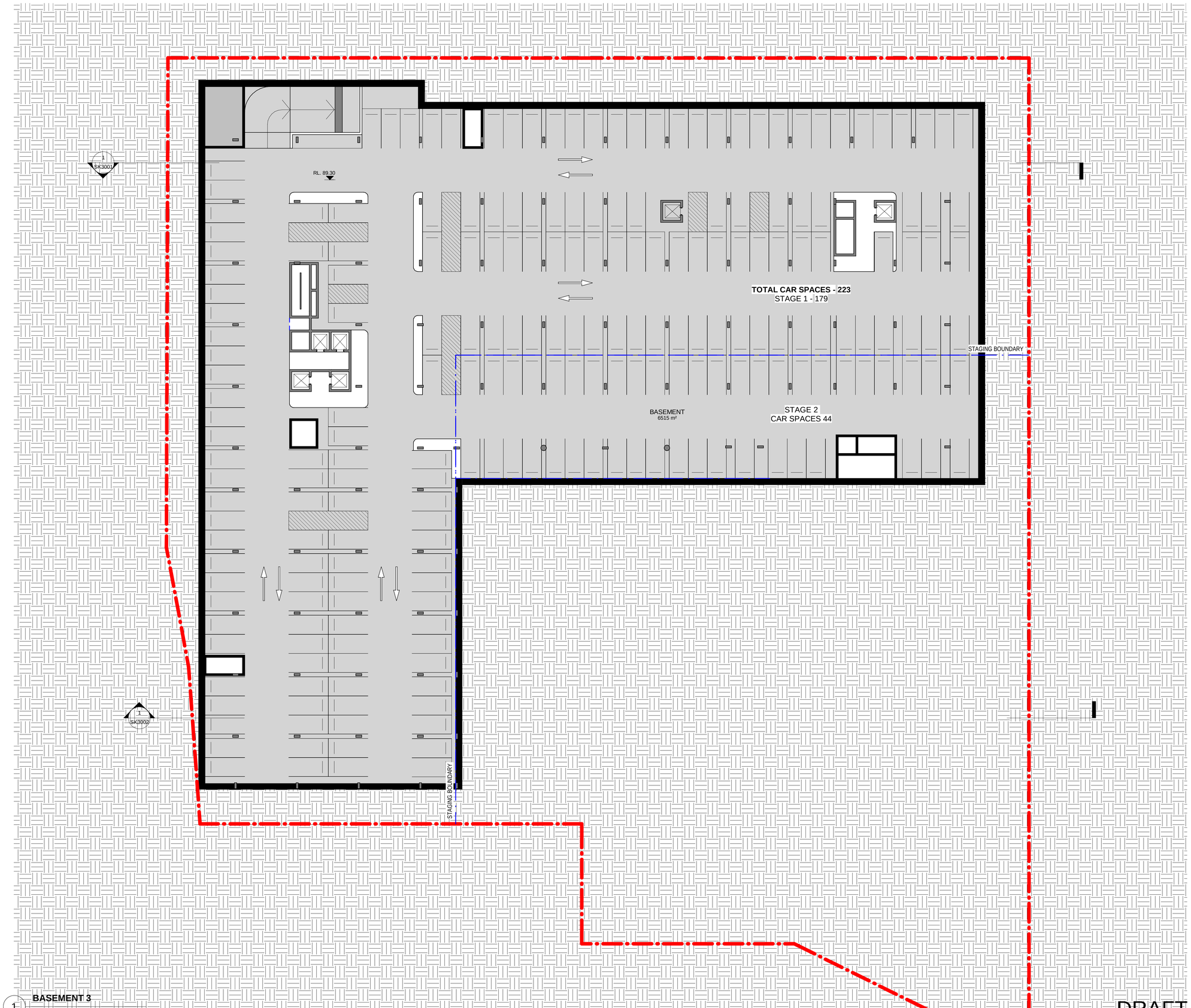
8= ANZECC/ARMCANZ (2000) Recreational Criteria utilised were NHMRC (2017) does not provide criteria.

Highlighted Indicates concentration value exceeding the Groundwater Investigation Level for Marine Water

Highlighted indicates criteria exceeded

eiaustralia
Contamination | Remediation | Geotechnical

Appendix C – Proposed Development Plans



1 **BASEMENT 3**
Scale:1 : 250

DRAFT ONLY

ISSUE	DATE	DESCRIPTION
1	07.07.2020	DRFAT SET FOR COODINATION

CLIENT:
ARDEN GROUP/ THE HILLS CLUB

PROJECT:
THE HILLS CLUB, 6-18 JENNER STREET,BAULKHAM HILLS

ARCHITECT:
ALTIS
architecture
p 61 2 9364 9000 f 61 2 9571 7930 lower deck jones bay wharf
suite 123 / 26 - 32 pirrama road pyrmont nsw 2009 australia

DRAWING TITLE:
BASEMENT-3

NOTES:
Nominated architect: Rolfe Latimer : 5535

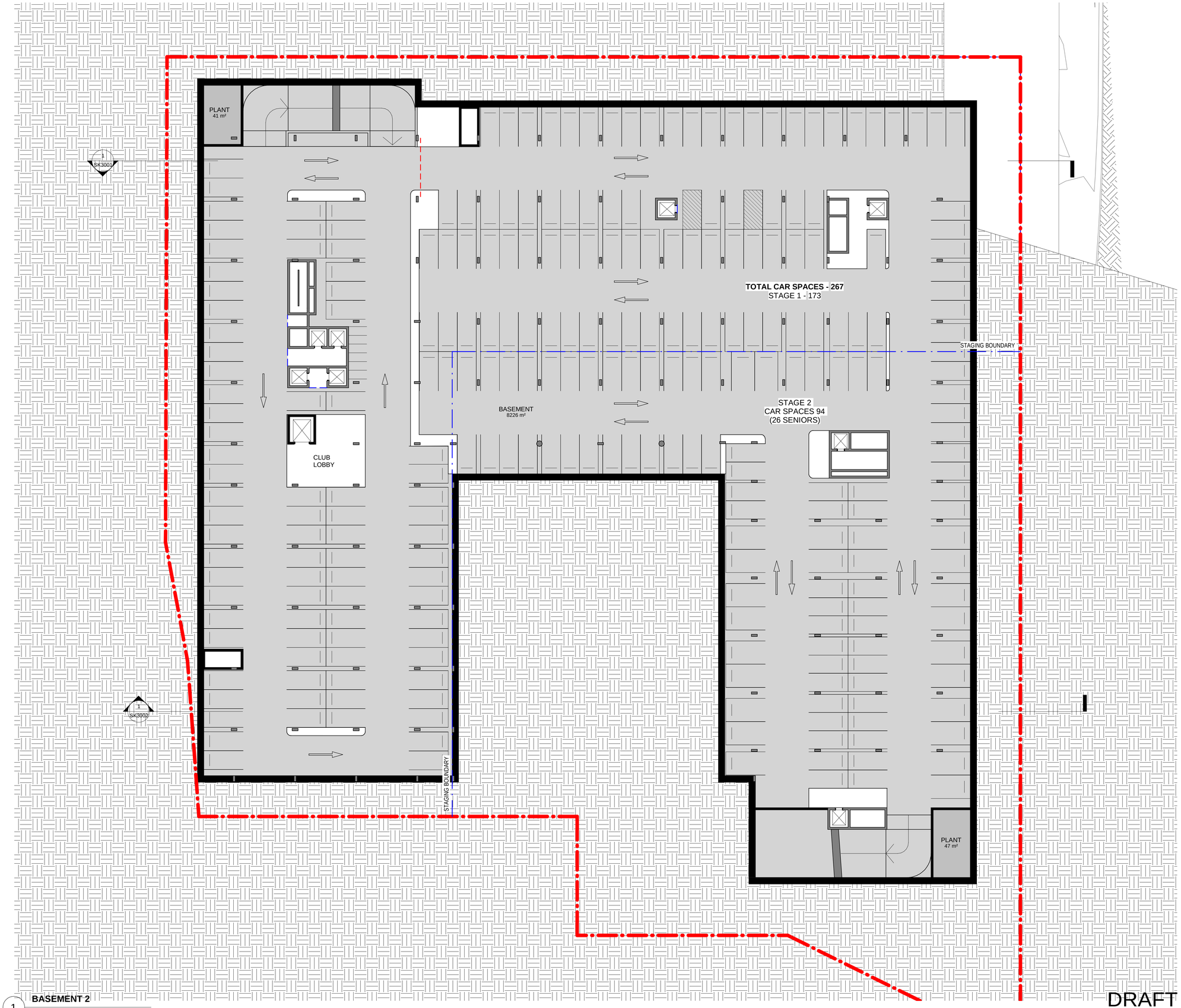
Use only figured dimensions.
All discrepancies to be referred to Altis Architecture Pty Ltd prior to construction.
Ensure compliance with the Building Code of Australia and all relevant Australian Standards and Authority requirements.

NORTH:
NORTH

SCALE:		DATE:	
1 : 250 @ A1		07.07.2020	
DRAWN BY:	CHECKED BY:	PROJECT NO:	DRAWING NO: / ISSUE:
EY	DF	2817.01	SK1101 / 1
CAD FILE:			

7/07/2020 6:59:29 PM

ISSUE	DATE	DESCRIPTION
1	07.07.2020	DRFAT SET FOR COODINATION



1 **BASEMENT 2**
Scale:1 : 250

DRAFT ONLY

CLIENT:
ARDEN GROUP/ THE HILLS CLUB

PROJECT:
THE HILLS CLUB, 6-18 JENNER STREET,BAULKHAM HILLS

ARCHITECT:
ALTIS architecture
p 61 2 9364 9000 f 61 2 9571 7930 lower deck jones bay wharf
suite 123 / 26 - 32 pirrama road pyrmont nsw 2009 australia

DRAWING TITLE:
BASEMENT-2

NOTES:
Nominated architect: Rolfe Latimer : 5535

Use only figured dimensions.
All discrepancies to be referred to Altis Architecture Pty Ltd prior to construction.
Ensure compliance with the Building Code of Australia and all relevant Australian Standards and Authority requirements.

NORTH:

SCALE:		DATE:	
1 : 250	@ A1	07.07.2020	
DRAWN BY:	CHECKED BY:	PROJECT NO:	DRAWING NO: / ISSUE:
EY	DF	2817.01	SK1102 / 1
CAD FILE:			

7/07/2020 6:59:30 PM

ISSUE	DATE	DESCRIPTION
1	07.07.2020	DRFAT SET FOR COODINATION

PLANT
56 m²

1
SK3001

2B
123 m²

1B
69 m²

1B
64 m²

BASEMENT
7064 m²

TOTAL CAR SPACES - 193
STAGE 1 - 137

RL 94.90

STAGING BOUNDARY

3B
146 m²

JENNER STREET

STAGE 2
CAR SPACES 56
(14 SENIORS)

CLUB LOBBY
78 m²

BOWLING GREEN
1852 m²

1
SK3002

STAGING BOUNDARY

PLANT
47 m²

1 **BASEMENT 1**
Scale:1 : 250

DRAFT ONLY

CLIENT:
ARDEN GROUP/ THE HILLS CLUB

PROJECT:
THE HILLS CLUB, 6-18 JENNER STREET,BAULKHAM HILLS

ARCHITECT:
ALTIS architecture
p 61 2 9364 9000 f 61 2 9571 7930 lower deck jones bay wharf
suite 123 / 26 - 32 pirrama road pyrmont nsw 2009 australia

DRAWING TITLE:
BASEMENT-1

NOTES:
Nominated architect: Rolfe Latimer : 5535

Use only figured dimensions.

All discrepancies to be referred to Altis Architecture Pty Ltd prior to construction.

Ensure compliance with the Building Code of Australia and all relevant Australian Standards and Authority requirements.

NORTH:
NORTH

SCALE:	DATE:
1 : 250 @ A1	07.07.2020

DRAWN BY:	CHECKED BY:	PROJECT NO:	DRAWING NO:	ISSUE:
EY	DF	2817.01	SK1103	1

CAD FILE:

7/07/2020 6:59:32 PM

ISSUE	DATE	DESCRIPTION
1	07.07.2020	DRFAT SET FOR COODINATION

PLANT
83 m²

RESIDENT STORAGE
370 m²

RESIDENT COMMON FACILITIES
529 m²

WASTE ROOM
136 m²

FREEZER

BOH
294 m²

COOL ROOM

DRY STORE

BOWLING LOCKERS
40 m²

BOARD RM
25 m²

ADMIN
75 m²

RL 98.00

CELLAR

KEGROOM

PREP KITCHEN
83 m²

CLUB LAYOUT UNDER REVIEW

MEMBER LOUNGE
274 m²

TERRACE
406 m²

PLANT
166 m²

AMENITIES
75 m²

GREEN KEEPER
67 m²

COMMUNAL OPEN SPACE

ENCLOSED BOWLING GREEN
36x38.5m

1 2 3 4 5 6 7 8 9

STAGING BOUNDARY

3B
118 m²

2B
102 m²

2B
82 m²

2B
113 m²

2B
113 m²

2B
114 m²

1B
69 m²

1B
64 m²

STAGING BOUNDARY

2B
96 m²

2B
98 m²

2B
93 m²

2B
90 m²

LANDSCAPING

COMMON FACILITIES
380 m²

PLANT
139 m²

WASTE ROOM
57 m²

JENNER STREET

1 SK3001

1 SK3002

1 LOWER GROUND
Scale:1 : 250

DRAFT ONLY

CLIENT:
ARDEN GROUP/ THE HILLS CLUB

PROJECT:
THE HILLS CLUB, 6-18 JENNER STREET,BAULKHAM HILLS

ARCHITECT:
ALTIS architecture
p 61 2 9364 9000 f 61 2 9571 7930 lower deck jones bay wharf
suite 123 / 26 - 32 pirrama road pyrmont nsw 2009 australia

DRAWING TITLE:
LOWER GROUND FLOOR

NOTES:
Nominated architect: Rolfe Latimer : 5535

Use only figured dimensions.
All discrepancies to be referred to Altis Architecture Pty Ltd prior to construction.
Ensure compliance with the Building Code of Australia and all relevant Australian Standards and Authority requirements.

NORTH

SCALE: 1 : 250 @ A1
DATE: 07.07.2020
DRAWN BY: EY
CHECKED BY: DF
PROJECT NO: 2817.01
DRAWING NO: SK1104
ISSUE: 1
CAD FILE:

7/07/2020 6:59:38 PM

ISSUE	DATE	DESCRIPTION
1	07.07.2020	DRFAT SET FOR COODINATION

OLD NORTHERN ROAD

JENNER STREET

MRV TURNING PATH(AS2890.2-2002)

RL 102.00

Substation
83 m²

RETAIL
171 m²

PLANT
42 m²

8m Diameter to accommodate up to Medium Rigid delivery, service or garbage vehicles

LOADING DOCK
360 m²

RL 102.00

LOBBY
152 m²

B.O.H
56 m²

RECEPTION

CLUB LAYOUT UNDER REVIEW

CLUB
936 m²

BAR
71 m²

TERRACE
147 m²

SERVERY

B.O.H
138 m²

COMMUNAL OPEN SPACE/
GARDEN BELOW

STAGING BOUNDARY

1
2
3
4
5
6
7
8
9

OPEN AIR BOWLING GREEN
35mx38m

RL 98.00

3B
116 m²

2B
82 m²

2B
102 m²

2B
113 m²

2B
113 m²

2B
114 m²

1B
69 m²

1B
64 m²

2B
96 m²

2B
98 m²

2B
93 m²

1B
60 m²

1B
60 m²

2B
90 m²

2B
93 m²

2B
91 m²

STAGING BOUNDARY

3B
124 m²

2B
102 m²

2B
115 m²

2B
95 m²

1B
66 m²

2B
110 m²

GEORGE
SUTTOR RESERVE

1 **GROUND FLOOR**
Scale:1 : 250

DRAFT ONLY

CLIENT:
ARDEN GROUP/ THE HILLS CLUB

PROJECT:
THE HILLS CLUB, 6-18 JENNER STREET,BAULKHAM HILLS

ARCHITECT:
ALTIS
architecture
p 61 2 9364 9000 f 61 2 9571 7930 lower deck jones bay wharf
suite 123 / 26 - 32 pirrama road pyrmont nsw 2009 australia

DRAWING TITLE:
GROUND FLOOR PLAN

NOTES:
Nominated architect: Rolfe Latimer : 5535

Use only figured dimensions.

All discrepancies to be referred to Altis Architecture Pty Ltd prior to construction.

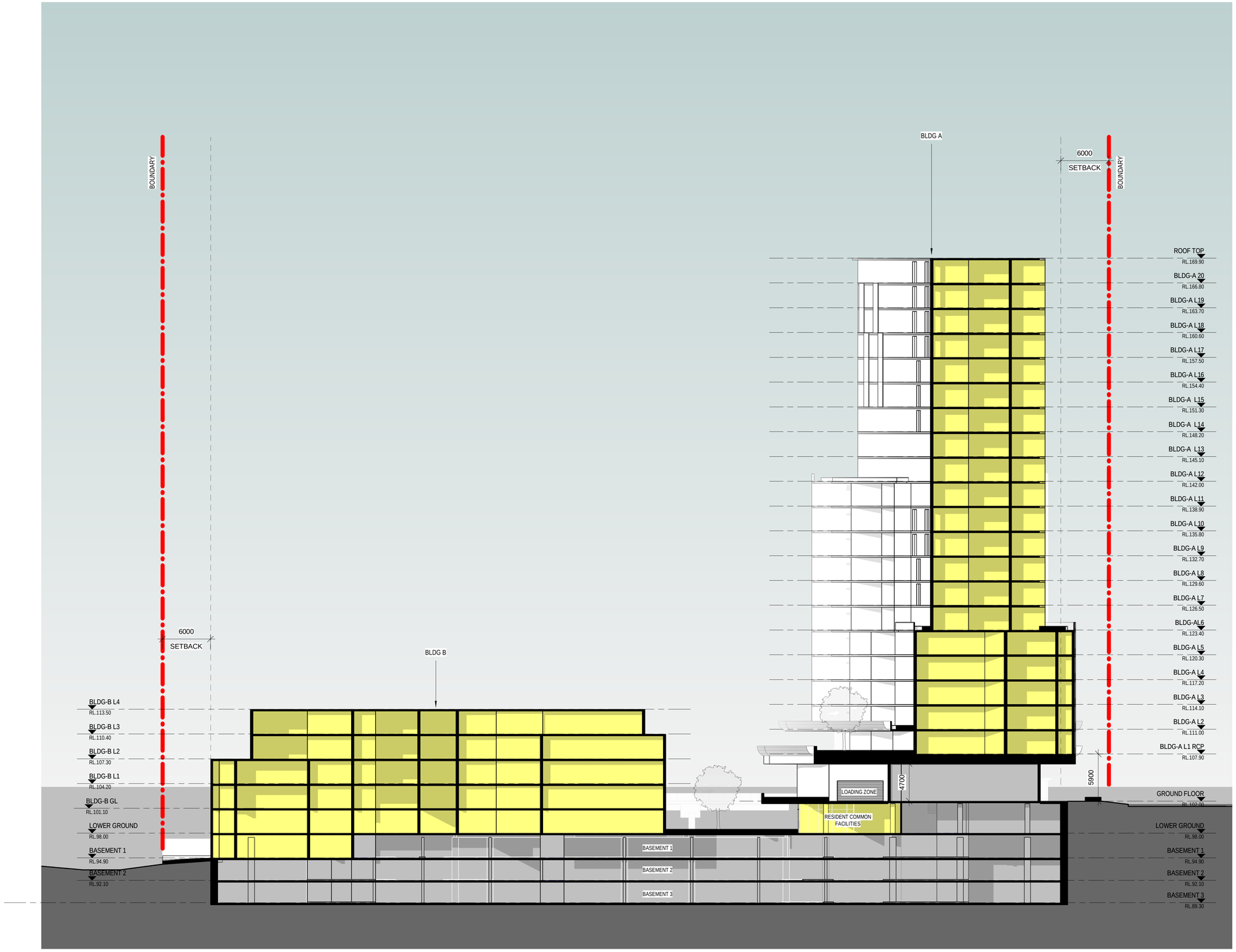
Ensure compliance with the Building Code of Australia and all relevant Australian Standards and Authority requirements.

NORTH:

SCALE: 1 : 250 @ A1
DATE: 07.07.2020
DRAWN BY: FY
CHECKED BY: DF
PROJECT NO: 2817.01
DRAWING NO: SK1105
ISSUE: 1
CAD FILE:

7/07/2020 6:59:42 PM

ISSUE	DATE	DESCRIPTION
1	07.07.2020	DRFAT SET FOR COODINATION



1 **Section BB**
Scale:1 : 250

DRAFT ONLY

CLIENT:
ARDEN GROUP/ THE HILLS CLUB

PROJECT:
THE HILLS CLUB, 6-18 JENNER STREET,BAULKHAM HILLS

ARCHITECT:
ALTIS architecture
p 61 2 9364 9000 f 61 2 9571 7930 lower deck jones bay wharf
suite 123 / 26 - 32 pirrama road pyrmont nsw 2009 australia

DRAWING TITLE:
PROPOSED SECTIONS

NOTES:
Nominated architect: Rolfe Latimer : 5535

Use only figured dimensions.
All discrepancies to be referred to Altis Architecture Pty Ltd prior to construction.
Ensure compliance with the Building Code of Australia and all relevant Australian Standards and Authority requirements.

NORTH:

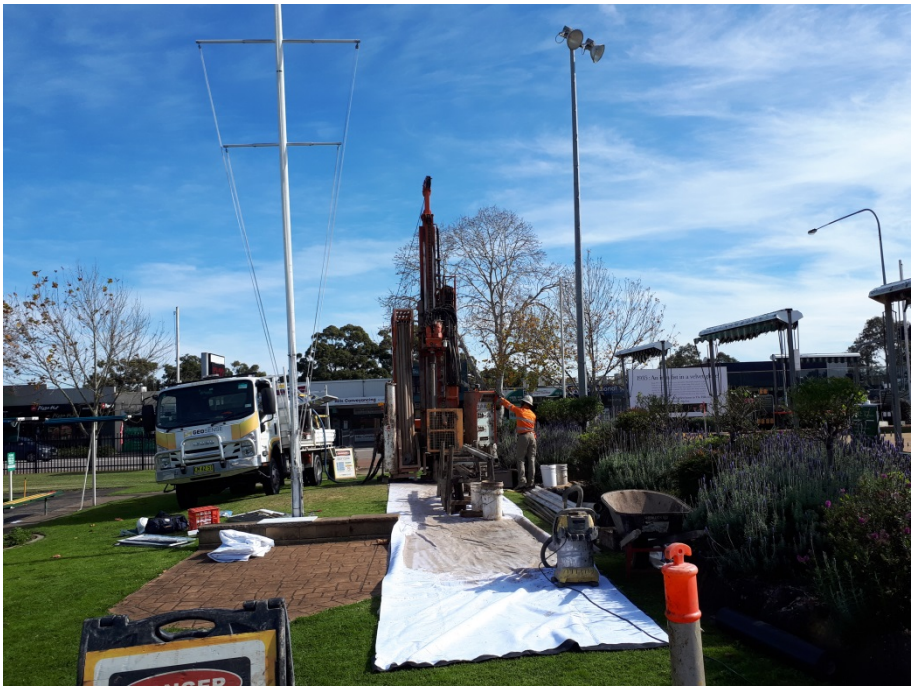
SCALE: 1 : 250 @ A1
DATE: 07.07.2020
DRAWN BY: EY
CHECKED BY: DF
PROJECT NO: 2817.01
DRAWING NO: SK3001
ISSUE: 1
CAD FILE:

7/07/2020 7:10:45 PM

Appendix D – Site Photograph

Photograph 1: Car park area, looking south.

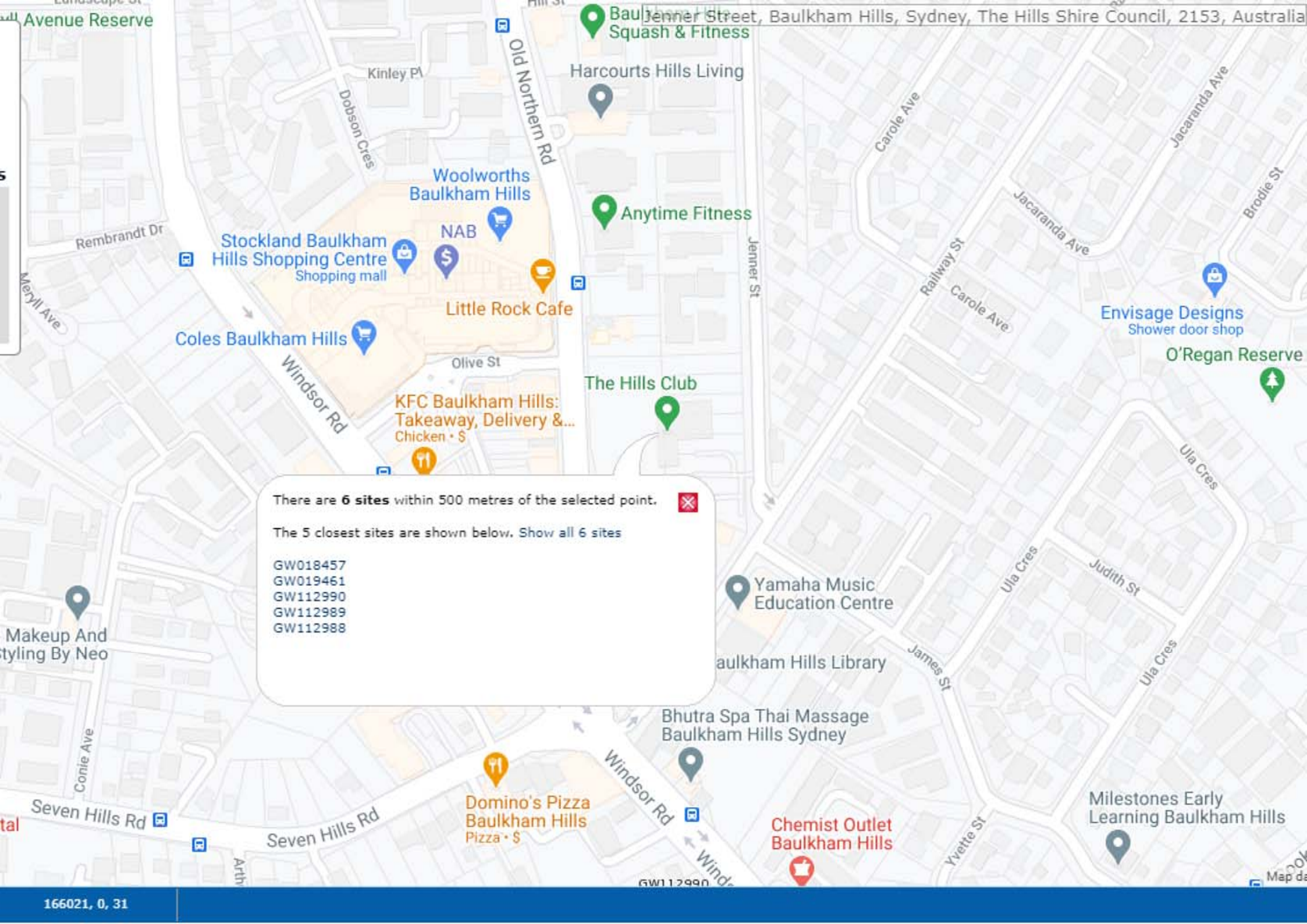
Photograph 2: Site condition, looking south.



Photograph 3 Site condition during drilling, looking west.

Photograph 4: Site condition, looking east.

Appendix E – Groundwater Bore Search


Jenner Street, Baulkham Hills, Sydney, The Hills Shire Council, 2153, Australia
Avenue Reserve
Squash & Fitness
Harcourts Hills Living
Kinley Pl
Dobson Cres
Old Northern Rd
Woolworths Baulkham Hills
NAB
Anytime Fitness
Stockland Baulkham Hills Shopping Centre
Shopping mall
Rembrandt Dr
Meryll Ave
Little Rock Cafe
Coles Baulkham Hills
Windsor Rd
Olive St
The Hills Club
KFC Baulkham Hills: Takeaway, Delivery &...
Chicken • $
Jenner St
Carole Ave
Jacaranda Ave
Railway St
Brodie St
Envisage Designs
Shower door shop
O'Regan Reserve
Ula Cres
Judith St
James St
There are 6 sites within 500 metres of the selected point.
The 5 closest sites are shown below. Show all 6 sites
GW018457
GW019461
GW112990
GW112989
GW112988
Yamaha Music Education Centre
aulkham Hills Library
Makeup And Styling By Neo
Bhutra Spa Thai Massage Baulkham Hills Sydney
Conie Ave
Seven Hills Rd
Domino's Pizza Baulkham Hills
Pizza • $
Chemist Outlet Baulkham Hills
Yvette St
Milestones Early Learning Baulkham Hills
GW112990

166021, 0, 31

WaterNSW
Work Summary

GW018457

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): WASTE DISPOSAL

Work Type: Bore open thru rock
Work Status:
Construct.Method: Cable Tool
Owner Type: Private

Commenced Date:
Completion Date: 01/10/1959
Final Depth: 52.40 m
Drilled Depth: 52.40 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description: Salty
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	CASTLE HI	114
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2N
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6262448.000
Easting: 314034.000
Latitude: 33°45'42.3"S
Longitude: 150°59'31.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	0.00	6.00	152			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
19.80	52.40	32.60	Fractured	1.20		0.32			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	19.81	19.81	Shale Sandy	Shale	
19.81	52.42	32.61	Shale Water Supply	Shale	

Remarks

07/08/1974: SITE SEVEN HILLS/WINDSOR RD 2153

***** End of GW018457 *****

WaterNSW
Work Summary

GW019461

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): WASTE DISPOSAL

Work Type: Bore open thru rock
Work Status:
Construct.Method: Cable Tool
Owner Type: Private

Commenced Date:
Completion Date: 01/10/1959
Final Depth: 52.40 m
Drilled Depth: 52.40 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description: Salty
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	CASTLE HI	114
Licensed:			

Region: 10 - Sydney South Coast
River Basin: 213 - SYDNEY COAST - GEORGES RIVER
Area/District:
CMA Map: 9030-2N
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6262478.000
Easting: 313982.000
Latitude: 33°45'41.3"S
Longitude: 150°59'29.2"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	0.00	6.00	152			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
19.80	52.40	32.60	Fractured	1.20		10.10			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	19.81	19.81	Shale Sandy	Shale	
19.81	52.42	32.61	Shale Water Supply	Shale	

Remarks

07/08/1974: SITE SEVEN HILLS/WINDSOR RD 2153

***** End of GW019461 *****

WaterNSW
Work Summary

GW112988

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 18/10/2002
Final Depth: 7.91 m
Drilled Depth: 7.91 m

Contractor Name: (None)
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	CASTLE HI	20 26746
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6262276.000
Easting: 314234.000
Latitude: 33°45'48.0"S
Longitude: 150°59'38.8"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

23/07/2014: Nat Carling, 23-July-2014; Added status, drill method & depth, updated work type.

***** End of GW112988 *****

WaterNSW
Work Summary

GW112989

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 18/02/2002
Final Depth: 6.89 m
Drilled Depth: 6.89 m

Contractor Name: (None)
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	CASTLE HI	20 28197
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6262278.000
Easting: 314222.000
Latitude: 33°45'48.0"S
Longitude: 150°59'38.3"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

23/07/2014: Nat Carling, 23-July-2014; Added status, drill method & depth, updated work type.

***** End of GW112989 *****

WaterNSW
Work Summary

GW112990

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 18/10/2002
Final Depth: 9.91 m
Drilled Depth: 9.91 m

Contractor Name: (None)
Driller: Unkown Unknown
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	CASTLE HI	20 28197
Licensed:			

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6262290.000
Easting: 314234.000
Latitude: 33°45'47.6"S
Longitude: 150°59'38.8"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Remarks

23/07/2014: Nat Carling, 23-July-2014; Added status, drill method & depth, updated work type.

***** End of GW112990 *****

Appendix F – Historical Properties Titles

ABN: 36 092 724 251
Ph: 02 9099 7400
(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

Address: - The Hills Bowling Club, Baulkham Hills

Description: - Lots 39 to 45 Section 2 D.P. 2489, Lot Z D.P. 400638 & Lot 4 D.P. 1108855
(Lot 4 D.P. 1108855 is limited to a depth of 50 feet)

As regards Lots 39 to 45 Section 2 D.P. 2489

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
28.10.1924 (1924 to 1928)	Jane Tanner (Married Woman)	Vol 1421 Fol 152 & Vol 2292 Fol 163
27.06.1928 (1928 to 1939)	Ernest Felix Holmes (Grazier) (& His deceased estate)	Vol 1421 Fol 152 & Vol 2292 Fol 163
22.08.1939 (1939 to 1946)	Alfred Victor Lord (Grazier) Edna Frances Lord (Married Woman)	Vol 1421 Fol 152 Now Vol 5721 Fol 34 & Vol 2292 Fol 163
22.01.1946 (1946 to 1952)	Rupert Sidney Cropley (Gentleman) William Spriggs (Gentleman)	Vol 5721 Fol 34 Now Vol 5901 Fol 122 & Vol 2292 Fol 163
15.12.1952 (1952 to 1952)	Alice Louisa Spriggs (Widow) (Transmission Application not investigated)	Vol 5901 Fol 122 & Vol 2292 Fol 163
15.12.1952 (1952 to 1953)	David William Reed (Stipendiary Magistrate) Barclay Thomson Wright (Retired)	Vol 5901 Fol 122 & Vol 2292 Fol 163 Now Vol 6621 Fol 118
04.12.1953 (1953 to 1971)	Victor Thomas Ackling (Produce Merchant) Henry Francis Allen (Master Electroplater)	Vol 6621 Fol 118
20.08.1971 (1971 to date)	# The Hills District Bowling Club Limited	Vol 6621 Fol 118 Now Auto Consol 6621-118

# Denotes Current Registered Proprietor

Easements and Leases: -NIL

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0412 199 304)

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

As regards Lot Z D.P. 400638

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
28.10.1924 (1924 to 1928)	Jane Tanner (Married Woman)	Vol 1421 Fol 152
28.10.1924 (1924 to 1928)	Jane Tanner (Married Woman)	Vol 1421 Fol 152
27.06.1928 (1928 to 1939)	Ernest Felix Holmes (Grazier) (& His deceased estate)	Vol 1421 Fol 152
22.08.1939 (1939 to 1952)	Alfred Victor Lord (Grazier) Edna Frances Lord (Married Woman)	Vol 1421 Fol 152 Now Vol 5901 Fol 135
24.07.1952 (1952 to 1957)	Leigha Eileen Shepherd Reid (Widow)	Vol 5901 Fol 135
27.08.1957 (1957 to 1996)	Alexander William Jackson (Project Engineer) Lorraine Mary Brown (Spinster) Now Lorraine Mary Jackson (Married Woman)	Vol 5901 Fol 135 Now Z/400638
17.04.1996 (1996 to date)	# The Hills District Bowling Club Limited	Z/400638

# Denotes Current Registered Proprietor

Easements and Leases: -NIL

As regards Lot 4 D.P. 1108855 – limited to a depth of 50 feet

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
04.08.1903 (1903 to 1934)	Minister for Public Works	Vol 1483 Fol 148
04.08.1903 (1903 to 1934)	The Railway Commissioners of New South Wales Now Commissioner for Railways	Vol 1483 Fol 148
23.10.1934	Surrendered to the Crown	
02.11.1934	Reserved from Sale or Lease	Gazette
02.11.1934	Reserve R 64890 for Public Recreation	Gazette Revoked 31.01.1964
13.03.1964 (1964 to date)	# The Hills District Bowling Club Limited	Crown Tenure Special Lease 1961/9 Metropolitan Now 4/1108855

# Denotes Current Registered Proprietor

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0412 199 304)

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

Leases: -NIL

Easements: -

- 29.12..1978 Easement for Transmission Line

Yours Sincerely
Mark Groll
4 September 2020

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
3/9/2020 4:10PM

FOLIO: AUTO CONSOL 6621-118

Recorded	Number	Type of Instrument	C.T. Issue
25/1/1993		CONSOL HISTORY RECORD CREATED FOR AUTO CONSOL 6621-118	
		PARCELS IN CONSOL ARE: 39-45/2/2489.	
13/7/1998	5120002	DISCHARGE OF MORTGAGE	
13/7/1998	5120003	DISCHARGE OF MORTGAGE	EDITION 1
18/6/1999	5911731	MORTGAGE	EDITION 2
9/9/2018	AN695392	DEPARTMENTAL DEALING	EDITION 3 CORD ISSUED
1/5/2020	AQ70332	DISCHARGE OF MORTGAGE	
1/5/2020	AQ70333	MORTGAGE	EDITION 4

*** END OF SEARCH ***

hills bowling PRINTED ON 3/9/2020

Received: 03/09/2020 16:11:23

Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: AUTO CONSOL 6621-118

SEARCH DATE	TIME	EDITION NO	DATE
3/9/2020	4:10 PM	4	1/5/2020

LAND

LAND DESCRIBED IN SCHEDULE OF PARCELS
AT BAULKHAM HILLS
LOCAL GOVERNMENT AREA THE HILLS SHIRE
PARISH OF CASTLE HILL COUNTY OF CUMBERLAND
PARISH OF FIELD OF MARS COUNTY OF CUMBERLAND
TITLE DIAGRAM DP2489

FIRST SCHEDULE

THE HILLS DISTRICT BOWLING CLUB LIMITED (T M437062)

SECOND SCHEDULE (2 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 AQ70333 MORTGAGE TO NASR GROUP INVESTMENTS PTY LTD

NOTATIONS

UNREGISTERED DEALINGS: NIL

SCHEDULE OF PARCELS

LOTS 39-45 SEC. 2 IN DP2489.

*** END OF SEARCH ***

Received: 03/09/2020 16:10:37

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
3/9/2020 4:11PM

FOLIO: Z/400638

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 7458 FOL 130

Recorded	Number	Type of Instrument	C.T. Issue
2/9/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
17/1/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
24/7/1995	O404005	MORTGAGE	EDITION 1
17/4/1996	2090452	DISCHARGE OF MORTGAGE	
17/4/1996	2090453	DISCHARGE OF MORTGAGE	
17/4/1996	2090454	TRANSFER	EDITION 2
18/6/1999	5911731	MORTGAGE	EDITION 3
9/9/2018	AN695392	DEPARTMENTAL DEALING	EDITION 4 CORD ISSUED
1/5/2020	AQ70332	DISCHARGE OF MORTGAGE	
1/5/2020	AQ70333	MORTGAGE	EDITION 5

*** END OF SEARCH ***

hills bowling PRINTED ON 3/9/2020

Received: 03/09/2020 16:11:24

Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: Z/400638

SEARCH DATE	TIME	EDITION NO	DATE
3/9/2020	4:10 PM	5	1/5/2020

LAND

LOT Z IN DEPOSITED PLAN 400638
LOCAL GOVERNMENT AREA THE HILLS SHIRE
PARISH OF FIELD OF MARS COUNTY OF CUMBERLAND
TITLE DIAGRAM DP400638

FIRST SCHEDULE

THE HILLS DISTRICT BOWLING CLUB LIMITED (T 2090454)

SECOND SCHEDULE (2 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 AQ70333 MORTGAGE TO NASR GROUP INVESTMENTS PTY LTD

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Hills Bowling PRINTED ON 3/9/2020

Received: 03/09/2020 16:10:37

PLAN FORM 2 — Plan Drawing only to appear in this space — ePlan *OFFICE USE ONLY

SIGNATURES AND SEALS ONLY

FOR SIGNATURES AND SEALS SEE SIGNATURES FORM

THIS PLAN IS EXEMPT FROM SUBDIVISION CERTIFICATION PURSUANT TO A DECISION BETWEEN DUAP, R.T.A. AND LPI NSW– SEE 1997 M6 (ITEM2) – LAND IN THIS PLAN COMPRISES ONLY ROAD OR ROAD AND RESIDUE

SEE SIGNATURES FORM

.....
AUTHORISED OFFICER
ROADS AND TRAFFIC AUTHORITY, NSW

Department of Lands Approval

I PAUL LAYT (Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown herean have been given.

Signature: SEE SIGNATURE FORM
Date: 6-2-2007
File Number: MN07H24
Office: SYDNEY METROPOLITAN

Subdivision Certificate

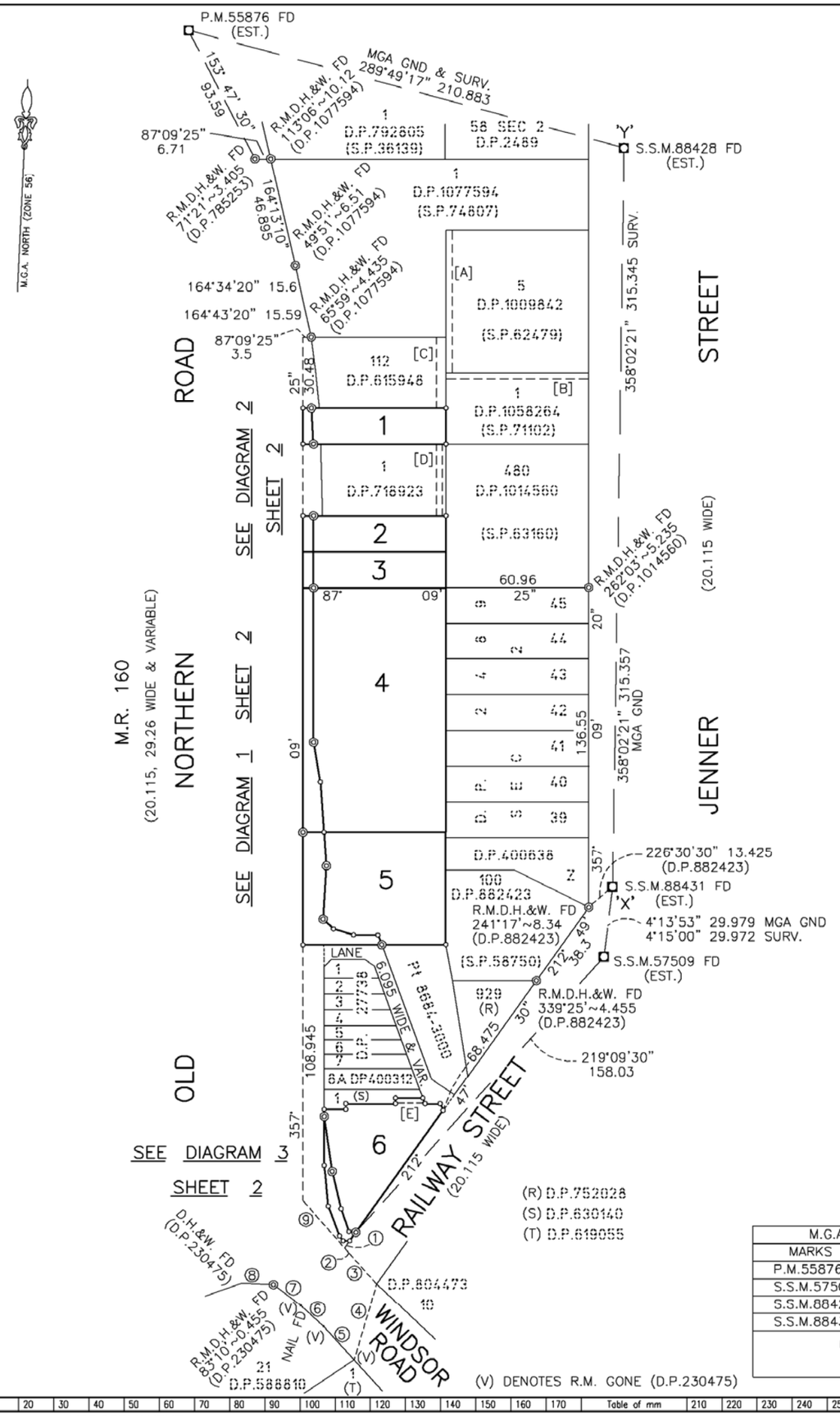
I certify that the provisions of s.109J of the Environmental Planning and Assessment ACt 1979 have been satisfied in relation to the proposed ..... set out herein (insert 'subdivision' or 'new road')

..... † Authorised Person / General Manager / Accredited Certifier

Consent Authority: .....
Date of endorsement: .....
Accreditation No.: .....
Subdivision Certificate No.: .....
File No.: .....

Note:
When the plan is to be lodged electronically in the Land Titles Office, it should include a signature in an electronic or digital format approved by the Registrar-General.

† Delete if inapplicable



LOTS 1 & 7
LOT 13 SEC 2 D.P.2489
C.T. 13/2/2489

LOTS 2 & 8
LOT 16 SEC 2 D.P.2489
AUTO CONSOL 6358–9

LOTS 3 & 9
LOT 17 SEC 2 D.P.2489
AUTO CONSOL 6358–9

LOTS 4 & 10
LOT 932 D.P.752028
C.T. 932/752028

LOTS 5 & 11
LOT 7006 D.P.1028435
& LOT 8 D.P.230475
CROWN LAND

LOTS 6 & 12
LOT 2 D.P.630140
C.T. 2/630140

[A] DP1009842 – EASEMENT TO DRAIN WATER 2.75 WIDE
[B] DP616984 – EASEMENT TO DRAIN WATER 2.5 WIDE
[C] V962426 – EASEMENT TO DRAIN WATER 4 WIDE
[D] DP718923 – EASEMENT TO DRAIN WATER 2.5 WIDE
[E] DP630140 – EASEMENT FOR SEWERAGE PURPOSES OVER EXISTING LINE OF PIPES

SCHEDULE OF SHORT LINES		
No.	BEARING	DISTANCE
①	212°47'30"	3.725
②	135°44'35"	2.98
③	135°14'25"	17.635
④	193°41'10"	33.81
⑤	314°46'55"	19.405
⑥	309°39'00"	13.13
⑦	304°24'55"	14.75
⑧	270°03'55"	13.5
⑨	315°44'35"	26.995

SURVEYING REGULATION 2006: CLAUSE 35(1)(b) & 61(2)

M.G.A. CO–ORDINATES		ZONE 56			METHOD	ORIGIN
MARKS	EASTINGS	NORTHINGS	CLASS	ORDER		
P.M.55876	314055.011	6262959.273	B	U		SCIMS
S.S.M.57509	314261.980	6262542.691	C	U		SCIMS
S.S.M.88428	314253.401	6262887.764	C	U		SCIMS
S.S.M.88431	314264.192	6262572.589	C	U		SCIMS

M.G.A. CO–ORDINATES ADOPTED FROM SCIMS AT 31 OCTOBER 2006
COMBINED MEAN SEA LEVEL SCALE FACTOR 1.000 010

DP1108855

Registered: 27.2.2007
Title System: TORRENS & CROWN LAND
Purpose: ACQUISITION
Ref. Map: U90160-64 #
Last Plan: _____

PLAN OF LAND TO BE ACQUIRED FOR THE PURPOSES OF THE ROADS ACT, 1993.

Lengths are in metres. Reduction Ratio 1: 1500

L.G.A. BAULKHAM HILLS
Locality: BAULKHAM HILLS
Parish: FIELD OF MARS
County: CUMBERLAND

This is sheet 1 of my plan in 2 sheets (Delete if inapplicable)

Surveying Regulation 2006

I, ROBERT W PASCOE

of LOVEGROVE OXLEY CONSULTANTS P/L DX 8152 BLACKTOWN

a surveyor registered under the Surveying Act 2002, certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying Regulation 2006 and was completed on 28 NOV 2006

The survey relates to LOTS 7–12 INCLUSIVE & CONNECTIONS (specify the land actually surveyed or specify any land shown in the plan that is not subject to survey)

SEE SIGNATURES FORM

.....(Dated).....
Surveyor registered under the Surveying Act 2002

Datum Line: 'X'–'Y'
Type: Urban

Plans used in preparation of survey/~~compilation~~.

DP2489	DP882423	DP1077594
DP27738	DP400638	DP1058264
DP400312	DP230475	DP1009842
DP615948	DP718923	DP1014560
8684–3000	DP630140	DP1028435
DP752028 (C8662–2030)		

RTA F.Bk No: 0160 031 FP 0009

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

LOTS 7, 8, 9, 10, 11 & 12 ARE REQUIRED FOR ROAD AND AFTER CONSTRUCTION WILL BE DEDICATED AS PUBLIC ROAD UNDER SEC 10 OF THE ROADS ACT, 1993.

APPROVED

SEE SIGNATURES FORM

.....
MANAGER SURVEY SERVICES
REGIONAL OPERATIONS & ENGINEERING SERVICES
ROADS AND TRAFFIC AUTHORITY, NSW

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

SURVEYOR'S REFERENCE: 69909 (SP3345) – CHECKLIST MPR PERMANENT

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

R.T.A. FILE: 31.1339 L.A. R.T.A. PLAN : 0160 031 SS 4001

PLAN FORM 3 — To be used in conjunction with Plan Form 2

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

ePlan *OFFICE USE ONLY

DP1108855

Registered 27-2-2007

This is sheet 2 of my plan in 2 sheets dated 28 NOV 2006

SEE SIGNATURES FORM

Surveyor registered under Surveying Act 2002

This is sheet of my plan of sheets covered by my Certificate No. of

General Manager/Authorised Person/Accredited Certifier

L.G.A. BAULKHAM HILLS

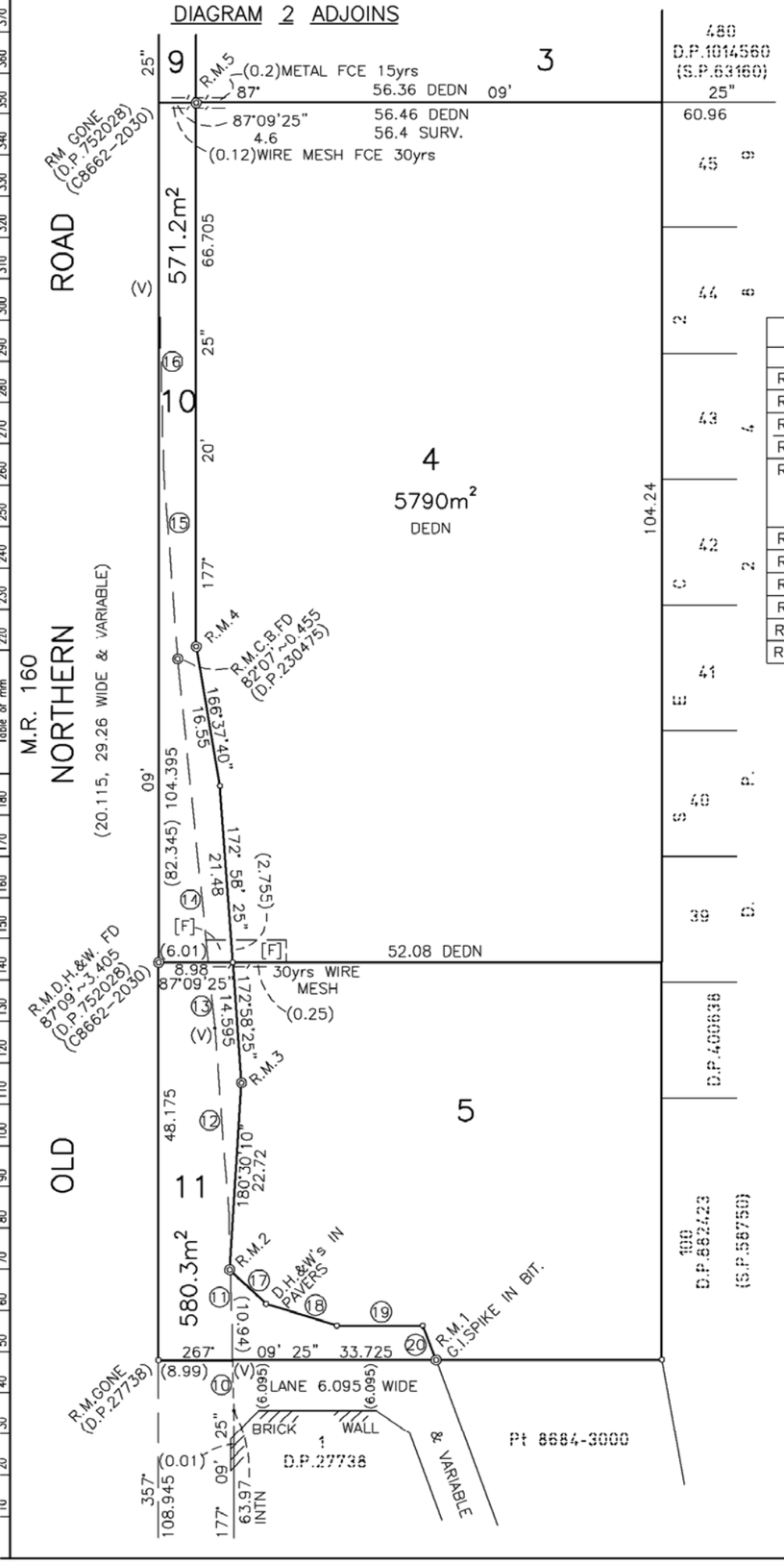
Suburb: BAULKHAM HILLS

Parish: FIELD OF MARS

County: CUMBERLAND

For use where space is insufficient in any panel on Plan Form 2.

DIAGRAM 1



SCHEDULE OF REFERENCE MARKS			
RM	BEARING & DISTANCE		FROM
R.M.1	46°56'	7.98	DH&W IN KB
R.M.2	0°15'40"	16.3	DH&W
R.M.3	287°14'	7.4	DH&W IN RAMP
R.M.4	198°51'	15.8	DH&W IN PATH
R.M.5	84°22'	5.185	DH&W IN PATH
	239°01'	7.42	SW CNR OF MAIN WALL OF SANDSTONE COTTAGE
R.M.6	17°29'	5.815	DH&W
R.M.7	171°04'	6.135	DH&W
R.M.8	140°15'	8.455	DH&W IN DRIVEWAY
R.M.9	305°22'	1.69	DH&W IN PATH
R.M.10	43°44'	18.47	DH&W IN PATH
R.M.11	153°25'	8.06	DH&W

[A] DP1009842 – EASEMENT TO DRAIN WATER 2.75 WIDE
[B] DP616984 – EASEMENT TO DRAIN WATER 2.5 WIDE
[C] V962426 – EASEMENT TO DRAIN WATER 4 WIDE
[D] DP718923 – EASEMENT TO DRAIN WATER 2.5 WIDE
[E] DP630140 – EASEMENT FOR SEWERAGE PURPOSES OVER EXISTING LINE OF PIPES

[F] GOV. GAZ. 29 DEC. 1978 FOL. 5429 EASEMENT FOR TRANSMISSION LINE

SCHEDULE OF SHORT LINES		
No.	BEARING	DISTANCE
10	355°42'55"	6.1
11	355°42'55"	17.095
12	352°49'55"	23.195
13	351°22'20"	7.99
14	351°22'20"	36.98
15	352°51'	22.815
16	355°44'	22.81
17	130°44'30"	5.9
18	104°12'30"	9.1
19	87°01'30"	10.485
20	156°58'10"	4.5
21	158°09'20"	10.185
22	94°00'	3.08

(V) DENOTES R.M. GONE (D.P.230475)

DIAGRAM 2

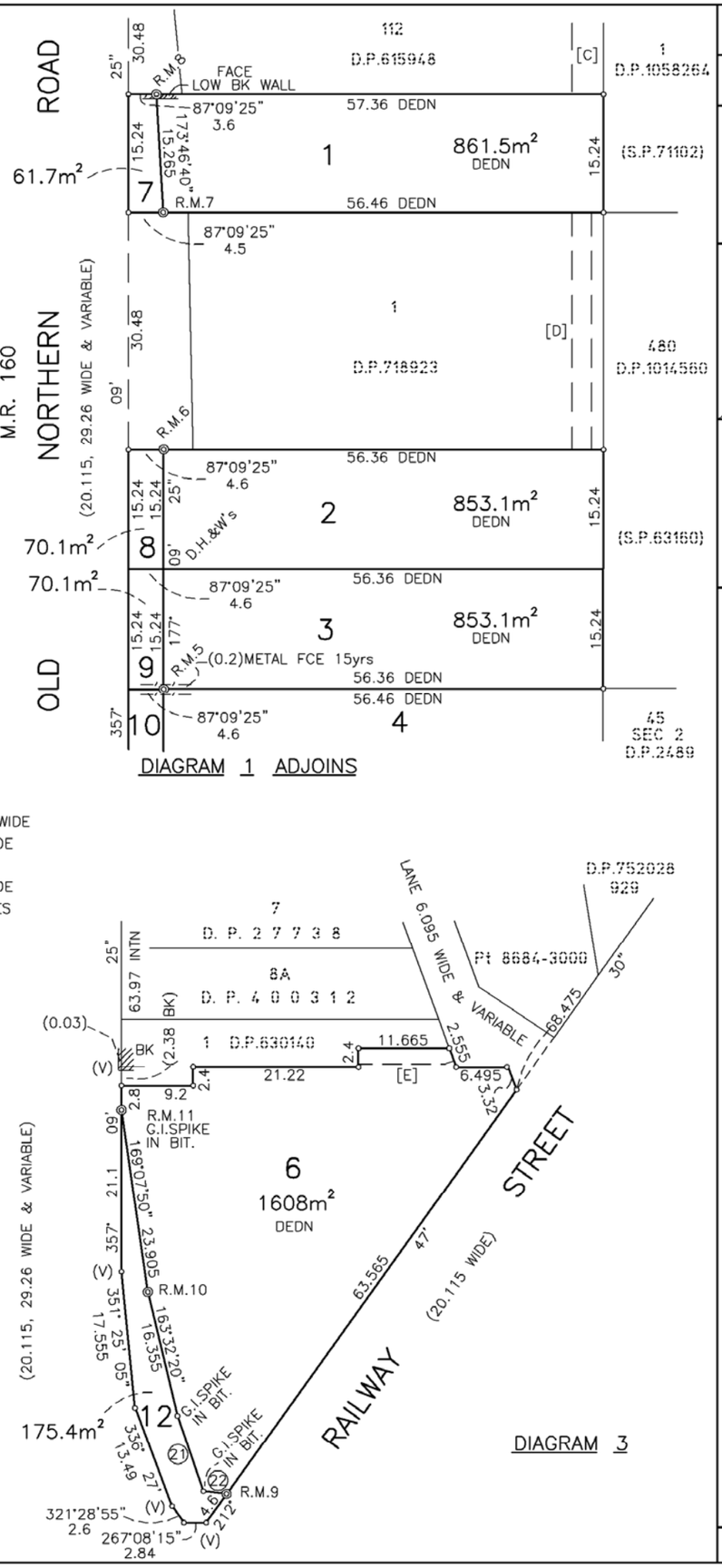


DIAGRAM 3

Reduction Ratio 1:500

Plan Drawing only to appear in this space

R.T.A. FILE: 31.1339 L.A. R.T.A. PLAN : 0160 031 SS 4001 SURVEYOR'S REFERENCE: 69909 (SP3345 RTA)

CERTIFICATES, SIGNATURES AND SEALS

Sheet 1 of 1 sheet

PLAN OF LAND TO BE ACQUIRED FOR THE PURPOSES OF THE ROADS ACT, 1993.

*

DP1108855

*

Registered: 27.2.2007

* OFFICE USE ONLY

Surveying Regulation 2006

I, ROBERT W PASCOE
of LOVEGROVE OXLEY CONSULTANTS P/L
DX 8152, BLACKTOWN
a surveyor registered under the *Surveying Act 2002*, certify that the survey represented in this plan is accurate, has been made in accordance with the *Surveying Regulation 2006* and was completed on: 28 NOV 2006
The survey relates to LOTS 7-12 INCLUSIVE & CONNECTIONS
(specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey)

Signature ..... *Dated* 25/01/2007.
Surveyor registered under the Surveying Act 2002

Datum Line: 'X' – 'Y'
Type: Urban

Department of Lands Approval

I ..... P.L.Layt ..... in approving this plan certify
(Authorised Officer)
that all necessary approvals in regard to the allocation of the land shown hereon have been given
Signature: ..... P.L.Layt .....
Date: ..... 6.2.07 .....
File Number: ..... MN07H24 .....
Office: ..... Sydney Metropolitan .....

Subdivision Certificate

I certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to:

the proposed ..... set out herein
(insert 'subdivision' or 'new road')

.....
* Authorised Person/General Manager/Accredited Certifier

Consent Authority: .....
Date of Endorsement: .....
Accreditation no: .....
Subdivision Certificate no: .....
File no: .....

Note:
When the plan is to be lodged electronically in Land and Property Information, it should include a signature in an electronic or digital format approved by the Registrar-General.
* Delete whichever is inapplicable.

SIGNATURES, SEALS and STATEMENTS of intention to dedicate public roads or to create public reserves and drainage reserves.

THIS PLAN IS EXEMPT FROM SUBDIVISION CERTIFICATION PURSUANT TO A DECISION BETWEEN DUAP, RTA & LPI *NSW* – SEE 1997 M6 (Item 2). LAND IN THIS PLAN COMPRISES ONLY ROAD OR ROAD AND RESIDUE.

30/1/2007

.....
AUTHORISED OFFICER
ROADS AND TRAFFIC AUTHORITY, NSW

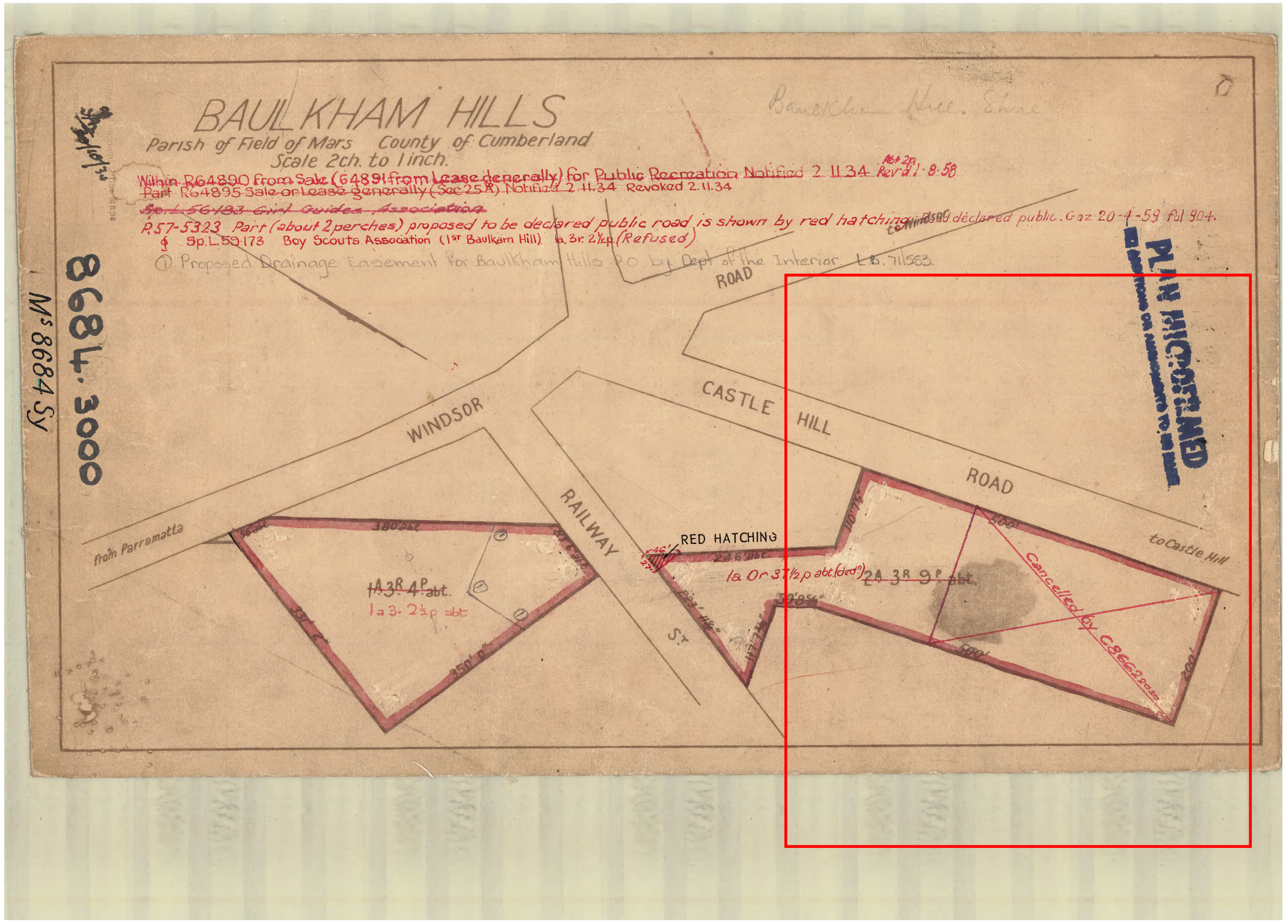
APPROVED: 30/1/2007

.....
MANAGER, SURVEY SERVICES
REGIONAL OPERATIONS AND
ENGINEERING SERVICES
ROADS AND TRAFFIC AUTHORITY, NSW

Use PLAN FORM 6A for additional certificates, signatures and seals

SURVEYOR'S REFERENCE: 69909 CHECKLIST (RTA:SP3345)

R.T.A. FILE: 31.1339 L.A.
R.T.A. PLAN: 0160 031 SS 4001



RESERVATION FROM SALE OR LEASE GENERALLY.

PROCLAMATION.

IN pursuance of the provisions of section 25A of the Crown Lands Consolidation Act, 1913, I, Sir PHILIP WOOLCOTT GAME, Governor of the State of New South Wales, with the advice of the Executive Council, do hereby proclaim the following areas of land to be reserved from sale or lease generally, and the same are hereby reserved accordingly:—

LAND DISTRICT—METROPOLITAN; SHIRE—BLACKTOWN.

No. 64,895. Parish St. John, county Cumberland; area, about 4 acres 2 roods 24 perches, shown by red edging on plan Ms. 8,687 Sy. Roll.

Parish St. John, county Cumberland; area, about 2 roods 28 perches (in two parts), as shown by red edging on plan Ms. 8,683 Sy.

LAND DISTRICT—METROPOLITAN; SHIRE—BAULKHAM HILLS.

Parish South Colah, county Cumberland; area, about 2 acres 2 roods, as shown by red edging on plan Ms. 8,686 Sy.

Parish Castle Hill, county Cumberland; area, about 4 acres 1 rood 23 perches, as shown by red edging and blue tint on plan Ms. 8,685 Sy.

Parish Field of Mars, county Cumberland; area, about 4 acres 2 roods 11½ perches (in two parts), as shown by red edging on plan Ms. 8,684 Sy. P. 34-8,856.

Signed and sealed at Sydney, this 1st day of November, 1934.

PHILIP GAME, Governor.

By His Excellency's Command,

E. A. BUTTENSHAW, Minister for Lands.

(6152) GOD SAVE THE KING!

REVOCATION OF RESERVE FROM SALE OR LEASE GENERALLY.

PROCLAMATION.

IN pursuance of the provisions of section 25A of the Crown Lands Consolidation Act, 1913, I Sir PHILIP WOOLCOTT GAME, Governor of the State of New South Wales, with the advice of the Executive Council, do hereby proclaim the reserve from sale or lease generally, particularised in the Schedule hereunder, to be revoked, and the same is hereby revoked accordingly:—

LAND DISTRICT—METROPOLITAN; SHIRES—BLACKTOWN AND BAULKHAM HILLS.

No. 64,895. Parishes of St. John, South Colah, Castle Hill and Field of Mars, county of Cumberland; about 16 acres 3 roods 6½ perches. P. 34-8,856.

Signed and sealed at Sydney, this 1st day of November, 1934.

PHILIP GAME, Governor.

By His Excellency's Command,

E. A. BUTTENSHAW, Minister for Lands.

(6153) GOD SAVE THE KING!

(6164) Sydney, 2nd November, 1934.

RESERVES FROM SALE.

IT is hereby notified that, in pursuance of the provisions of section 28 of the Crown Lands Consolidation Act, 1913, the Crown Lands hereunder described shall be reserved from sale for the public purposes hereinafter specified, and they are hereby reserved accordingly.

E. A. BUTTENSHAW, Minister for Lands.

FOR PUBLIC HALL.

LAND DISTRICT—BALRANALD.

No. 64,869. Parish Benanee, county Taila, about ½ acre, red tint. W.L.O. 3,513. P. 34-8,802.

FOR TRAVELLING STOCK.

LAND DISTRICT—WARIALDA; SHIRE—BOOLOOROO.

Within Coppymurrumbil Occupation License No. 308.

No. 64,870. Parish Coppymurrumbil, county Stapylton, about 230 acres; being a strip of Crown Land 10 chains wide extending south-easterly from the south-eastern side of T.S.R. 32,019; along the north-eastern boundary of Reserve 56,998 from sale and lease generally; thence north-easterly and thence north-westerly along north-western and south-western boundaries of portion 11, parish Mungle, and a continuation north-westerly of the lastmentioned boundary to its junction with a boundary of portion 1, parish Coppymurrumbil, on the north-western side of T.S.R. 32,019. Ms. 881 Me. R. P. 34-8,715.

LAND DISTRICT—COONABARRABRAN; SHIRE—COONABARABRAN.

No. 64,894. Parish Coonabarrabran, county Gowen; about 98 acres (in two parts) shown by green edgings on sketch marked "D" with papers. P. 34-8,993.

(6195) Sydney, 2nd November, 1934.

RESERVE FROM SALE GENERALLY.

IT is hereby notified that, in pursuance of the provisions of section 29 of the Crown Lands Consolidation Act, 1913, the Crown Lands hereunder described shall be and are hereby temporarily reserved from sale generally.

E. A. BUTTENSHAW, Minister for Lands.

LAND DISTRICT—COOMA; SHIRE—MONARO.

No. 64,872. Parish Sherlock, county Beresford, 246 acres 1 rood, portions 69 and 107. B. 4,428 and 4,427-1,765. L. 34-12,622.

(6196) Sydney, 2nd November, 1934.

RESERVE FROM SALE OR LEASE GENERALLY.

IT is hereby notified that, in pursuance of the provisions of section 29 of the Crown Lands Consolidation Act, 1913, the Crown Lands hereunder described shall be temporarily reserved from sale or lease generally.

E. A. BUTTENSHAW, Minister for Lands.

LAND DISTRICT—COOMA; SHIRE—MONARO.

No. 64,879. Parish Hill, county Beresford, about 755 acres: Commencing at the north-western corner of portion 59; and bounded thence by portions 59 and 1, end of road and part of portion 45 easterly for a distance of about 62 chains; thence by lines northerly about 31 chains and easterly about 32 chains to Burra Creek; and thence by that creek generally northerly, part portion 17 westerly, and Scrub Lease 305 and portion 58 generally south-easterly, to the point of commencement. P. 34-8,107.

(6162) Sydney, 2nd November, 1934.

RESERVES FROM SALE AND LEASE GENERALLY.

IT is hereby notified that, in pursuance of the provisions of sections 28 and 29 of the Crown Lands Consolidation Act, 1913, the Crown Lands hereunder described shall be temporarily reserved from sale for the public purposes hereinafter specified, and temporarily reserved and exempted from lease generally, and they are hereby reserved and exempted accordingly.

E. A. BUTTENSHAW, Minister for Lands.

FOR CAMPING.

LAND DISTRICT—ALBURY; SHIRE—HUME.

No. 64,863 from sale (64,864 from lease generally). Parish Albury, county Goulburn; about 1½ acres, bounded on the west by portion 646, on the south and north-east by public roads. L. 34-15,435.

FOR PUBLIC RECREATION AND ACCESS.

LAND DISTRICT—BELLINGEN; SHIRE—BELLINGEN.

No. 64,865 from sale (64,866 from lease generally). Parish South Bellingen, county Raleigh, village Weekes; about 3¼ acres: Commencing on the North Arm of the Bellingen River at the northern corner of a log depot adjoining portion Ms. 416 Ksy.; and bounded by that depot, the road 150 links wide from Bellingen to Raleigh, allotment 1, section 2, a line, allotments 6, 5, 4 and 3, section 1, and the road of approach to Fernmount Ferry; exclusive of Bell-street and of about 8 perches occupied by R. S. McDougall. P. 34-8,396.

FOR RESTING PLACE.

LAND DISTRICT—MOSS VALE; SHIRE—NATTAI.

No. 64,867 from sale (64,868 from lease generally). Parish Berrima, county Camden, town Berrima; about 3 acres 1 rood 32 perches, bounded by addition to Police Paddock, dedicated 6th January, 1846, Fountain-street, Oxley-street and Wingecarribee River. P. 34-8,377.

FOR ATHLETIC SPORTS.

LAND DISTRICT—BEGA; SHIRE—IMLAY.

No. 64,873 from sale (64,874 from lease generally). Parish Wallagoot, county Auckland, town Tathra; about 5 acres, bounded by Koorilla, Bega and Tomigee streets, and R. 64,333 for Public Recreation, notified 5th January, 1934. Includes portions 184, 185, and part 186. A. 3,318-2,098 roll. P. 34-8,384.

FOR TRAVELLING STOCK AND CAMPING.

LAND DISTRICT—CASINO; SHIRE—COPMANHURST.

No. 64,875 from sale (64,876 from lease generally). Parish Ewingar, county Drake; 28 acres, bounded by Ewingar Creek, by portions 27 and 24, and by a line from the south-east corner of portion 27 to the south-west corner of portion 24. P. 34-8,996.

FOR POLICE PURPOSES.

LAND DISTRICT—PENRITH; MUNICIPALITY—KATOOMBA.

No. 64,877 from sale (64,878 from lease generally). Parish Blackheath, county Cook; 1 rood 39¾ perches, within portion 525. C. 2,566-1,507. Mis. 26-5,013.

FOR PUBLIC RECREATION.

LAND DISTRICT—HILLSTON; SHIRE—LACHLAN.

No. 64,880 from sale (64,881 from lease generally). Parish Bootoowa, county Dowling; 10 acres, portion 32. D. 1,411-1,841. P. 34-5,828.

FOR WAR MEMORIAL.

LAND DISTRICT—METROPOLITAN; SHIRE—BAULKHAM HILLS.

No. 64,882 from sale (64,883 from lease generally). Parish Castle Hill, county Cumberland; about 3 roods 14½ perches, as shown by blue tint on plan Ms. 8,685 Sy. P. 34-8,856.

FOR HOSPITAL (ADDITION).

LAND DISTRICT—METROPOLITAN; SHIRE—BLACKTOWN.

No. 64,884 from sale (64,885 from lease generally). Parish St. John, county Cumberland; about 4 acres 2 roods 24 perches, as shown by red edging on plan Ms. 8,687 Sy. roll. P. 34-8,856.

FOR PUBLIC RECREATION.

LAND DISTRICT—METROPOLITAN; SHIRE—BAULKHAM HILLS.

No. 64,886 from sale (64,887 from lease generally). Parish Castle Hill, county Cumberland; about 3 acres 2 roods, 8½ perches, as shown by red edging on plan Misc. 8,685 Sy. P. 34-8,856.

LAND DISTRICT—METROPOLITAN; SHIRE—BLACKTOWN.

No. 64,888 from sale (64,889 from lease generally). Parish St. John, county Cumberland; about 2 roods 28 perches (in two parts), as shown by red edging on plan Ms. 8,683 Sy. P. 34-8,856.

LAND DISTRICT—METROPOLITAN; SHIRE—BAULKHAM HILLS.

No. 64,890 from sale (64,891 from lease generally). Parish Field of Mars, county Cumberland; about 4 acres 2 roods 11½ perches (in two parts), as shown by red edging on plan Ms. 8,684 Sy. P. 34-8,856.

LAND DISTRICT—METROPOLITAN; SHIRE—BAULKHAM HILLS.

No. 64,892 from sale (64,893 from lease generally). Parish South Colah, county Cumberland; about 2 acres 2 roods, as shown by red edging on plan Ms. 8,686 Sy. P. 34-8,856.

(6163) Sydney, 2nd November, 1934.

WITHDRAWAL OF TRAVELLING STOCK AND CAMPING RESERVES FROM THE CONTROL OF PASTURES PROTECTION BOARDS.

IT is hereby notified that, in pursuance of the provisions of the Pastures Protection Act, 1912, as amended by Act No. 49, 1918, and Act No. 25, 1920, the parts of travelling stock and camping reserves particularised hereunder shall be and the same are hereby withdrawn from the control of the Pastures Protection Boards of the districts mentioned.

E. A. BUTTENSHAW, Minister for Lands.

LAND BOARD DISTRICT—MAITLAND; PASTURES PROTECTION DISTRICT—PORT MACQUARIE.

Parish Ellenborough, county Macquarie; Reserve No. 103 for travelling stock. Part withdrawn—comprises about 5 acres 2 roods within approved Special Lease 1934-6.

(Placed under control, Gazette 16th December, 1921; renewed, 9th December, 1932.) L. 34-17,100.

LAND BOARD DISTRICT—MOREE; PASTURES PROTECTION DISTRICT—WARIALDA.

Parish Bledger, county Burnett; Reserve No. 14,771 for travelling stock. Part withdrawn—9 acres, being part within closed reserved road within portion 23.

(Placed under control, Gazette 11th July, 1930.) R. 33-370.

LAND BOARD DISTRICT—WAGGA WAGGA; PASTURES PROTECTION DISTRICT—COROWA.

Parish Boreegerry, county Urana; Reserve No. 49,972 for travelling stock and camping. Part dedicated as public road R. 18,964-1,603.

(Gazetted 7th September, 1934.) P. 34-9,032.

LAND BOARD DISTRICT—DUBBO; PASTURES PROTECTION DISTRICT—DUBBO.

Parish Whylandra, county Gordon; Reserve No. 732 from sale for travelling stock. Part withdrawn—10 ac. 2 rd. 10 per. within portion 151.

(Placed under control, Gazette 25th January, 1924; extended 14th February, 1930). S. 34-19,544.

LAND BOARD DISTRICT—GRAFTON; PASTURES PROTECTION DISTRICT—GRAFTON.

Parish Nymboida, county Fitzroy; travelling stock and camping reserve 36,957. Part withdrawn—part (about 41 acres) east of portion 18, north of Goolang Creek.

(Placed under control, Gazette 16th April, 1920, extended Gazettes 17th April, 1925, and 31st October, 1930). L. 34-17,436.

Parish Kremnos, county Clarence; Reserve No. 36,287 from sale for water supply and camping. Part withdrawn—the part within approved Special Lease 34-11.

(Placed under control, 3rd December, 1920, and 2nd December, 1932). L. 34-16,954.

LAND BOARD DISTRICT—MAITLAND; PASTURES PROTECTION DISTRICT—MAITLAND.

Parish Hay, county Northumberland; Reserve No. 155 for camping and access to water. Part withdrawn—about 34 acres within approved Special Lease 34-3.

(Placed under control, Gazette 23rd April, 1920, extended 31st October, 1930). L. 34-17,547.

(6165) Sydney, 2nd November, 1934.

CROWN LANDS NOT AVAILABLE FOR SETTLEMENT UNTIL FURTHER NOTIFICATION.

IN pursuance of the provisions of section 84 of the Crown Lands Consolidation Act, 1913, it is hereby notified that the Crown Lands comprised within the tracts or areas hereunder described shall not be available for the purposes of any application until a further notification has been published in the Gazette.

E. A. BUTTENSHAW, Minister for Lands.

LAND DISTRICT—BRAIDWOOD; SHIRE—TALLAGANDA.

Parish Bettowynd, county St. Vincent; about 388 acres: Commencing on the south-eastern boundary of portion 190 at a point distant about 1 chain north-easterly from the south-eastern corner of that portion; and bounded thence by a line east to Araluen Creek; thence by that creek upwards to the south-eastern corner of portion 1, parish of Araluen; thence by that portion and

(4568) Sydney, 31st January, 1964.

REVOCATION OF RESERVES FROM SALE, LEASE, ETC.

IT is hereby notified that under the provisions of section 30 of the Crown Lands Consolidation Act, 1913, the reserves from sale, lease, etc., hereunder described, are hereby revoked.

K. C. COMPTON, Minister for Lands.

Land District	Reserve No.	Purpose	Date of Notification	Parish	County	Shire, etc.	Area	Part Revoked	Papers No.
Bathurst	66,907	For public recreation	3 Sep., 1937	Bathurst	Bathurst	City of Bathurst	a. r. p. 2 2 27	Bounded by Henry, William and Durham streets, the south-eastern boundary of allotment 1, section 72, and it's prolongation to the said Henry-street. Ms. 2,406 Oe.	T. 63-7,826
Bega	64,171	For water supply	22 Sept., 1933	Eden	Auckland	Imlay	1 2 0 (about).	Part within portion 110. A. 3,867-2,098.	T. 61-4,105
Do	....	do do	24 Dec., 1861	do	do	do	1 3 28	Portion 110. A. 3,867-2,098.	do
Casino	46,040	For public hall	23 Nov., 1910	Hogarth	Richmond	Copmanhurst.	1 0 0	The whole; portion 113. R. 2,017-1,744.	P. 61-5,048
Condobolin	7,436	For travelling stock	3 May, 1890	Mount Nobby and Mowabla	Cunningham	Lachlan	669 0 0 (about).	Part withdrawn from Pastures Protection Board control this day.	P. 63-2,519
Do	17,213	do do	15 Apr., 1893	Mowabla	do	do	10 0 0 (about).	do do	do
Do	7,420	For travelling stock and camping.	27 Oct., 1888	do	do	do	525 0 0 (about).	Part south-west of the south-easterly prolongation of the north-eastern boundary of portion 69; Ms. 58 Fs.	do
Do	7,419	do do	27 Oct., 1888	do	do	do	75 0 0 (about).	Part south-west of the south-easterly prolongation of the north-eastern boundary of portion 69; Ms. 58. Fs.	do
Dubbo	64,722	For public school	24 Aug., 1934	Bundijoe	Ewenmar	Warren	1 3 36	The whole; portion 11. E. 2,294-1,890.	P. 64-23
Gloucester	16,783	For public school purposes	26 Nov., 1892	Myall	Gloucester	Stroud	5 2 0	The whole; portion 40. G. 2,625-1,497.	P. 63-3,168
Do	70	do do	28 June, 1880	do	do	do	2 0 0 (about).	Part bounded by public road 150 links wide, Deep Creek and a line from the south-western corner of portion 48 perpendicular to that road.	do
Gosford	48,831	For public recreation	14 May, 1913	Munmorah	Northumberland.	Wyong	1 0 21½	Portion 134. N. 8,447-2,111.	T. 63-40
Grafton	56,146	From sale or lease generally.	11 May, 1923	Newbold (Private Town of Gresham)	W	Nymboida (Wyong)	0 2 0 (about).	Bed of Pipeclay Creek within portion 43. G. 721-1,782.	D. 64-268
Inverell	42,569	For racecourse	25 Mar., 1908	Leslie	Arrawatta	Ashford	90 2 0	The whole; portion 16. A. 2,613-1,847.	P. 59-6,309
Lismore	1,278	For public wharf	28 July, 1884	Tuckombil	Rous	Tintenbar	10 0 0 (about).	The whole includes portions 300 and 365. R. 9,328, 9,822-1,759.	T. 62-6,782
Do	700	For water supply and acess thereto.	21 Feb., 1881	South Gundurimba.	do	Gundurimba	4 0 0 (about).	The balance	T. 63-7,794
Metropolitan	64,890	For public recreation	2 Nov., 1934	Field of Mars.	Cumberland	Baulkham Hills.	1 2 11½	Part within portion 932. C. 8,662-2,030.	T. 62-5,811
Molong	56,146	From sale or lease generally.	11 May, 1923	Buckinbah	Gordon	Molong	5 0 0 (about).	Bed of Darigal or Hanover Creek within portion 143. G. 3,561-1,567.	D. 64-152
Nyngan	75,781	For public recreation	1 May, 1953	Beaconsfield (Suburban Lands of Village of Tottenham.)	Kennedy	Lachlan	4 1 28	Portion 148. K. 2,419-2,004 R.	T. 63-4,080
Penrith	32	For preservation of water supply for Railway purposes.	10 May, 1876	Jamieson	Cook	Blue Mountains.	94 0 0 (about).	The residue	P. 62-3,176
Port Macquarie	58,126	For public school purposes	3 July, 1925	Pappinbarra	Macquarie	Hastings	2 0 0	The whole; portion 183. M. 7,569-666.	P. 63-3,102
Queanbeyan	83,867	From sale or lease generally.	29 June, 1962	Queanbeyan (Town of Queanbeyan)	Murray	Queanbeyan.	3 29	Allotments 5 and 6, section 47. Queanbeyan 43.	T. 63-5,521
Tamworth	31,534	For Police purposes	22 Sept., 1900	Loftus (within Town Weabonga)	Parry	Cockburn	0 1 0	Allotment 9, section 3. Swamp Oak 4.	P. 56-3,569
Warialda	7,314	For temporary common	29 Sept., 1888	Boggabilla (Suburban Lands, Village Boggabilla)	Stapylton	Booloorooo	0 3 26½	Portion 217. S. 2,043-1,857.	T. 63-2,373

(4569) Sydney, 31st January, 1964

REVOCATION OF NOTIFICATIONS OF SUBURBAN HOLDING AREAS

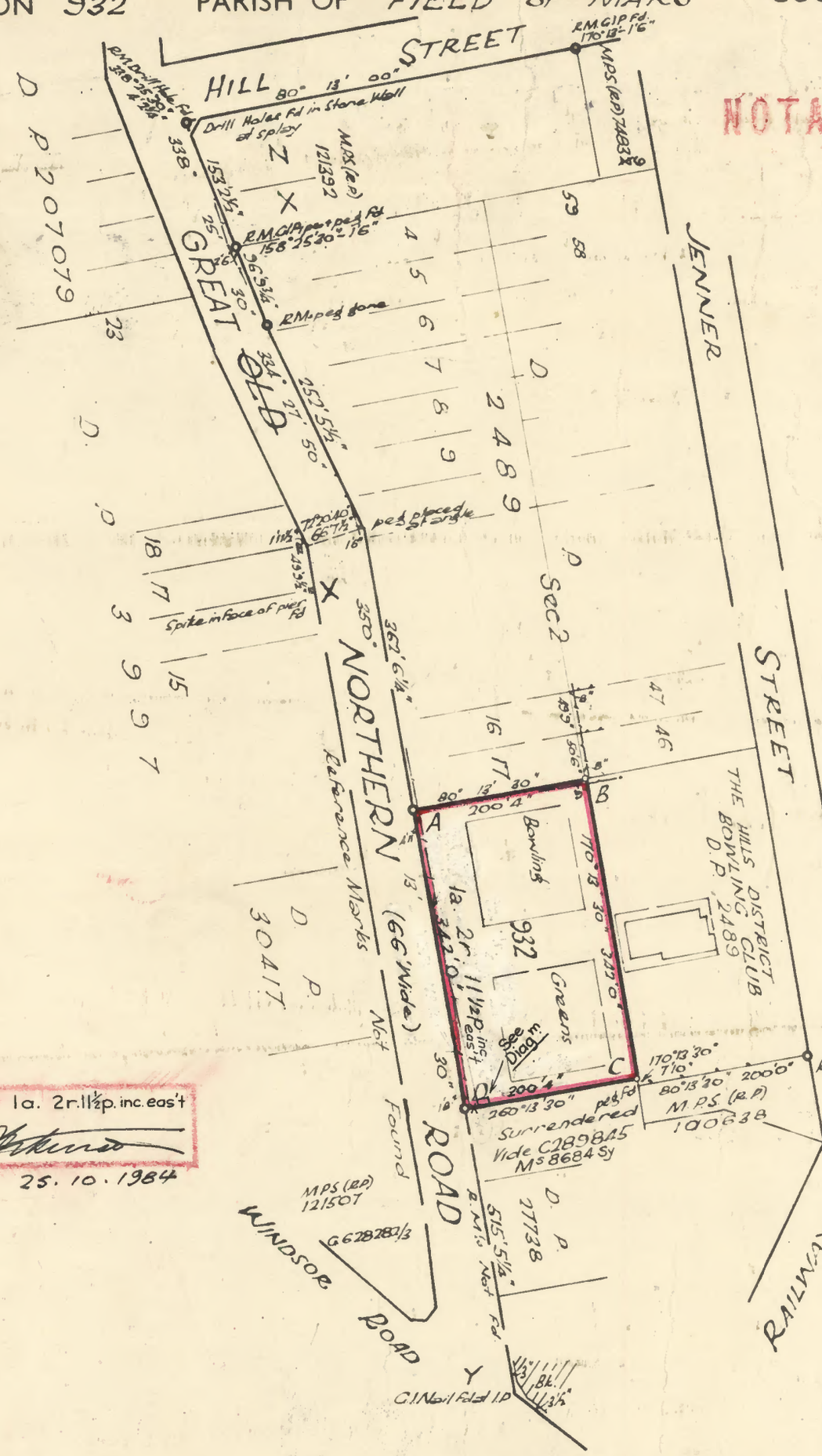
IT is hereby notified that, in pursuance of the provisions of the Crown Lands Consolidation Act, 1913, the notifications of suburban holding areas are hereby revoked in respect of the areas particularised hereunder.

K. C. COMPTON, Minister for Lands.

Land District	Class of holding for which the land was set apart	Date of Notification	Parish	County	Shire, etc.	Area	Part Revoked	Papers No.
Bellingen	Area No. 2,946	6 Mar., 1959	Valley Valley.	Raleigh	Nambucca	a. r. p. 28 1 0	The whole; portion 138. R. 4,070-1,714.	P. 63-3,129
Blayney	Area No. 2,218	14 May, 1954	Errol (Town of Blayney)	Bathurst	Lyndhurst	0 0 36	Allotment 4, section 26. B. 26-1,232.	P. 63-3,036
Dunedoo Central.	Area No. 3,048 (Closer Settlement).	9 Oct., 1959	Coolah	Napier	Coolah	64 0 2	The whole. N. 1,686, 1,687, 1,688	P. 64-19
Mudgee	Area No. 3,194	10 Mar., 1961	Guntawang	Phillip	Cudgegong	23 0 0	R.—1,883. Portion 446. P. 4.404-2,125 R.	T. 63-2,777

PLAN OF PORTION 932 PARISH OF FIELD of MARS COUNTY OF CUMBERLAND

At BAULKHAM HILLS.



NOTATION PLAN

NOTATION PLAN.

I CERTIFY that this is a CORRECT COPY of the original plan of survey and of all notations thereon now relevant, I being the officer having the custody thereof.

Officer in Charge,
Land Board Office.

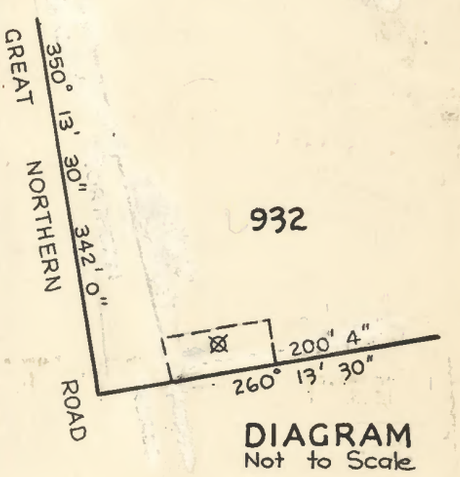


DIAGRAM
Not to Scale

FOR 932 APPD. FOR 1a. 2r. 11½p. inc. eas't
AUTH. OFFR.
25. 10. 1984

PLAN MICROFILMED
NO ADDITIONS OR AMENDMENTS TO BE MADE

SURROUND AREA- 68.5/2 sq ft.

SCALE 160 ~~CHAINS~~ FEET TO AN INCH

CAT. NO. C8662 2030

REFERENCE MARKS

CORNER	BEARING	FROM	LINKS	NO. ON TREE
A	80°13'30"	Drill Hole and Wing	11·3'	
	↑ Numbered Peg on Corner 932			
B	↑ Numbered Peg on Corner 932			
C	↑ Numbered Peg on Corner 932			
D	80°13'30"	Drill Hole and Wing	11·2"	
	↑ Numbered Peg on Corner 932			

AZIMUTH TAKEN FROM X – Y (D.P.s 2489, 27738 & 39)
FIELD BOOK 4866 PAGES 7 – 12

NOTATION PLAN Land District Metropolitan Papers LB.61/356 Ten.62/5811

Partly cancels plan Ms8684 Sy.

~~Within R64890 from sale for Public Recreation notified 2nd November, 1934.~~ Revd. 31·1·64

R2716 from occupation under any M.R. or B.L. notified 28th October, 1960.

Title is limited to the surface and to a depth of fifty (50) feet below the surface.

Portion 932 Sp.L.61/9 The Hills District Bowling Club. Gaz. 13·3·64

⊠ Easement for T/L. Gaz. 29-12-78. fol. 5429.

NOTATION PLAN

I CHRISTOPHER WARWICK SMITH of 399 PACIFIC HIGHWAY ASQUITH a Surveyor registered under the Surveyors Act, 1929-1946, hereby certify that the survey represented in this plan is accurate and has been made by me ~~under my immediate supervision~~ in accordance with the Survey Practice Regulations, 1933, and the special requirements of the Department of Lands and was completed on 3rd May 1963

Signature Christopher W. Smith
Surveyor registered under the Surveyors Act, 1929-1946.

CHECKED & CHARTED Graham 5th November 1963
EXAMINED
PLAN APPROVED J. C. Maddy
Authorised Officer 5th November 1963

Printed at the Department of Lands, Sydney, N.S.W.

CERTIFICATE OF TITLE

NEW SOUTH WALES

PROPERTY ACT, 1900

First Title This Folio

Prior Title Crown Land (FI 105669)

Vol. 15294 Fol. 153

EDITION ISSUED

4 2 1985

I certify that the person named in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set out below) in the land described subject to the recordings appearing in the Second Schedule and to the provisions of the Real Property Act, 1900.

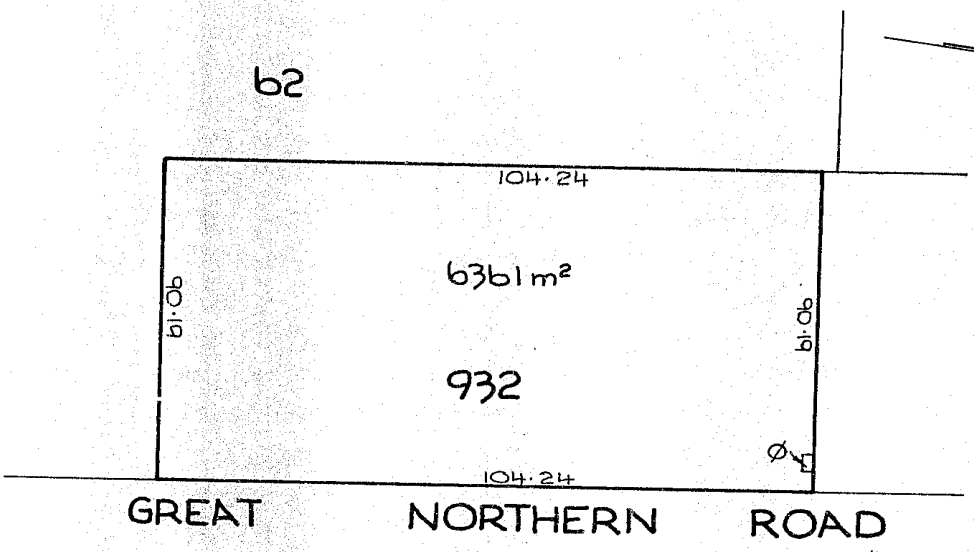
Registrar General.

CANCELLED

SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



Ø - EASEMENT FOR TRANSMISSION LINE VAR. WIDTH

LAND REFERRED TO

P Portion 932 at Baulkham Hills in the Shire of Baulkham Hills Parish of Field of Mars County of Cumberland.

FIRST SCHEDULE

THE HILLS DISTRICT BOWLING CLUB LIMITED.

GSB

SECOND SCHEDULE

XL 1. Excepting land below a depth from the surface of 15.24 metres.
2. Land excludes minerals and is subject to reservations and conditions in favour of the Crown - see Memorandum S700000B.

AA 3. Notification in Government Gazette dated 29-12-1978 Folio 5428: Easement for transmission line affecting the land shown so burdened in the plan hereon.

AB 4. Conditional Purchase 1979/21 Metropolitan - subject to the provisions of the Crown Lands Consolidation Act, 1913, particularly as regards -
(a) PAYMENT OF BALANCE OF PURCHASE AND OTHER MONEYS;
(b) forfeiture provisions;
(c) restrictions on dealings, see s.272
(d) restrictions on subdivision, see s.257.

RG 2/64

40828—4036

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR | Registrar General

CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

PARTICULARS | Registrar General | CANCELLATION

NOTATIONS AND UNREGISTERED DEALINGS

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

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
4/9/2020 6:33PM

FOLIO: 4/1108855

First Title(s): VOL 15294 FOL 153
Prior Title(s): 932/752028

Recorded	Number	Type of Instrument	C.T. Issue
27/2/2007	DP1108855	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
19/2/2008	AD712358	REQUEST	FOLIO CREATED CT NOT ISSUED
1/5/2020	AQ70332	DISCHARGE OF MORTGAGE	
1/5/2020	AQ70333	MORTGAGE	EDITION 1

*** END OF SEARCH ***

hills bowling PRINTED ON 4/9/2020

Received: 04/09/2020 18:33:11

Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 4/1108855

SEARCH DATE	TIME	EDITION NO	DATE
4/9/2020	6:32 PM	1	1/5/2020

LAND

LOT 4 IN DEPOSITED PLAN 1108855
AT BAULKHAM HILLS
LOCAL GOVERNMENT AREA THE HILLS SHIRE
PARISH OF FIELD OF MARS COUNTY OF CUMBERLAND
TITLE DIAGRAM DP1108855

FIRST SCHEDULE

THE HILLS DISTRICT BOWLING CLUB LIMITED

SECOND SCHEDULE (4 NOTIFICATIONS)

1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE MEMORANDUM S700000B
2 EXCEPTING LAND BELOW A DEPTH FROM THE SURFACE OF 15.24 METRES
3 EASEMENT FOR TRANSMISSION LINE EASEMENT FOR TRANSMISSION LINE AFFECTING THE LAND SHOWN SO BURDENED IN TITLE DIAGRAM GOV GAZ 29-12-1978 FOL 5428
4 AQ70333 MORTGAGE TO NASR GROUP INVESTMENTS PTY LTD

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

hills bowling PRINTED ON 4/9/2020

Received: 04/09/2020 18:32:57

Appendix G – SafeWork NSW Record

Locked Bag 2906, Lisarow NSW 2252
Customer Experience 13 10 50
ABN 81 913 830 179 | www.safework.nsw.gov.au

Our Ref: D20/177543

25 September 2020

Mr Liangshi Chen
EI Australia
liangshi.chen@eiaustralia.com.au

Dear Mr Chen

RE SITE: Lot 39-45 in section 2 DP2489, Lot Z in DP 400638 and Lot 4 in DP1108855

Old Northern Rd, Baulkham Hills NSW 2153

I refer to your site search request received by SafeWork NSW on 25 August 2020 requesting information on Storage of Hazardous Chemicals for the above site.

A search of the records held by SafeWork NSW has not located any records pertaining to the above-mentioned premises.

For further information or if you have any questions, please call us on 13 10 50 or email licensing@safework.nsw.gov.auw

Yours sincerely

Gabriela Draper

Customer Service Officer
Customer Experience - Operations
SafeWork NSW

Appendix H – Borehole Logs

BOREHOLE LOG

BH NO. BH1M

Project	Proposed Development	**Sheet**	1 of 3
Location	The Hills Bowling Club, Baulkham Hills NSW	**Date Started**	03/08/2020
Position	Refer to Figure 2	**Date Completed**	03/08/2020
Job No.	E24782.E01	**Logged By** IW	**Date** 03/08/2020
Client	Arden Property Group Pty Ltd	**Reviewed By** SR	**Date** 01/08/2020

Drilling Contactor	Geosense Drilling	**Surface RL**	≈103.10 m AHD
Drill Rig	Hanjin DB8	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0	103.10	BH1M_0.2-0.3 DS			-	FILL: Silty SAND; fine to medium grained, grey, with rootlets.	M	-	FILL
					SPT 0.50-0.95 m 3,3,3 N=6							
			1	*0.90* 102.20	BH1M_1.2-1.3 DS			-	FILL: Silty CLAY; medium plasticity, brown, variably compacted, with some ash, bitumen and brick fragments.	M (=PL)	-	
				1.60 *1.75*	SPT 1.50-1.75 m 16,26/100mm HB N>30			-	SHALE; pale grey-brown, very low strength, distinctly weathered.	-	-	BEDROCK
			2						Continued as Cored Borehole			
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE LOG

BH NO. BH2M

Project	Proposed Development	**Sheet**	1 of 3
Location	The Hills Bowling Club, Baulkham Hills NSW	**Date Started**	04/08/2020
Position	Refer to Figure 2	**Date Completed**	04/08/2020
Job No.	E24782.E01	**Logged By**	RS/IW **Date** 04/08/2020
Client	Arden Property Group Pty Ltd	**Reviewed By**	SR **Date** 01/09/2020

Drilling Contactor	Geosense Drilling	**Surface RL**	≈98.50 m AHD
Drill Rig	Hanjin DB8	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	4/8/20	0	98.50				-	FILL: Silty SAND; fine to medium grained, dark brown, trace rootlets.	M	-	FILL
				0.50								
				98.00	SPT 0.50-0.95 m 1/300mm,1 N=10			-	FILL: Silty CLAY; medium plasticity, pale grey-brown, with fine to coarse, angular to sub-angular gravel.			
			1		SPT 1.50-1.95 m 2,2,3 N=5							
			2							M (=PL)	-	
			3		SPT 3.00-3.45 m 2,4,5 N=9							
			4	*4.50*								
	L			94.00	SPT 4.50-4.70 m 23,12/50mm HB N>30			-	SHALE; pale grey-brown, very low strength, extremely to distinctly weathered.	-	-	BEDROCK
			5	*5.50*								
				93.00					From 5.5 m, grading to very low to low strength.			
			6	*6.00*					Continued as Cored Borehole			
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE LOG

BH NO. BH3

Project	Proposed Development	**Sheet**	1 of 3
Location	The Hills Bowling Club, Baulkham Hills NSW	**Date Started**	05/08/2020
Position	Refer to Figure 2	**Date Completed**	05/08/2020
Job No.	E24782.E01	**Logged By**	RS/IW **Date** 05/08/2020
Client	Arden Property Group Pty Ltd	**Reviewed By**	SR **Date** 01/09/2020

Drilling Contactor	Geosense Drilling	**Surface RL**	≈99.00 m AHD
Drill Rig	Hanjin DB8	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DT			0	98.95				-	ASPHALT; 50 mm thick pavement.	-	-	ASPHALT PAVEMENT
				0.50				-	FILL: Gravelly SAND; fine to coarse grained sand, pale brown, fine to medium, sub-angular gravel.	M	-	FILL
				98.50				-	FILL: Silty CLAY; low plasticity, brown, with trace fine to medium, angular to sub-angular ironstone and shale gravel.			
				1.00	SPT 0.50-0.95 m 2,3,4 N=7							
			1	98.00					From 1.0 to 1.9 m, with some fine to coarse, angular to sub-angular shale gravel.			
AD/T	-	GWNE			SPT 1.50-1.95 m 2,2,2 N=4					M (=PL)	-	
				1.90					From 1.9 m, grading to brown-pale brown.			
			2	97.10								
				2.60								
				96.40				-	SHALE; brown-grey, very low strength, distinctly weathered.			BEDROCK
	L		3		SPT 2.90-2.91 m 3/10mm HB					-		
	M			3.80								
									Continued as Cored Borehole			
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE LOG

BH NO. BH4M

Project	Proposed Development	**Sheet**	1 of 3
Location	The Hills Bowling Club, Baulkham Hills NSW	**Date Started**	04/08/2020
Position	Refer to Figure 2	**Date Completed**	05/08/2020
Job No.	E24782.E01	**Logged By** RS	**Date** 04/08/2020
Client	Arden Property Group Pty Ltd	**Reviewed By** SR	**Date** 01/09/2020

Drilling Contactor	Geosense Drilling	**Surface RL**	≈103.80 m AHD
Drill Rig	Hanjin DB8	**Inclination**	-90°

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY REL. DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DT	-		0	0.20 103.60				-	ASPHALT; 50 mm thick pavement.	-	-	ASPHALT PAVEMENT
								-	FILL: Gravelly SAND; fine to medium grained sand, pale grey, with some medium, angular to sub-angular blue metal gravel.	D		FILL
								-	SHALE; brown-pale grey, very low strength, extremely to distinctly weathered, with some extremely weathered seams.	-	-	BEDROCK
AD/T	L		1		SPT 0.60-0.75 m 34 HB N>30							
			2									
			3									
			4							-	-	
				4.70 99.10					From 4.7 m, with slight chemical odour.			
		4/8/20	5									
			6									
			7	7.60								
									Continued as Cored Borehole			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH5

eiaustralia
Contamination | Remediation | Geotechnical

Project	Preliminary Site Investigation			Sheet	1 OF 1
Location	Arden Property Group Pty Ltd			Date Started	5/8/20
Position	Refer to Figure 2			Date Completed	5/8/20
Job No.	E24782.E01	Contractor		Logged IW	Date:
Client	Riveredge Investments Pty Ltd	Drill Rig	Hand Auger	Checked SE	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0.0		BH5_0.1-0.2 ES 0.10-0.20 m			-	FILL: Silty sand, fine to medium grained, dark brown, with rootlets, no odour.	D	-	FILL
			0.5	0.50	BH5_0.7-0.8 ES 0.70-0.80 m			CI	Silty Clay, medium plasticity, red and brown mottled pale grey, with some fine to medium ironstone gravels, no odour.			RESIDUAL SOIL
			1.0	0.80					Hole Terminated at 0.80 m Target depth reached			
			1.5									
			2.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH6

eiaustralia
Contamination | Remediation | Geotechnical

Project	Preliminary Site Investigation			Sheet	1 OF 1
Location	Arden Property Group Pty Ltd			Date Started	5/8/20
Position	Refer to Figure 2			Date Completed	5/8/20
Job No.	E24782.E01	Contractor		Logged IW	Date:
Client	Riveredge Investments Pty Ltd	Drill Rig	Hand Auger	Checked SE	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0.0					-	FILL: Silty sand, fine to medium grained, dark brown, with rootlets, no odour.			FILL
				0.10								
					BH6_0.1-0.2 ES 0.10-0.20 m			-	FILL: Silty clay, medium plasticity, dark brown, with some fine to medium ironstone gravel, ash and sandstone fragments, no odour.			
			0.5		BH6_0.6-0.7 ES 0.60-0.70 m					D	-	
					BH6_0.9-1.0 ES 0.90-1.00 m							
			1.0	1.00					Hole Terminated at 1.00 m Hand Auger refusal on gravel in fill.			
			1.5									
			2.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH7

eiaustralia
Contamination | Remediation | Geotechnical

Project	Preliminary Site Investigation			Sheet	1 OF 1
Location	Arden Property Group Pty Ltd			Date Started	5/8/20
Position	Refer to Figure 2			Date Completed	5/8/20
Job No.	E24782.E01	Contractor		Logged IW	Date:
Client	Riveredge Investments Pty Ltd	Drill Rig	Hand Auger	Checked SE	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0.0					-	FILL: Silty SAND; fine to medium grained, dark brown, with rootlets, no odour	D	-	FILL
					BH7_0.1-0.2 ES 0.10-0.20 m							
			0.5									
				0.60	BH7_0.6-0.7 ES 0.60-0.70 m				From 0.6m, dark brown and pale grey.			
				0.70					From 0.7m, with some fine to medium and sub-angular to angular blue metal gravels.			
			1.0	1.00	BH7_1.0-1.1 ES 1.00-1.10 m				From 1.0m, with some clay.			
				1.30					From 1.3m, with some fine to medium and sub-angular to angular ironstone gravels.			
				1.40				CI	Silty CLAY; medium plasticity, pale grey mottled red/brown, no odour.			RESIDUAL SOIL
			1.5		BH7_1.5-1.6 ES 1.50-1.60 m							
				1.60					Hole Terminated at 1.60 m Target depth reached			
			2.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH8

eiaustralia
Contamination | Remediation | Geotechnical

Project	Preliminary Site Investigation			Sheet	1 OF 1
Location	Arden Property Group Pty Ltd			Date Started	5/8/20
Position	Refer to Figure 2			Date Completed	5/8/20
Job No.	E24782.E01	Contractor		Logged IW	Date:
Client	Riveredge Investments Pty Ltd	Drill Rig	Hand Auger	Checked SE	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0.0		BH8_0.1-0.2 ES 0.10-0.20 m			-	FILL: Sandy CLAY; low to medium plasticity, dark brown, with some fine to coarse shale gravels, with some concrete fragment and trace rootlets, no odour.	D	-	FILL
			0.5		BH8_0.5-0.6 ES 0.50-0.60 m							
				0.60					Hole Terminated at 0.60 m Hand auger refusal.			
			1.0									
			1.5									
			2.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH9

eiaustralia
Contamination | Remediation | Geotechnical

Project	Preliminary Site Investigation			Sheet	1 OF 1
Location	Arden Property Group Pty Ltd			Date Started	5/8/20
Position	Refer to Figure 2			Date Completed	5/8/20
Job No.	E24782.E01	Contractor		Logged IW	Date:
Client	Riveredge Investments Pty Ltd	Drill Rig	Hand Auger	Checked SE	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0.0					-	FILL: Clayey SAND; fine to medium grained, with some fine to medium grained gravels (shale, ironstone and sandstone), with rootlets, no odour.	D	-	FILL
					BH9_0.1-0.2 ES 0.10-0.20 m							
			0.5		BH9_0.6-0.7 ES 0.60-0.70 m							
				0.90								
									Hole Terminated at 0.90 m Hand auger refusal.			
			1.0									
			1.5									
			2.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

MONITORING WELL LOG

MW NO. BH1M

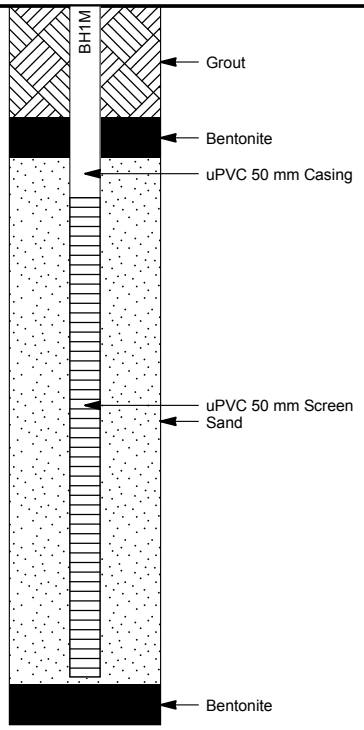
Project	Proposed Development	**Sheet**	1 of 2
Location	The Hills Bowling Club, Baulkham Hills NSW	**Date Started**	03/08/2020
Position	Refer to Figure 2	**Date Completed**	03/08/2020
Job No.	E24782.E01	**Logged By** IW	**Date** 03/08/2020
Client	Arden Property Group Pty Ltd	**Reviewed By** SR	**Date** 01/09/2020

Drilling Contactor	Geosense Drilling	**Surface RL**	≈103.10 m AHD
Drill Rig	Hanjin DB8	**Inclination**	-90°

METHOD	WATER	DEPTH (m)	RL (m AHD)	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION
AD/T	GWNE	0			FILL: Silty SAND; fine to medium grained, grey, with rootlets.
			102		FILL: Silty CLAY; medium plasticity, brown, variably compacted, with some ash, bitumen and brick fragments.
		2			SHALE; pale grey-brown, very low strength, distinctly weathered.
					SHALE; pale grey, very low strength, distinctly weathered, laminated interbedded with extremely low strength, extremely weathered seams.
			100		NO CORE; 470 mm thick.
		4			From 4.08 m, grading to grey-brown, low strength.
					NO CORE; 280 mm thick.
			98		
NMLC	90% RETURN	6			From 5.56 m, grading to grey-brown, thinly bedded, medium strength, slightly weathered, with some fine grained sandstone laminations.
			96		
		8			
			94		From 8.66 m, grading to grey, medium bedded, fresh.
		10			
			92		
		12			
			90		
		14			
			88		
		16			SANDSTONE; fine to medium grained, pale grey, medium bedded, medium strength, fresh, with some shale laminations.
			86		
		18			Borehole Terminated at 17.21 m, Target Depth Reached.

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
BH1M	Standpipe	-0.10 m 103.20 m	8.40 m 94.70 m		



This well log should be read in conjunction with EI Australia's accompanying standard notes.

MONITORING WELL LOG

MW NO. BH2M

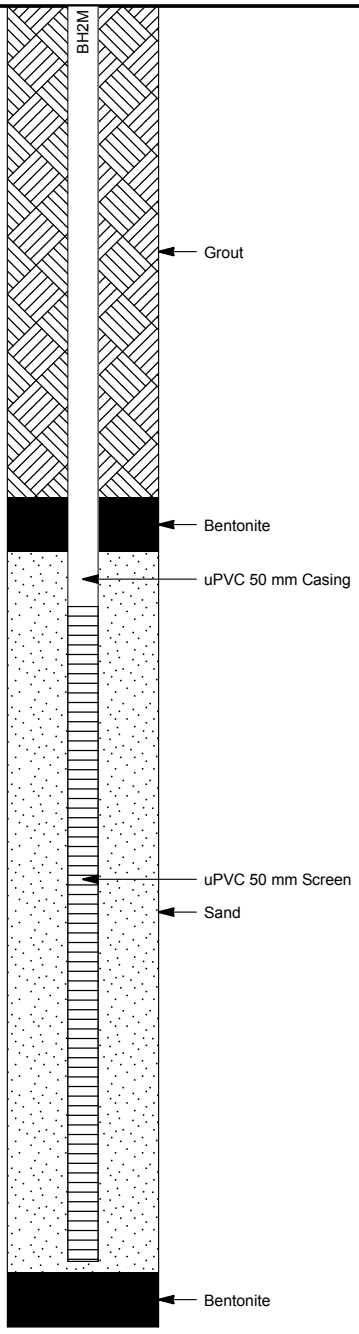
Project	Proposed Development	**Sheet**	1 of 2
Location	The Hills Bowling Club, Baulkham Hills NSW	**Date Started**	04/08/2020
Position	Refer to Figure 2	**Date Completed**	04/08/2020
Job No.	E24782.E01	**Logged By**	RS/IW **Date** 04/08/2020
Client	Arden Property Group Pty Ltd	**Reviewed By**	SR **Date** 01/09/2020

Drilling Contactor	Geosense Drilling	**Surface RL**	≈98.50 m AHD
Drill Rig	Hanjin DB8	**Inclination**	-90°

METHOD	WATER	DEPTH (m)	RL (m AHD)	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION
AD/T		0			FILL: Silty SAND; fine to medium grained, dark brown, trace rootlets.
			98		FILL: Silty CLAY; medium plasticity, pale grey-brown, with fine to coarse, angular to sub-angular gravel.
		2			
			96		
		4			
	▽		94		SHALE; pale grey-brown, very low strength, extremely to distinctly weathered.
					From 5.5 m, grading to very low to low strength.
NMLC		6			SHALE; dark grey-brown, indistinctly laminated at 0 to 10 °, low strength, distinctly weathered.
			92		
					NO CORE; 160 mm thick.
		8			
			90		From 9.0 m, grading to dark grey. thinly laminated at 0 to 5°, medium strength, slightly weathered.
	80-90% RETURN	10			
			88		From 11.0 m, fresh.
					From 11.9 to 12.0 m, pale grey.
		12			From 12.15 m, with 60% pale grey, fine grained sandstone laminations, bedded to 45 mm thick.
			86		SANDSTONE; fine grained, pale grey, 10 % carbonaceous laminations at 0 to 10°.
					Borehole Terminated at 12.59 m, Target Depth Reached.

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
BH2M	Standpipe	-0.10 m 98.60 m	11.50 m 87.00 m		



This well log should be read in conjunction with EI Australia's accompanying standard notes.

MONITORING WELL LOG

MW NO. BH4M

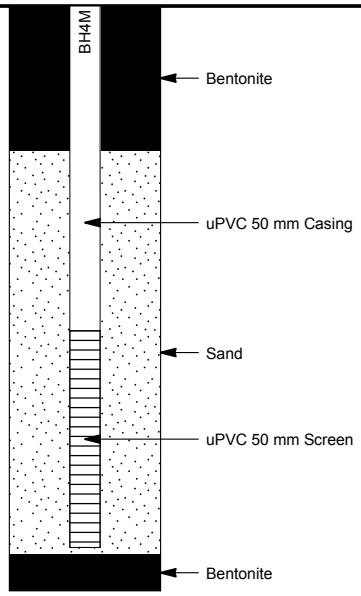
Project	Proposed Development	**Sheet**	1 of 2
Location	The Hills Bowling Club, Baulkham Hills NSW	**Date Started**	04/08/2020
Position	Refer to Figure 2	**Date Completed**	05/08/2020
Job No.	E24782.E01	**Logged By** RS	**Date** 04/08/2020
Client	Arden Property Group Pty Ltd	**Reviewed By** SR	**Date** 01/09/2020

Drilling Contactor	Geosense Drilling	**Surface RL**	≈103.80 m AHD
Drill Rig	Hanjin DB8	**Inclination**	-90°

METHOD	WATER	DEPTH (m)	RL (m AHD)	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION
DT		0			ASPHALT; 50 mm thick pavement.
					FILL: Gravelly SAND; fine to medium grained sand, pale grey, with some medium, angular to sub-angular blue metal gravel.
AD/T		2	102		SHALE; brown-pale grey, very low strength, extremely to distinctly weathered, with some extremely weathered seams.
		4	100		
	▽				From 4.7 m, with slight chemical odour.
		6	98		
NMLC	90-95% RETURN	8	96		SHALE; dark grey, with 15% fine grained, pale grey, sandstone laminations at 0 to 15°, medium strength, slightly weathered.
					From 9.4 m, high strength, fresh.
		10	94		
		12	92		
		14	90		
		16	88		
		18	86		
		20	84		Borehole Terminated at 19.04 m, Target Depth Reached.

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
BH4M	Standpipe		7.50 m 96.30 m		



This well log should be read in conjunction with EI Australia's accompanying standard notes.

EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT LOGS

DRILLING/EXCAVATION METHOD					
HA	Hand Auger	RR	Rock Roller	RH	Rock Hammer
DTC	Diatube Coring	RD	Rotary blade or drag bit	NQ	Diamond Core - 47 mm
NDD	Non-destructive digging	RT	Rotary Tricone bit	NMLC	Diamond Core - 52 mm
AS*	Auger Screwing	RAB	Rotary Air Blast	HQ	Diamond Core - 63 mm
AD*	Auger Drilling	RC	Reverse Circulation	HMLC	Diamond Core - 63mm
*V	V-Bit	PT	Push Tube	BH	Tractor Mounted Backhoe
*T	TC-Bit, e.g. ADT	CT	Cable Tool Rig	EX	Tracked Hydraulic Excavator
ADH	Hollow Auger	JET	Jetting	EE	Existing Excavation
		WB	Washbore or Bailer	HAND	Excavated by Hand Methods

PENETRATION/EXCAVATION RESISTANCE

L **Low resistance.** Rapid penetration/ excavation possible with little effort from equipment used.

M **Medium resistance.** Penetration/ excavation possible at an acceptable rate with moderate effort from equipment used.

H **High resistance.** Penetration/ excavation is possible but at a slow rate and requires significant effort from equipment used.

R **Refusal/ Practical Refusal.** No further progress possible without risk of damage or unacceptable wear to equipment used.

These assessments are subjective and are dependent on many factors, including equipment power and weight, condition of excavation or drilling tools and experience of the operator.

WATER

Water level at date shown

Water inflow

Partial water loss

Complete water loss

GROUNDWATER NOT OBSERVED — Observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave-in of the borehole/ test pit.

GROUNDWATER NOT ENCOUNTERED — Borehole/ test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/ test pit been left open for a longer period.

SAMPLING AND TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-2004
4,7,11 N=18	4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm
seating 30/80mm	Where practical refusal occurs, the blows and penetration for that interval are reported
RW	Penetration occurred under the rod weight only
HW	Penetration occurred under the hammer and rod weight only
HB	Hammer double bouncing on anvil
Sampling	
DS	Disturbed Sample
BDS	Bulk disturbed Sample
GS	Gas Sample
WS	Water Sample
U63	Thin walled tube sample - number indicates nominal sample diameter in millimetres
Testing	
FP	Field Permeability test over section noted
FVS	Field Vane Shear test expressed as uncorrected shear strength (sv = peak value, sr = residual value)
PID	Photoionisation Detector reading in ppm
PM	Pressuremeter test over section noted
PP	Pocket Penetrometer test expressed as instrument reading in kPa
WPT	Water Pressure tests
DCP	Dynamic Cone Penetrometer test
CPT	Static Cone Penetration test
CPTu	Static Cone Penetration test with pore pressure (u) measurement

RANKING OF VISUALLY OBSERVABLE CONTAMINATION AND ODOUR (for specific soil contamination assessment

R = 0	No visible evidence of contamination	R = A	No non-natural odours identified
R = 1	Slight evidence of visible contamination	R = B	Slight non-natural odours identified
R = 2	Visible contamination	R = C	Moderate non-natural odours identified
R = 3	Significant visible contamination	R = D	Strong non-natural odours identified

ROCK CORE RECOVERY

TCR = Total Core Recovery (%)

$$= \frac{\text{Length of core recevered}}{\text{Lengh of core run}} \text{ x } 100$$

SCR = Solid Core Recovery (%)

$$= \frac{\Sigma \text{ Length ofcylindrical core recevered}}{\text{Lengh of core run}} \text{ x } 100$$

RQD = Rock Quality Designation (%)

$$= \frac{\Sigma \text{Axial Lenghts of core} > 100\text{mm}}{\text{Lengh of core run}} \text{ x } 100$$

MATERIAL BOUNDARIES

———— = inferred boundary

- - - - - - - - = probable boundary

— ?— ?— ?— ? = possible boundary

METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT LOGS

	FILL		ORGANIC SOILS (OL, OH or Pt)		CLAY (CL, CI or CH)
	COUBLES or BOULDERS		SILT (ML or MH)		SAND (SP or SW)
	GRAVEL (GP or GW)	Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay			

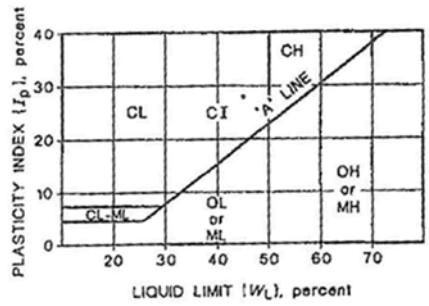
CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS1726 – 1993, (Amdt1 – 1994 and Amdt2 – 1994), Appendix A. Material properties are assessed in the field by visual/tactile methods.

PARTICLE SIZE CHARACTERISTICS

Major Division	Sub Division	Particle Size
BOULDERS		>200 mm
COBBLES		63 to 200 mm
GRAVEL	Coarse	20 to 63 mm
	Medium	6 to 20 mm
	Fine	2 to 6 mm
SAND	Coarse	0.6 to 2 mm
	Medium	0.2 to 0.6 mm
	Fine	0.075 to 0.2mm
SILT		0.002 to 0.075 mm
CLAY		<0.002 mm

PLASTICITY PROPERTIES



USCS SYMBOLS

Major Divisions		Symbol	Description
COARSE GRAINED SOILS More than 50% by dry mass less than 63mm is greater than 0.075mm	More than 50% of coarse grains are >2.mm	GW	Well graded gravel and gravel-sand mixtures, little or no fines.
		GP	Poorly graded gravel and gravel-sand mixtures, little or no fines.
		GM	Silty gravel, gravel-sand-silt mixtures.
		GC	Clayey gravel, gravel-sand-clay mixtures.
	More than 50% of coarse grains are <2 mm	SW	Well graded sand and gravelly sand, little or no fines.
		SP	Poorly graded sand and gravelly sand, little or no fines.
		SM	Silty sand, sand-silt mixtures.
		SC	Clayey sand, sandy-clay mixtures.
FINE GRAINED SOILS More than 50% by dry mass less than 63mm is less than 0.075mm	Liquid Limit less < 50%	ML	Inorganic silts of low plasticity, very fine sands, rock flour, silty or clayey fine sands.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
		OL	Organic silts and organic silty clays of low plasticity.
	Liquid Limit > than 50%	MH	Inorganic silts of high plasticity.
		CH	Inorganic clays of high plasticity.
		OH	Organic clays of medium to high plasticity.
		PT	Peat muck and other highly organic soils.

MOISTURE CONDITION

Symbol	Term	Description
D	Dry	Sands and gravels are free flowing. Clays & Silts may be brittle or friable and powdery.
M	Moist	Soils are darker than in the dry condition & may feel cool. Sands and gravels tend to cohere.
W	Wet	Soils exude free water. Sands and gravels tend to cohere.

Moisture content of cohesive soils may also be described in relation to plastic limit (WP) or liquid limit (WL) [» much greater than, > greater than, < less than, « much less than].

CONSISTENCY

Symbol	Term	Undrained Shear Strength
VS	Very Soft	0. to 12 kPa
S	Soft	12 to 25 kPa
F	Firm	25 to 50 kPa
St	Stiff	50 to 100 kPa
VSt	Very Stiff	100 to 200 kPa
H	Hard	Above 200 kPa

DENSITY

Symbol	Term	Density Index %	SPT "N" #
VL	Very Loose	< 15	0 to 4
L	Loose	15 to 35	4 to 10
MD	Medium Density	35 to 65	10 to 30
D	Dense	65 to 85	30 to 50
VD	Very Dense	Above 85	Above 50

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.
SPT correlations are not stated in AS1726 – 1993, and may be subject to corrections for overburden pressure and equipment type.

MINOR COMPONENTS

Term	Assessment Guide	Proportion by Mass
Trace	Presence just detectable by feel or eye but soil properties little or no different to general properties of primary component	Coarse grained soils: ≤ 5% Fine grained soil: ≤15%
Some	Presence easily detectable by feel or eye but soil properties little or no different to general properties of primary component	Coarse grained soils: 5 - 12% Fine grained soil: 15 - 30%

TERMS FOR ROCK MATERIAL STRENGTH AND WEATHERING

CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS1726 – 1993, (Amdt1 – 1994 and Amdt2 – 1994), Appendix A. Material properties are assessed in the field by visual/ tactile methods.

STRENGTH

Symbol	Term	Point Load Index, $Is_{(50)}$ (MPa) #	Field Guide
EL	Extremely Low	< 0.03	Easily remoulded by hand to a material with soil properties.
VL	Very Low	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30 mm can be broken by finger pressure.
L	Low	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
H	High	1 to 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken with pick with a single firm blow; rock rings under hammer.
VH	Very High	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

 # Rock Strength Test Results

▼ Point Load Strength Index, $Is_{(50)}$, Axial test (MPa)

◀ Point Load Strength Index, $Is_{(50)}$, Diametral test (MPa)

Relationship between rock strength test result ($Is_{(50)}$) and unconfined compressive strength (UCS) will vary with rock type and strength, and should be determined on a site-specific basis. UCS is typically 10 to 30 x $Is_{(50)}$, but can be as low as 5 MPa.

ROCK MATERIAL WEATHERING

Symbol		Term	Field Guide
RS		Residual Soil	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
EW		Extremely Weathered	Rock is weathered to such an extent that it has soil properties - i.e. it either disintegrates or can be remoulded, in water.
DW	HW	Distinctly Weathered	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores. In some environments it is convenient to subdivide into Highly Weathered and Moderately Weathered, with the degree of alteration typically less for MW.
	MW		
SW		Slightly Weathered	Rock slightly discoloured but shows little or no change of strength relative to fresh rock.
FR		Fresh	Rock shows no sign of decomposition or staining.

ABBREVIATIONS AND DESCRIPTIONS FOR ROCK MATERIAL AND DEFECTS

CLASSIFICATION AND INFERRED STRATIGRAPHY

Rock is broadly classified and described in Borehole Logs using the preferred method given in AS1726 – 1993, (Amdt1 – 1994 and Amdt2 – 1994), Appendix A. Material properties are assessed in the field by visual/ tactile methods.

ROCK MATERIAL DESCRIPTION

Layering

Term	Description
Massive	No layering apparent
Poorly Developed	Layering just visible; little effect on properties
Well Developed	Layering (bedding, foliation, cleavage) distinct; rock breaks more easily parallel to layering

Structure

Term	Spacing (mm)
Thinly laminated	<6
Laminated	6 – 20
Very thinly bedded	20 – 60
Thinly bedded	60 – 200
Medium bedded	200 – 600
Thickly bedded	600 – 2,000
Very thickly bedded	> 2,000

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT TYPES

Defect Type	Abbr.	Description
Joint	JT	Surface of a fracture or parting, formed without displacement, across which the rock has little or no tensile strength. May be closed or filled by air, water or soil or rock substance, which acts as cement.
Bedding Parting	BP	Surface of fracture or parting, across which the rock has little or no tensile strength, parallel or sub-parallel to layering/ bedding. Bedding refers to the layering or stratification of a rock, indicating orientation during deposition, resulting in planar anisotropy in the rock material.
Foliation	FL	Repetitive planar structure parallel to the shear direction or perpendicular to the direction of higher pressure, especially in metamorphic rock, e.g. Schistosity (SH) and Gneissosity.
Contact	CO	The surface between two types or ages of rock.
Cleavage	CL	Cleavage planes appear as parallel, closely spaced and planar surfaces resulting from mechanical fracturing of rock through deformation or metamorphism, independent of bedding.
Sheared Seam/ Zone (Fault)	SS/SZ	Seam or zone with roughly parallel almost planar boundaries of rock substance cut by closely spaced (often <50 mm) parallel and usually smooth or slickensided joints or cleavage planes.
Crushed Seam/ Zone (Fault)	CS/CZ	Seam or zone composed of disoriented usually angular fragments of the host rock substance, with roughly parallel near-planar boundaries. The brecciated fragments may be of clay, silt, sand or gravel sizes or mixtures of these.
Decomposed Seam/ Zone	DS/DZ	Seam of soil substance, often with gradational boundaries, formed by weathering of the rock material in places.
Infilled Seam	IS	Seam of soil substance, usually clay or clayey, with very distinct roughly parallel boundaries, formed by soil migrating into joint or open cavity.
Schistocity	SH	The foliation in schist or other coarse grained crystalline rock due to the parallel arrangement of platy or prismatic mineral grains, such as mica.
Vein	VN	Distinct sheet-like body of minerals crystallised within rock through typically open-space filling or crack-seal growth.

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT SHAPE AND ROUGHNESS

Shape	Abbr.	Description	Roughness	Abbr.	Description
Planar	Pl	Consistent orientation	Polished	Pol	Shiny smooth surface
Curved	Cu	Gradual change in orientation	Slickensided	SL	Grooved or striated surface, usually polished
Undulating	Un	Wavy surface	Smooth	S	Smooth to touch. Few or no surface irregularities
Stepped	St	One or more well defined steps	Rough	RF	Many small surface irregularities (amplitude generally <1mm). Feels like fine to coarse sandpaper
Irregular	Ir	Many sharp changes in orientation	Very Rough	VR	Many large surface irregularities, amplitude generally >1mm. Feels like very coarse sandpaper

Orientation: **Vertical Boreholes –** The dip (inclination from horizontal) of the defect.
Inclined Boreholes – The inclination is measured as the acute angle to the core axis.

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT COATING

Coating	Abbr.	Description
Clean	CN	No visible coating or infilling
Stain	SN	No visible coating but surfaces are discoloured by staining, often limonite (orange-brown)
Veneer	VNR	A visible coating of soil or mineral substance, usually too thin to measure (< 1 mm); may be patchy

DEFECT APERTURE

Aperture	Abbr.	Description
Closed	CL	Closed.
Open	O	Without any infill material.
Infilled	-	Soil or rock i.e. clay, talc, pyrite, quartz, etc.

Appendix I – Field Data Sheets

WATER SAMPLING FIELD SHEET

eiaustralia

Site Address: The Hills Bowling Club, Bowkham Hills	Job Number: E24782
Client: Arden Group	Date: 14/8/20
Field Staff: LY	Sampling Location ID BH1M
Well Location:	Round No:
MEDIUM ☒Groundwater ☐Surface Water	☐Stormwater ☐Other:
SAMPLING POINT INFO	
Well Installation Date: 3/8/20	Stick up / down (m): -0.1 (+ above ground - below ground)
Initial Well Depth (mBTOC): 8.3	Screen Interval (mBTOC): 2.3-8.3
Previous Sampling Date:	Previous SWL (mBTOC):
PID READINGS	
PID Headspace (ppm):	PID Background (ppm):
PID Breathing Space (ppm):	
PRE PURGE	
Total Well Depth (mBTOC): 8.3	Well Head Condition: Good
SWL (mBTOC): 3.04	Water Column (m): 5.26
PHASE SEPARATED HYDROCARBONS (PSH)	
Depth to PSH (mBTOC):	PSH Visually Confirmed (Bailer):
PSH Thickness (mm):	
PURGE AND SAMPLE	
Sampling Method ☒Bladder ☐Peristaltic ☐Submersible ☐Other:	
Depth of Pump Inlet (mBTOC): 7.9	Fill Timer: 5
Pump Pressure Regulator (psi): 45	Discharge Timer: 10
Weather Conditions: Fine	Cycle: CPM 4
Pump on time: 10:45	Pump off time:
WATER QUALITY PARAMETERS	
Probe Make and Model:	Bump Test Date and Time:

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (µS/cm)	Redox (mV)	DO (mg/L)	pH (units)	Comments (colour, turbidity, odour, sheen etc.)
10:48	0.5		22.38	1626	11.5	0.0	6.45	light grey, low, no, no
10:49			22.38	1615	11.4	0.0	6.46	
10:50	1.0		22.38	1610	11.3	0.0	6.46	
10:51			22.37	1598	11.2	0.0	6.46	
10:52	1.5		22.37	1593	11.0	0.0	6.46	
Stabilisation range: 3 consecutive readings			±0.2°C	±3%	±20mV	±10%	±0.2	

OTHER COMMENTS/OBSERVATIONS:

SIGNATURE:

WATER SAMPLING FIELD SHEET

eiaustralia

Site Address: The Hills Bowling Club, Baulkham Hills	Job Number: E24782
Client: Arden Group	Date: 14/8/20
Field Staff: LY	Sampling Location ID: BH2M
Well Location:	Round No:

MEDIUM ☒Groundwater ☐Surface Water ☐Stormwater ☐Other:

SAMPLING POINT INFO

Well Installation Date: 4/8/20	Stick up / down (m): -0.1 (+ above ground - below ground)
Initial Well Depth (mBTOC): 11.4	Screen Interval (mBTOC): 5.4-11.4
Previous Sampling Date:	Previous SWL (mBTOC):

PID READINGS

PID Headspace (ppm):	PID Background (ppm):
PID Breathing Space (ppm):	

PRE PURGE

Total Well Depth (mBTOC): 11.4	Well Head Condition: Good
SWL (mBTOC): 5.15	Water Column (m): 6.25

PHASE SEPARATED HYDROCARBONS (PSH)

Depth to PSH (mBTOC):	PSH Visually Confirmed (Bailer):
PSH Thickness (mm):	

PURGE AND SAMPLE

Sampling Method ☒Bladder ☐Peristaltic ☐Submersible ☐Other:

Depth of Pump Inlet (mBTOC): 10.0	Fill Timer: 5
Pump Pressure Regulator (psi): 50	Discharge Timer: 10
Weather Conditions: Fine	Cycle: CPM4
Pump on time: 10:25	Pump off time: 10:40

WATER QUALITY PARAMETERS

Probe Make and Model: | Bump Test Date and Time:

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (µS/cm)	Redox (mV)	DO (mg/L)	pH (units)	Comments (colour, turbidity, odour, sheen etc.)
10:30	0.5		21.84	1867	-22.1	0	7.5	Grey, medium, no, no.
10:31			21.84	1901	-18.1	0	7.5	
10:32	1.0		21.84	1908	-18.0	0	7.5	
10:33			21.84	1918	-18.0	0	7.5	
10:34	1.5		21.84	1920	-18.0	0	7.5	
Stabilisation range: 3 consecutive readings			±0.2°C	±3%	±20mV	±10%	±0.2	

OTHER COMMENTS/OBSERVATIONS: GWQD1, GWQT1.

SIGNATURE:

WATER SAMPLING FIELD SHEET

eiaustralia

Site Address:	The Hills Bowling Club, Baulkham Hills	Job Number:	E24782
Client:	Arden Group	Date:	14/8/20
Field Staff:	LY	Sampling Location ID	BH4M
Well Location:		Round No:	

MEDIUM ☒Groundwater ☐Surface Water ☐Stormwater ☐Other:

SAMPLING POINT INFO

Well Installation Date:	4/8/20	Stick up / down (m):	-0.1 (+ above ground - below ground)
Initial Well Depth (mBTOC):	7.4	Screen Interval (mBTOC):	4.4-7.4
Previous Sampling Date:		Previous SWL (mBTOC):	

PID READINGS

PID Headspace (ppm):		PID Background (ppm):	
PID Breathing Space (ppm):			

PRE PURGE

Total Well Depth (mBTOC):	7.4	Well Head Condition:	Good
SWL (mBTOC):	4.87	Water Column (m):	2.53

PHASE SEPARATED HYDROCARBONS (PSH)

Depth to PSH (mBTOC):		PSH Visually Confirmed (Bailer):	
PSH Thickness (mm):			

PURGE AND SAMPLE

Sampling Method ☒Bladder ☐Peristaltic ☐Submersible ☐Other:

Depth of Pump Inlet (mBTOC):	6.8	Fill Timer:	5
Pump Pressure Regulator (psi):	45	Discharge Timer:	10
Weather Conditions:	Fine	Cycle:	CPM4
Pump on time:	11:00	Pump off time:	11:15

WATER QUALITY PARAMETERS

Probe Make and Model:		Bump Test Date and Time:	

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (µS/cm)	Redox (mV)	DO (mg/L)	pH (units)	Comments (colour, turbidity, odour, sheen etc.)
11:05	0.5		22.51	813	-1.8	0.18	6.75	Light grey, low, no, no
11:06			22.51	808	-1.7	0.16	6.75	
11:07	1.0		22.50	805	-1.6	0.16	6.75	
11:08			22.50	804	-1.5	0.15	6.75	
11:09	1.5		22.50	801	-1.3	0.15	6.75	
Stabilisation range: 3 consecutive readings			**±0.2°C**	**±3%**	**±20mV**	**±10%**	**±0.2**	

OTHER COMMENTS/OBSERVATIONS:

SIGNATURE:

Appendix J – Chain Of Custody and Sample Receipt Forms

E-MAILED 7/8 @ 11.41

Sheet 1 of 4

Site: The Hills Bowling Club, Baulkham Hills.

Project No: E24782

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS	HOLD			TCLP HM [B] / PAH
BHM_0.2-0.3		J, ZLB	5/8/20			X														X			
BHM_0.7-0.8	1	↓	↓	↓		↓		X												↓			
BHM_1.2-1.3		↓																		X			
BHM_1.6-1.7		J																		↓			
BH2M_0.1-0.2	2	J, ZLB						X															
BH2M_0.6-0.7		↓																		X			
BH2M_1.1-1.2																							
BH2M_1.6-1.7																							
BH2M_2.1-2.2																							
BH2M_2.6-2.7																							
BH2M_3.2-3.3		↓																		↓			
BH2M_4.5-4.6	3	J	↓	↓		↓			X														

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / Turbidity NTU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

SGS EHS Sydney
SE209734

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (SGS):
Print: Ian Watts	Print:
Signature:	Signature:
Date: 7/8/20	Date: 6/8/20 @ 4:10

Sampler's Comments: Please cc Ben Aggar the report.

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

Sheet 2 of 4

Site: As first Page

Project No: E24782

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS	HOLD	OCP/OP/PCB		TCLP HM [B] / PAH
BH3_0.2-0.3	4	J, 2LB	5/8/20			X		X															
BH3_0.6-0.7		↓	↓			↓														X			
BH3_1.1-1.2																				↓			
BH3_1.6-1.7																							
BH3_2.1-2.2		↓																					
BH3_2.6-2.7		J																					
BH3_3.7-3.8		J																					
BH4_0.1-0.2		J, 2LB																					
BH4_0.5-0.6	5	↓						X															
BH4_1.5-1.6		J																		X			
BH4_5.0-5.5	6	J							X												X		
BH5_0.1-0.2	7	J, 2LB	↓			↓		X															

Container Type:
J= solvent washed, acid rinsed, Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

eiaustralia
Contamination | Remediation | Geotechnical

Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC March 2018 FORM v.4 - SGS

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Name (EI):	Received by (SGS):
Print: Ian Watts	Print:
Signature:	Signature:
Date: 7/8/20	Date: 6/8/20 @ 4:10

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

Report with EI Waste Classification Table ☐

Sampler's Comments: As first Page

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / Turbidity NTU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND
☒ Standard
☐ 24 Hours
☐ 48 Hours
☐ 72 Hours
☐ Other_____

Sheet 3 of 4

Site: As first Page

Project No: E24782

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS ·	PFAS	HOLD			TCLP HM [B] / PAH
BH5_0.7-0.8	8	J	5/8/20			X			X														
BH6_0.1-0.2		J, ZLB																		X			
BH6_0.6-0.7	9							X										·					
BH6_0.9-1.0																				X			
BH7_0.1-0.2		J, ZLB																					
BH7_0.6-0.7																							
BH7_1.0-1.1	10							X															
BH7_1.5-1.6	11	J							X									·					
BH8_0.1-0.2	12	J, ZLB						X															
BH8_0.5-0.6																				X			
BH9_0.1-0.2	13	J, ZLB						X															
BH9_0.6-0.7																				X			

Container Type:
J= solvent washed, acid rinsed, Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / Turbidity NTU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND
- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other____

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

· Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (SGS):
Print: Ian watts	Print:
Signature:	Signature:
Date: 7/8/20	Date: 6/8/20 @ 4:10

Sampler's Comments: As first Page

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

Sheet 4 of 4

Site: A3 first Page

Project No: E24782

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM[A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM[A] /TRH/BTEX/PAHs	HM[A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS	HOLD.			TCLP HM[B] / PAH
QD1	14	J	5/8/20			Y				X												
QR1	15	S,P,VC	↓		X					X												
QRB1	16	S,P,VC	↓		X														X			
QTB1	17	Lab	Prepared.			X					X											
QTS1	18					X					X											

Comments

HM[A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM[B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / Turbidity NTU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (SGS):
Print: Ian Watts.	Print: Emily
Signature:	Signature:
Date: 7/8/20	Date: 8/8/20 @ 4:10

Sampler's Comments: A3 first Page

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

Yin, Emily (Sydney)

From: Benjamin Aggar - EIAustralia <benjamin.aggar@eiaustralia.com.au>
Sent: Monday, 10 August 2020 9:14 AM
To: AU.SampleReceipt.Sydney (Sydney); AU.Environmental.Sydney (Sydney)
Cc: Ian Watts - EIAustralia; Linda Xiao - EIAustralia; Lance Chen - EIAustralia
Subject: [EXTERNAL] RE: SGS Sample Receipt Advice (Ref: E24782 The Hills Bowling Club, Baulkham, Lab Ref: SE209734)

*** WARNING: this message is from an EXTERNAL SENDER. Please be cautious, particularly with links and attachments. ***

Hi SGS,

Please add VOCs to sample BH4_5.0-5.5

Kind regards,

Ben Aggar
Environmental Engineer
Project Coordinator

T (02) 9516 0722 M 0435 759 966
E benjamin.aggar@eiaustralia.com.au

Suite 6.01, 55 Miller Street
Pyrmont, NSW 2009

www.eiaustralia.com.au

eiaustralia
Practical Solutions for Built Environments

FINANCIAL REVIEW CLIENT CHOICE AWARDS 2019 WINNER beaton

Environmental | Geotechnical | Structural | Civil | Hazardous Materials

---

From: AU.Samplereceipt.Sydney@SGS.com [mailto:AU.Samplereceipt.Sydney@SGS.com]
Sent: Saturday, 8 August 2020 12:02 PM
To: Ian Watts - EIAustralia; Benjamin Aggar - EIAustralia; Laboratory Results - EIAustralia
Subject: SGS Sample Receipt Advice (Ref: E24782 The Hills Bowling Club, Baulkham, Lab Ref: SE209734)

Dear Ian Watts,

Please be advised we have received samples for analysis as detailed in the attached documentation.

Covid-19 update: SGS Australia is open, with our Business Service Continuity Plans being put in place to ensure your project can be delivered as normal, please see the following links further details:
19 March 2020 Letter.
30 March 2020 Update.

Best regards,
SGS Alexandria Sample Administration Team
SGS Australia Pty Ltd

SAMPLE RECEIPT ADVICE

SE209734

CLIENT DETAILS

Contact	Ian Watts
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Ian.watts@eiaustralia.com.au
Project	**E24782 The Hills Bowling Club, Baulkham**
Order Number	**E24782**
Samples	18

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Thu 6/8/2020
Report Due	Fri 14/8/2020
SGS Reference	**SE209734**

SUBMISSION DETAILS

This is to confirm that 18 samples were received on Thursday 6/8/2020. Results are expected to be ready by COB Friday 14/8/2020. Please quote SGS reference SE209734 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	16 Sol, 2 Water
Date documentation received	7/8/2020@11:21pm	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	14°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

23 samples have been placed on hold as no tests have been assigned for them by the client. These samples will not be processed.

SAMPLE RECEIPT ADVICE

SE209734

CLIENT DETAILS

Client EI AUSTRALIA

Project E24782 The Hills Bowling Club, Baulkham

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Recoverable Elements in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	BH1M_0.7-0.8	29	14	26	11	7	10	11	7
002	BH2M_0.1-0.2	29	14	26	11	7	10	11	7
003	BH2M_4.5-4.6	-	-	26	-	7	10	11	7
004	BH3_0.2-0.3	29	14	26	11	7	10	11	7
005	BH4_0.5-0.6	29	14	26	11	7	10	11	7
006	BH4_5.0-5.5	29	14	26	11	7	10	11	7
007	BH5_0.1-0.2	29	14	26	11	7	10	11	7
008	BH5_0.7-0.8	-	-	26	-	7	10	11	7
009	BH6_0.6-0.7	29	14	26	11	7	10	11	7
010	BH7_1.0-1.1	29	14	26	11	7	10	11	7
011	BH7_1.5-1.6	-	-	26	-	7	10	11	7
012	BH8_0.1-0.2	29	14	26	11	7	10	11	7
013	BH9_0.1-0.2	29	14	26	11	7	10	11	7
014	QD1	-	-	-	-	7	10	11	7
017	QTB1	-	-	-	-	-	-	11	-
018	QTS1	-	-	-	-	-	-	11	-

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE209734

CLIENT DETAILS

Client EI AUSTRALIA

Project E24782 The Hills Bowling Club, Baulkham

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content
001	BH1M_0.7-0.8	2	1	1
002	BH2M_0.1-0.2	2	1	1
003	BH2M_4.5-4.6	-	1	1
004	BH3_0.2-0.3	2	1	1
005	BH4_0.5-0.6	2	1	1
006	BH4_5.0-5.5	-	1	1
007	BH5_0.1-0.2	2	1	1
008	BH5_0.7-0.8	-	1	1
009	BH6_0.6-0.7	2	1	1
010	BH7_1.0-1.1	2	1	1
011	BH7_1.5-1.6	-	1	1
012	BH8_0.1-0.2	2	1	1
013	BH9_0.1-0.2	2	1	1
014	QD1	-	1	1
017	QTB1	-	-	1

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE209734

CLIENT DETAILS

Client EI AUSTRALIA

Project E24782 The Hills Bowling Club, Baulkham

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
015	QR1	1	7	9	11	7

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

Please book this in

Regards,

Paul Harley
Environment, Health & Safety
Client Manager
Phone: +61 (0)2 8594 0400
Direct: +61 (0)2 8594 0449
Mobile: +61 (0)4 0797 2867
(Please note my new working hours of Mon-Fri 6:00am-2:00pm)

-----Original Message-----
From: Benjamin Aggar - EIAustralia <benjamin.aggar@eiaustralia.com.au>
Sent: Thursday, 20 August 2020 11:10 AM
To: AU.Environmental.Sydney (Sydney) <AU.Environmental.Sydney@sgs.com>; AU.SampleReceipt.Sydney (Sydney) <AU.SampleReceipt.Sydney@sgs.com>
Cc: Ian Watts - EIAustralia <ian.watts@eiaustralia.com.au>; Lance Chen - EIAustralia <lance.chen@eiaustralia.com.au>; Lan Ye - EIAustralia <lan.ye@eiaustralia.com.au>
Subject: [EXTERNAL] RE: Report Job SE209734, your reference E24782 The Hills Bowling Club, Baulkham, order number E24782

Hi SGS,

Please complete the following:
- TCLP for B(a)P in sample BH1M_0.7-0.8 and BH7_1.0-1.1 on standard TAT
- TCLP for lead in sample BH7_1.0-1.1 and BH8_0.1-0.2 on standard TAT
- Send a photo of the 8x2x2mm fibrous rope material

Kind regards,

Ben Aggar
Environmental Engineer
Project Coordinator

T (02) 9516 0722 M 0435 759 966
E benjamin.aggar@eiaustralia.com.au

Suite 6.01, 55 Miller Street
Pyrmont, NSW 2009

www.eiaustralia.com.au

Environmental | Geotechnical | Structural | Civil | Hazardous Materials

EI Australia is a proud member of the Australian Contaminated Land Consultants Association and the Australian Geomechanics Society.

-----Original Message-----
From: AU.Environmental.Sydney@SGS.com [mailto:AU.Environmental.Sydney@SGS.com]
Sent: Friday, 14 August 2020 7:19 PM
To: Benjamin Aggar - EIAustralia; Ian Watts - EIAustralia; Laboratory Results - EIAustralia
Subject: Report Job SE209734, your reference E24782 The Hills Bowling Club, Baulkham, order number E24782

Dear valued customer,

Please find attached the report for SGS job SE209734, your reference E24782 The Hills Bowling Club, Baulkham, order number E24782.

-IMPORTANT INFORMATION ABOUT YOUR REPORT- To align with NEPM 1999 (2013), SGS Environmental has changed the way Silica Gel Clean-up of TRH extracts is reported. TPH Silica Gel has now become TRH – Silica. NEPM 1999(2013) seeks to clarify TRH and TPH in Schedule B3, 10.2.7.

If you have any questions or concerns, please don't hesitate to contact your SGS Client Services representative.

Regards,
Jennifer Munar

SAMPLE RECEIPT ADVICE

SE209734A

CLIENT DETAILS

Contact	Ian Watts
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Ian.watts@eiaustralia.com.au
Project	**E24782 The Hills Bowling Club, Baulkham**
Order Number	**E24782**
Samples	18

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Thu 20/8/2020
Report Due	Thu 27/8/2020
SGS Reference	**SE209734A**

SUBMISSION DETAILS

This is to confirm that 18 samples were received on Thursday 20/8/2020. Results are expected to be ready by COB Thursday 27/8/2020. Please quote SGS reference SE209734A when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	3 Soil
Date documentation received	20/8/2020@11:10am	Type of documentation received	Email
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	14°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

SAMPLE RECEIPT ADVICE

SE209734A

CLIENT DETAILS

Client EI AUSTRALIA

Project E24782 The Hills Bowling Club, Baulkham

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in TCLP Extract by ICPOES	PAH (Polynuclear Aromatic Hydrocarbons) in TCLP	TCLP (Toxicity Characteristic Leaching	TCLP (Toxicity Characteristic Leaching
001	BH1M_0.7-0.8	-	4	-	6
010	BH7_1.0-1.1	1	4	-	6
012	BH8_0.1-0.2	1	-	6	-

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

248695

Sheet 1 of 1

Site: The Hills Bowling Club, Baulkham Hills

Project No: E24782

Laboratory: Envirolab Services
12 Ashley Street,
CHATSWOOD NSW 2067
P: 02 9910 6200

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS				TCLP HM [B] / PAH
QT1	1	J	05/08/20			X				X													

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / Turbidity NTU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (Envirolab)
Print: Ben Aggar	Print: Tanya Doherty
Signature:	Signature:
Date: 07/08/20	Date: 11/08/2020 15:12

Sampler's Comments:
Please cc Ben Aggar the report

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical

Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC March 2018 FORM v.4 - SGS

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	EI Australia
Attention	Ben Aggar, Lance Chen

Sample Login Details

Your reference	E24782, The Hills Bowling Club, Baulkham Hills
Envirolab Reference	248695
Date Sample Received	11/08/2020
Date Instructions Received	11/08/2020
Date Results Expected to be Reported	18/08/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	16.3
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	Acid Extractable metalsin soil
QT1	✓	✓	✓

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.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Sheet 1 of 1

Site: The Hills Bowling Club, Baulkham Hills

Project No: E24782

Laboratory: **SGS Australia**
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM Δ /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM Δ /TRH/BTEX/PAHs	HM Δ /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS	Phenols			TCLP HM B / PAH
BH1M	1	S,P x2,VC x2	14/8/20		X				X			X								X			
BH2M	2	↓	↓		↓				↓			↓								↓			
BH4M	3								↓			↓											
GWQD1	4				↓					X													
GWQTS1	5	VC	Lab prepared			X					X												
GWQTB1	6	VC				X					X												
GWQR1	7	S,VC x2	14/8/20		X					X													

SGS EHS Sydney COC
SE209989

Comments

HM Δ
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM B
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / Turbidity NTU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (SGS):
Print: Lan Ye	Print: George Zhi
Signature:	Signature:
Date: 14/8/20	Date: 14/8/2023:20

Sampler's Comments:
Please filter the plastic bottle for metal test.
Please send GWQT1 to Envirolab

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

SAMPLE RECEIPT ADVICE

SE209989

CLIENT DETAILS

Contact	Lan Ye
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Lan.ye@eiaustralia.com.au
Project	**E24782 The Hills Bowling Club, Baulkhan**
Order Number	**E24782**
Samples	7

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Fri 14/8/2020
Report Due	Fri 21/8/2020
SGS Reference	**SE209989**

SUBMISSION DETAILS

This is to confirm that 7 samples were received on Friday 14/8/2020. Results are expected to be ready by COB Friday 21/8/2020. Please quote SGS reference SE209989 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	2 Soil, 5 Water
Date documentation received	14/8/2020	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	14°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

SAMPLE RECEIPT ADVICE

SE209989

CLIENT DETAILS

Client EI AUSTRALIA

Project E24782 The Hills Bowling Club, Baulkhan

SUMMARY OF ANALYSIS

No.	Sample ID	Moisture Content	PAH (Polynuclear Aromatic Hydrocarbons) in Water	TRH (Total Recoverable Hydrocarbons) in Water	VOC's in Soil	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	BH1M	-	22	9	-	78	7
002	BH2M	-	22	9	-	78	7
003	BH4M	-	22	9	-	78	7
004	GWQD1	-	-	9	-	11	7
005	GWQTS1	1	-	-	11	-	-
006	GWQTB1	1	-	-	11	-	-
007	GWQR1	-	-	9	-	11	7

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE209989

CLIENT DETAILS

Client EI AUSTRALIA

Project E24782 The Hills Bowling Club, Baulkhan

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	Total Phenolics in Water	Trace Metals (Dissolved) in Water by ICPMS
001	BH1M	1	1	7
002	BH2M	1	1	7
003	BH4M	1	1	7
004	GWQD1	1	-	7
007	GWQR1	1	-	7

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

Sheet 1 of 1

Site: The Hills Bowling Club, Baulkham Hills

Project No: E24782

Laboratory: Envirolab Services
12 Ashley Street,
CHATSWOOD NSW 2067
P: 02 9910 6200

	Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS				TCLP HM [B] / PAH
(1)	GWQT1		S,Px2,VCx2	14/8/20		X					X												

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

Job No: 249161

Date Received: 17/08/2020

Time Received: 15.50

Received By: RL

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / Turbidity NTU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [x] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (Envirolab)
Print: Lan Yc	Print: ELS Sydney RL
Signature:	Signature:
Date: 17/8/20	Date: 17/08/2020 15:50

Sampler's Comments:
Please filter small plastic bottle for metal test.

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination · Remediation · Geotechnical
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

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	EI Australia
Attention	Lan Ye

Sample Login Details

Your reference	E24782, Baulkham Hills
Envirolab Reference	249161
Date Sample Received	17/08/2020
Date Instructions Received	17/08/2020
Date Results Expected to be Reported	24/08/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	13.1
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 Water	svTRH (C10-C40) in Water	HM in water - dissolved
GWQT1	✓	✓	✓

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.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Appendix K – Laboratory Analytical Reports

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Ian Watts
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Ian.watts@eiaustralia.com.au
Project	**E24782 The Hills Bowling Club, Baulkham**
Order Number	**E24782**
Samples	18

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE209734 R0**
Date Received	6/8/2020
Date Reported	14/8/2020

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

Sample #10: Asbestos found in approx 8x2x2mm fibrous rope material.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Bennet LO
Senior Organic Chemist/Metals Chemist

Dong LIANG
Metals/Inorganics Team Leader

Kamrul AHSAN
Senior Chemist

Ly Kim HA
Organic Section Head

Ravee SIVASUBRAMANIAM
Hygiene Team Leader

VOC's in Soil [AN433] Tested: 10/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH2M_4.5-4.6 SOIL - 5/8/2020 SE209734.003	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	-	-	-	-
Chloromethane	mg/kg	1	-	-	-	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	-	-	-	-
Bromomethane	mg/kg	1	-	-	-	-	-
Chloroethane	mg/kg	1	-	-	-	-	-
Trichlorofluoromethane	mg/kg	1	-	-	-	-	-
Acetone (2-propanone)	mg/kg	10	-	-	-	-	-
Iodomethane	mg/kg	5	-	-	-	-	-
1,1-dichloroethene	mg/kg	0.1	-	-	-	-	-
Acrylonitrile	mg/kg	0.1	-	-	-	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	-	-	-	-
Allyl chloride	mg/kg	0.1	-	-	-	-	-
Carbon disulfide	mg/kg	0.5	-	-	-	-	-
trans-1,2-dichloroethene	mg/kg	0.1	-	-	-	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	-	-	-	-
1,1-dichloroethane	mg/kg	0.1	-	-	-	-	-
Vinyl acetate	mg/kg	10	-	-	-	-	-
MEK (2-butanone)	mg/kg	10	-	-	-	-	-
cis-1,2-dichloroethene	mg/kg	0.1	-	-	-	-	-
Bromochloromethane	mg/kg	0.1	-	-	-	-	-
Chloroform	mg/kg	0.1	-	-	-	-	-
2,2-dichloropropane	mg/kg	0.1	-	-	-	-	-
1,2-dichloroethane	mg/kg	0.1	-	-	-	-	-
1,1,1-trichloroethane	mg/kg	0.1	-	-	-	-	-
1,1-dichloropropene	mg/kg	0.1	-	-	-	-	-
Carbon tetrachloride	mg/kg	0.1	-	-	-	-	-
Dibromomethane	mg/kg	0.1	-	-	-	-	-
1,2-dichloropropane	mg/kg	0.1	-	-	-	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	-	-	-	-
2-nitropropane	mg/kg	10	-	-	-	-	-
Bromodichloromethane	mg/kg	0.1	-	-	-	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	-	-	-	-
cis-1,3-dichloropropene	mg/kg	0.1	-	-	-	-	-
trans-1,3-dichloropropene	mg/kg	0.1	-	-	-	-	-
1,1,2-trichloroethane	mg/kg	0.1	-	-	-	-	-
1,3-dichloropropane	mg/kg	0.1	-	-	-	-	-
Chlorodibromomethane	mg/kg	0.1	-	-	-	-	-
2-hexanone (MBK)	mg/kg	5	-	-	-	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	-	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	-	-	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	-	-	-	-
Chlorobenzene	mg/kg	0.1	-	-	-	-	-
Bromoform	mg/kg	0.1	-	-	-	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	-	-	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	-	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	-	-	-	-
1,2,3-trichloropropane	mg/kg	0.1	-	-	-	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	-	-	-	-

VOC's in Soil [AN433] Tested: 10/8/2020 (continued)

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH2M_4.5-4.6 SOIL - 5/8/2020 SE209734.003	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005
Isopropylbenzene (Cumene)	mg/kg	0.1	-	-	-	-	-
Bromobenzene	mg/kg	0.1	-	-	-	-	-
n-propylbenzene	mg/kg	0.1	-	-	-	-	-
2-chlorotoluene	mg/kg	0.1	-	-	-	-	-
4-chlorotoluene	mg/kg	0.1	-	-	-	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	-	-	-	-
tert-butylbenzene	mg/kg	0.1	-	-	-	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	-	-	-	-
sec-butylbenzene	mg/kg	0.1	-	-	-	-	-
1,3-dichlorobenzene	mg/kg	0.1	-	-	-	-	-
1,4-dichlorobenzene	mg/kg	0.1	-	-	-	-	-
p-isopropyltoluene	mg/kg	0.1	-	-	-	-	-
1,2-dichlorobenzene	mg/kg	0.1	-	-	-	-	-
n-butylbenzene	mg/kg	0.1	-	-	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	-	-	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	-	-	-	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	-	-	-	-
Total VOC*	mg/kg	24	-	-	-	-	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	-	-	-	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-	-	-	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-	-	-	-

VOC's in Soil [AN433] Tested: 10/8/2020 (continued)

PARAMETER	UOM	LOR	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH5_0.7-0.8 SOIL - 5/8/2020 SE209734.008	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1	-	-	-	-
Chloromethane	mg/kg	1	<1	-	-	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1	-	-	-	-
Bromomethane	mg/kg	1	<1	-	-	-	-
Chloroethane	mg/kg	1	<1	-	-	-	-
Trichlorofluoromethane	mg/kg	1	<1	-	-	-	-
Acetone (2-propanone)	mg/kg	10	<10	-	-	-	-
Iodomethane	mg/kg	5	<5	-	-	-	-
1,1-dichloroethene	mg/kg	0.1	<0.1	-	-	-	-
Acrylonitrile	mg/kg	0.1	<0.1	-	-	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5	-	-	-	-
Allyl chloride	mg/kg	0.1	<0.1	-	-	-	-
Carbon disulfide	mg/kg	0.5	<0.5	-	-	-	-
trans-1,2-dichloroethene	mg/kg	0.1	<0.1	-	-	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1	-	-	-	-
1,1-dichloroethane	mg/kg	0.1	<0.1	-	-	-	-
Vinyl acetate	mg/kg	10	<10	-	-	-	-
MEK (2-butanone)	mg/kg	10	<10	-	-	-	-
cis-1,2-dichloroethene	mg/kg	0.1	<0.1	-	-	-	-
Bromochloromethane	mg/kg	0.1	<0.1	-	-	-	-
Chloroform	mg/kg	0.1	<0.1	-	-	-	-
2,2-dichloropropane	mg/kg	0.1	<0.1	-	-	-	-
1,2-dichloroethane	mg/kg	0.1	<0.1	-	-	-	-
1,1,1-trichloroethane	mg/kg	0.1	<0.1	-	-	-	-
1,1-dichloropropene	mg/kg	0.1	<0.1	-	-	-	-
Carbon tetrachloride	mg/kg	0.1	<0.1	-	-	-	-
Dibromomethane	mg/kg	0.1	<0.1	-	-	-	-
1,2-dichloropropane	mg/kg	0.1	<0.1	-	-	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.1	-	-	-	-
2-nitropropane	mg/kg	10	<10	-	-	-	-
Bromodichloromethane	mg/kg	0.1	<0.1	-	-	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	<1	-	-	-	-
cis-1,3-dichloropropene	mg/kg	0.1	<0.1	-	-	-	-
trans-1,3-dichloropropene	mg/kg	0.1	<0.1	-	-	-	-
1,1,2-trichloroethane	mg/kg	0.1	<0.1	-	-	-	-
1,3-dichloropropane	mg/kg	0.1	<0.1	-	-	-	-
Chlorodibromomethane	mg/kg	0.1	<0.1	-	-	-	-
2-hexanone (MBK)	mg/kg	5	<5	-	-	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1	-	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1	-	-	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1	-	-	-	-
Chlorobenzene	mg/kg	0.1	<0.1	-	-	-	-
Bromoform	mg/kg	0.1	<0.1	-	-	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	<1	-	-	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	<0.1	-	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1	-	-	-	-
1,2,3-trichloropropane	mg/kg	0.1	<0.1	-	-	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	<1	-	-	-	-

VOC's in Soil [AN433] Tested: 10/8/2020 (continued)

PARAMETER	UOM	LOR	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH5_0.7-0.8 SOIL - 5/8/2020 SE209734.008	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010
Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1	-	-	-	-
Bromobenzene	mg/kg	0.1	<0.1	-	-	-	-
n-propylbenzene	mg/kg	0.1	<0.1	-	-	-	-
2-chlorotoluene	mg/kg	0.1	<0.1	-	-	-	-
4-chlorotoluene	mg/kg	0.1	<0.1	-	-	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	<0.1	-	-	-	-
tert-butylbenzene	mg/kg	0.1	<0.1	-	-	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	<0.1	-	-	-	-
sec-butylbenzene	mg/kg	0.1	<0.1	-	-	-	-
1,3-dichlorobenzene	mg/kg	0.1	<0.1	-	-	-	-
1,4-dichlorobenzene	mg/kg	0.1	<0.1	-	-	-	-
p-isopropyltoluene	mg/kg	0.1	<0.1	-	-	-	-
1,2-dichlorobenzene	mg/kg	0.1	<0.1	-	-	-	-
n-butylbenzene	mg/kg	0.1	<0.1	-	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1	-	-	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	<0.1	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	<0.1	-	-	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	<0.1	-	-	-	-
Total VOC*	mg/kg	24	<24	-	-	-	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	<3.0	-	-	-	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8	-	-	-	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8	-	-	-	-

VOC's in Soil [AN433] Tested: 10/8/2020 (continued)

PARAMETER	UOM	LOR	BH7_1.5-1.6 SOIL - 5/8/2020 SE209734.011	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013	QD1 SOIL - 5/8/2020 SE209734.014	QTB1 SOIL - 5/8/2020 SE209734.017
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	-	-	-	-
Chloromethane	mg/kg	1	-	-	-	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	-	-	-	-
Bromomethane	mg/kg	1	-	-	-	-	-
Chloroethane	mg/kg	1	-	-	-	-	-
Trichlorofluoromethane	mg/kg	1	-	-	-	-	-
Acetone (2-propanone)	mg/kg	10	-	-	-	-	-
Iodomethane	mg/kg	5	-	-	-	-	-
1,1-dichloroethene	mg/kg	0.1	-	-	-	-	-
Acrylonitrile	mg/kg	0.1	-	-	-	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	-	-	-	-
Allyl chloride	mg/kg	0.1	-	-	-	-	-
Carbon disulfide	mg/kg	0.5	-	-	-	-	-
trans-1,2-dichloroethene	mg/kg	0.1	-	-	-	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	-	-	-	-
1,1-dichloroethane	mg/kg	0.1	-	-	-	-	-
Vinyl acetate	mg/kg	10	-	-	-	-	-
MEK (2-butanone)	mg/kg	10	-	-	-	-	-
cis-1,2-dichloroethene	mg/kg	0.1	-	-	-	-	-
Bromochloromethane	mg/kg	0.1	-	-	-	-	-
Chloroform	mg/kg	0.1	-	-	-	-	-
2,2-dichloropropane	mg/kg	0.1	-	-	-	-	-
1,2-dichloroethane	mg/kg	0.1	-	-	-	-	-
1,1,1-trichloroethane	mg/kg	0.1	-	-	-	-	-
1,1-dichloropropene	mg/kg	0.1	-	-	-	-	-
Carbon tetrachloride	mg/kg	0.1	-	-	-	-	-
Dibromomethane	mg/kg	0.1	-	-	-	-	-
1,2-dichloropropane	mg/kg	0.1	-	-	-	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	-	-	-	-
2-nitropropane	mg/kg	10	-	-	-	-	-
Bromodichloromethane	mg/kg	0.1	-	-	-	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	-	-	-	-
cis-1,3-dichloropropene	mg/kg	0.1	-	-	-	-	-
trans-1,3-dichloropropene	mg/kg	0.1	-	-	-	-	-
1,1,2-trichloroethane	mg/kg	0.1	-	-	-	-	-
1,3-dichloropropane	mg/kg	0.1	-	-	-	-	-
Chlorodibromomethane	mg/kg	0.1	-	-	-	-	-
2-hexanone (MBK)	mg/kg	5	-	-	-	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	-	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	-	-	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	-	-	-	-
Chlorobenzene	mg/kg	0.1	-	-	-	-	-
Bromoform	mg/kg	0.1	-	-	-	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	-	-	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	-	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	-	-	-	-
1,2,3-trichloropropane	mg/kg	0.1	-	-	-	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	-	-	-	-

VOC's in Soil [AN433] Tested: 10/8/2020 (continued)

PARAMETER	UOM	LOR	BH7_1.5-1.6 SOIL - 5/8/2020 SE209734.011	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013	QD1 SOIL - 5/8/2020 SE209734.014	QTB1 SOIL - 5/8/2020 SE209734.017
Isopropylbenzene (Cumene)	mg/kg	0.1	-	-	-	-	-
Bromobenzene	mg/kg	0.1	-	-	-	-	-
n-propylbenzene	mg/kg	0.1	-	-	-	-	-
2-chlorotoluene	mg/kg	0.1	-	-	-	-	-
4-chlorotoluene	mg/kg	0.1	-	-	-	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	-	-	-	-
tert-butylbenzene	mg/kg	0.1	-	-	-	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	-	-	-	-
sec-butylbenzene	mg/kg	0.1	-	-	-	-	-
1,3-dichlorobenzene	mg/kg	0.1	-	-	-	-	-
1,4-dichlorobenzene	mg/kg	0.1	-	-	-	-	-
p-isopropyltoluene	mg/kg	0.1	-	-	-	-	-
1,2-dichlorobenzene	mg/kg	0.1	-	-	-	-	-
n-butylbenzene	mg/kg	0.1	-	-	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	-	-	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	-	-	-	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	-	-	-	-
Total VOC*	mg/kg	24	-	-	-	-	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-	-	-	-	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-	-	-	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-	-	-	-	-

VOC's in Soil [AN433] Tested: 10/8/2020 (continued)

PARAMETER	UOM	LOR	QTS1 SOIL - 5/8/2020 SE209734.018
Benzene	mg/kg	0.1	[99%]
Toluene	mg/kg	0.1	[106%]
Ethylbenzene	mg/kg	0.1	[107%]
m/p-xylene	mg/kg	0.2	[108%]
o-xylene	mg/kg	0.1	[110%]
Total Xylenes	mg/kg	0.3	-
Total BTEX	mg/kg	0.6	-
Naphthalene	mg/kg	0.1	-
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-
Chloromethane	mg/kg	1	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-
Bromomethane	mg/kg	1	-
Chloroethane	mg/kg	1	-
Trichlorofluoromethane	mg/kg	1	-
Acetone (2-propanone)	mg/kg	10	-
Iodomethane	mg/kg	5	-
1,1-dichloroethene	mg/kg	0.1	-
Acrylonitrile	mg/kg	0.1	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-
Allyl chloride	mg/kg	0.1	-
Carbon disulfide	mg/kg	0.5	-
trans-1,2-dichloroethene	mg/kg	0.1	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-
1,1-dichloroethane	mg/kg	0.1	-
Vinyl acetate	mg/kg	10	-
MEK (2-butanone)	mg/kg	10	-
cis-1,2-dichloroethene	mg/kg	0.1	-
Bromochloromethane	mg/kg	0.1	-
Chloroform	mg/kg	0.1	-
2,2-dichloropropane	mg/kg	0.1	-
1,2-dichloroethane	mg/kg	0.1	-
1,1,1-trichloroethane	mg/kg	0.1	-
1,1-dichloropropene	mg/kg	0.1	-
Carbon tetrachloride	mg/kg	0.1	-
Dibromomethane	mg/kg	0.1	-
1,2-dichloropropane	mg/kg	0.1	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-
2-nitropropane	mg/kg	10	-
Bromodichloromethane	mg/kg	0.1	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-
cis-1,3-dichloropropene	mg/kg	0.1	-
trans-1,3-dichloropropene	mg/kg	0.1	-
1,1,2-trichloroethane	mg/kg	0.1	-
1,3-dichloropropane	mg/kg	0.1	-
Chlorodibromomethane	mg/kg	0.1	-
2-hexanone (MBK)	mg/kg	5	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-
Chlorobenzene	mg/kg	0.1	-
Bromoform	mg/kg	0.1	-
cis-1,4-dichloro-2-butene	mg/kg	1	-
Styrene (Vinyl benzene)	mg/kg	0.1	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-
1,2,3-trichloropropane	mg/kg	0.1	-
trans-1,4-dichloro-2-butene	mg/kg	1	-

VOC's in Soil [AN433] Tested: 10/8/2020 (continued)

PARAMETER	UOM	LOR	QTS1 SOIL - 5/8/2020 SE209734.018
Isopropylbenzene (Cumene)	mg/kg	0.1	-
Bromobenzene	mg/kg	0.1	-
n-propylbenzene	mg/kg	0.1	-
2-chlorotoluene	mg/kg	0.1	-
4-chlorotoluene	mg/kg	0.1	-
1,3,5-trimethylbenzene	mg/kg	0.1	-
tert-butylbenzene	mg/kg	0.1	-
1,2,4-trimethylbenzene	mg/kg	0.1	-
sec-butylbenzene	mg/kg	0.1	-
1,3-dichlorobenzene	mg/kg	0.1	-
1,4-dichlorobenzene	mg/kg	0.1	-
p-isopropyltoluene	mg/kg	0.1	-
1,2-dichlorobenzene	mg/kg	0.1	-
n-butylbenzene	mg/kg	0.1	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-
1,2,4-trichlorobenzene	mg/kg	0.1	-
Hexachlorobutadiene	mg/kg	0.1	-
1,2,3-trichlorobenzene	mg/kg	0.1	-
Total VOC*	mg/kg	24	-
Total Volatile Chlorinated Hydrocarbons*	mg/kg	3	-
Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-
Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	-

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 10/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH2M_4.5-4.6 SOIL - 5/8/2020 SE209734.003	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH5_0.7-0.8 SOIL - 5/8/2020 SE209734.008	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH7_1.5-1.6 SOIL - 5/8/2020 SE209734.011	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013	QD1 SOIL - 5/8/2020 SE209734.014
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 10/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH2M_4.5-4.6 SOIL - 5/8/2020 SE209734.003	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	**76**	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	**100**	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH5_0.7-0.8 SOIL - 5/8/2020 SE209734.008	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH7_1.5-1.6 SOIL - 5/8/2020 SE209734.011	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013	QD1 SOIL - 5/8/2020 SE209734.014
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 10/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH2M_4.5-4.6 SOIL - 5/8/2020 SE209734.003	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	0.9	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	2.9	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	1.7	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	12	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	11	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	5.8	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	5.2	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	6.5	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	3.0	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	5.6	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	4.4	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	0.4	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	3.9	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	8.1	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	8.1	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	8.1	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	63	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	63	<0.8	<0.8	<0.8	<0.8

PARAMETER	UOM	LOR	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH5_0.7-0.8 SOIL - 5/8/2020 SE209734.008	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	0.1	1.5
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.7
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	0.3	3.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	0.4	2.9
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	0.1	1.2
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	0.2	1.2
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.6
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.0
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.5
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.7
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	1.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	1.4
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	1.4
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	1.1	15
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	1.1	15

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 10/8/2020 (continued)

PARAMETER	UOM	LOR	BH7_1.5-1.6 SOIL - 5/8/2020 SE209734.011	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	**0.2**	**0.2**
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	**1.5**	**1.0**
Anthracene	mg/kg	0.1	<0.1	**0.6**	**0.5**
Fluoranthene	mg/kg	0.1	<0.1	**1.6**	**2.3**
Pyrene	mg/kg	0.1	<0.1	**1.9**	**2.4**
Benzo(a)anthracene	mg/kg	0.1	<0.1	**0.6**	**0.8**
Chrysene	mg/kg	0.1	<0.1	**0.8**	**1.0**
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	**0.5**	**0.8**
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	**0.4**	**0.5**
Benzo(a)pyrene	mg/kg	0.1	<0.1	**0.5**	**0.8**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	**0.2**	**0.4**
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	**0.4**	**0.6**
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	**0.7**	**1.0**
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	**0.8**	**1.1**
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	**0.7**	**1.1**
Total PAH (18)	mg/kg	0.8	<0.8	**9.0**	**11**
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	**9.0**	**11**

OC Pesticides in Soil [AN420] Tested: 10/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH2M_4.5-4.6 SOIL - 5/8/2020 SE209734.003	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005
Hexachlorobenzene (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
Lindane	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
Aldrin	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
Delta BHC	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
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	**1.1**	-	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	**1.3**	-	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	**0.8**	-	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	**0.2**	-	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	**0.9**	-	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
p,p'-DDT	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
Endrin Aldehyde	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
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
Mirex	mg/kg	0.1	**0.2**	<0.1	-	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	**4**	-	<1	<1

OC Pesticides in Soil [AN420] Tested: 10/8/2020 (continued)

PARAMETER	UOM	LOR	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH5_0.7-0.8 SOIL - 5/8/2020 SE209734.008	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010
Hexachlorobenzene (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
Lindane	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
Aldrin	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
Delta BHC	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
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
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
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
p,p'-DDT	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
Endrin Aldehyde	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
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	-	<1	<1

OC Pesticides in Soil [AN420] Tested: 10/8/2020 (continued)

PARAMETER	UOM	LOR	BH7_1.5-1.6 SOIL - 5/8/2020 SE209734.011	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013	QD1 SOIL - 5/8/2020 SE209734.014
Hexachlorobenzene (HCB)	mg/kg	0.1	-	<0.1	<0.1	-
Alpha BHC	mg/kg	0.1	-	<0.1	<0.1	-
Lindane	mg/kg	0.1	-	<0.1	<0.1	-
Heptachlor	mg/kg	0.1	-	<0.1	<0.1	-
Aldrin	mg/kg	0.1	-	<0.1	<0.1	-
Beta BHC	mg/kg	0.1	-	<0.1	<0.1	-
Delta BHC	mg/kg	0.1	-	<0.1	<0.1	-
Heptachlor epoxide	mg/kg	0.1	-	<0.1	<0.1	-
o,p'-DDE	mg/kg	0.1	-	<0.1	<0.1	-
Alpha Endosulfan	mg/kg	0.2	-	<0.2	<0.2	-
Gamma Chlordane	mg/kg	0.1	-	<0.1	<0.1	-
Alpha Chlordane	mg/kg	0.1	-	<0.1	<0.1	-
trans-Nonachlor	mg/kg	0.1	-	<0.1	<0.1	-
p,p'-DDE	mg/kg	0.1	-	<0.1	<0.1	-
Dieldrin	mg/kg	0.2	-	<0.2	<0.2	-
Endrin	mg/kg	0.2	-	<0.2	<0.2	-
o,p'-DDD	mg/kg	0.1	-	<0.1	<0.1	-
o,p'-DDT	mg/kg	0.1	-	<0.1	<0.1	-
Beta Endosulfan	mg/kg	0.2	-	<0.2	<0.2	-
p,p'-DDD	mg/kg	0.1	-	<0.1	<0.1	-
p,p'-DDT	mg/kg	0.1	-	<0.1	<0.1	-
Endosulfan sulphate	mg/kg	0.1	-	<0.1	<0.1	-
Endrin Aldehyde	mg/kg	0.1	-	<0.1	<0.1	-
Methoxychlor	mg/kg	0.1	-	<0.1	<0.1	-
Endrin Ketone	mg/kg	0.1	-	<0.1	<0.1	-
Isodrin	mg/kg	0.1	-	<0.1	<0.1	-
Mirex	mg/kg	0.1	-	<0.1	<0.1	-
Total CLP OC Pesticides	mg/kg	1	-	<1	<1	-

OP Pesticides in Soil [AN420] Tested: 10/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	**0.2**	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PCBs in Soil [AN420] Tested: 10/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH2M_4.5-4.6 SOIL - 5/8/2020 SE209734.003	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	<1	<1

PARAMETER	UOM	LOR	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH5_0.7-0.8 SOIL - 5/8/2020 SE209734.008	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	<1	<1

PARAMETER	UOM	LOR	BH7_1.5-1.6 SOIL - 5/8/2020 SE209734.011	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013	QD1 SOIL - 5/8/2020 SE209734.014
Arochlor 1016	mg/kg	0.2	-	<0.2	<0.2	-
Arochlor 1221	mg/kg	0.2	-	<0.2	<0.2	-
Arochlor 1232	mg/kg	0.2	-	<0.2	<0.2	-
Arochlor 1242	mg/kg	0.2	-	<0.2	<0.2	-
Arochlor 1248	mg/kg	0.2	-	<0.2	<0.2	-
Arochlor 1254	mg/kg	0.2	-	<0.2	<0.2	-
Arochlor 1260	mg/kg	0.2	-	<0.2	<0.2	-
Arochlor 1262	mg/kg	0.2	-	<0.2	<0.2	-
Arochlor 1268	mg/kg	0.2	-	<0.2	<0.2	-
Total PCBs (Arochlors)	mg/kg	1	-	<1	<1	-

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 11/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH2M_4.5-4.6 SOIL - 5/8/2020 SE209734.003	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005
Arsenic, As	mg/kg	1	8	9	1	11	1
Cadmium, Cd	mg/kg	0.3	<0.3	0.5	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	8.3	6.2	2.4	15	4.8
Copper, Cu	mg/kg	0.5	21	10	12	14	30
Lead, Pb	mg/kg	1	42	20	12	23	10
Nickel, Ni	mg/kg	0.5	4.6	4.0	1.4	19	36
Zinc, Zn	mg/kg	2	26	43	8.5	43	17

PARAMETER	UOM	LOR	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH5_0.7-0.8 SOIL - 5/8/2020 SE209734.008	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010
Arsenic, As	mg/kg	1	7	5	9	7	9
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	6.0	8.6	4.9	13	8.5
Copper, Cu	mg/kg	0.5	39	20	17	17	54
Lead, Pb	mg/kg	1	25	14	16	24	220
Nickel, Ni	mg/kg	0.5	23	3.2	<0.5	8.2	6.7
Zinc, Zn	mg/kg	2	150	39	5.8	33	230

PARAMETER	UOM	LOR	BH7_1.5-1.6 SOIL - 5/8/2020 SE209734.011	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013	QD1 SOIL - 5/8/2020 SE209734.014
Arsenic, As	mg/kg	1	7	35	9	3
Cadmium, Cd	mg/kg	0.3	<0.3	0.5	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	11	10	10	6.3
Copper, Cu	mg/kg	0.5	14	30	18	4.7
Lead, Pb	mg/kg	1	23	130	27	9
Nickel, Ni	mg/kg	0.5	1.2	4.7	5.3	3.0
Zinc, Zn	mg/kg	2	7.0	160	36	14

Mercury in Soil [AN312] Tested: 11/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH2M_4.5-4.6 SOIL - 5/8/2020 SE209734.003	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005
Mercury	mg/kg	0.05	<0.05	1.9	<0.05	1.0	<0.05

PARAMETER	UOM	LOR	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH5_0.7-0.8 SOIL - 5/8/2020 SE209734.008	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010
Mercury	mg/kg	0.05	<0.05	0.68	<0.05	0.09	0.13

PARAMETER	UOM	LOR	BH7_1.5-1.6 SOIL - 5/8/2020 SE209734.011	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013	QD1 SOIL - 5/8/2020 SE209734.014
Mercury	mg/kg	0.05	<0.05	0.99	2.2	0.20

Moisture Content [AN002] Tested: 10/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH2M_4.5-4.6 SOIL - 5/8/2020 SE209734.003	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005
% Moisture	%w/w	1	18.2	11.2	8.4	14.2	7.4

PARAMETER	UOM	LOR	BH4_5.0-5.5 SOIL - 5/8/2020 SE209734.006	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007	BH5_0.7-0.8 SOIL - 5/8/2020 SE209734.008	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010
% Moisture	%w/w	1	7.5	16.0	13.8	25.3	15.3

PARAMETER	UOM	LOR	BH7_1.5-1.6 SOIL - 5/8/2020 SE209734.011	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013	QD1 SOIL - 5/8/2020 SE209734.014	QTB1 SOIL - 5/8/2020 SE209734.017
% Moisture	%w/w	1	23.7	18.3	18.4	14.5	<1.0

Fibre Identification in soil [AN602] Tested: 12/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734.001	BH2M_0.1-0.2 SOIL - 5/8/2020 SE209734.002	BH3_0.2-0.3 SOIL - 5/8/2020 SE209734.004	BH4_0.5-0.6 SOIL - 5/8/2020 SE209734.005	BH5_0.1-0.2 SOIL - 5/8/2020 SE209734.007
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	BH6_0.6-0.7 SOIL - 5/8/2020 SE209734.009	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734.010	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734.012	BH9_0.1-0.2 SOIL - 5/8/2020 SE209734.013
Asbestos Detected	No unit	-	No	Yes	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01

VOCs in Water [AN433] Tested: 10/8/2020

PARAMETER	UOM	LOR	QR1 SOIL - 5/8/2020 SE209734.015
Benzene	µg/L	0.5	<0.5
Toluene	µg/L	0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5
m/p-xylene	µg/L	1	<1
o-xylene	µg/L	0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5
Total BTEX	µg/L	3	<3
Naphthalene	µg/L	0.5	<0.5

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 10/8/2020

PARAMETER	UOM	LOR	QR1 SOIL - 5/8/2020 SE209734.015
TRH C6-C9	µg/L	40	<40
Benzene (F0)	µg/L	0.5	<0.5
TRH C6-C10	µg/L	50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 10/8/2020

PARAMETER	UOM	LOR	QR1 SOIL - 5/8/2020 SE209734.015
TRH C10-C14	µg/L	50	<50
TRH C15-C28	µg/L	200	<200
TRH C29-C36	µg/L	200	<200
TRH C37-C40	µg/L	200	<200
TRH >C10-C16	µg/L	60	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60
TRH >C16-C34 (F3)	µg/L	500	<500
TRH >C34-C40 (F4)	µg/L	500	<500
TRH C10-C40	µg/L	320	<320

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 10/8/2020

PARAMETER	UOM	LOR	QR1 SOIL - 5/8/2020 SE209734.015
Arsenic, As	µg/L	1	<1
Cadmium, Cd	µg/L	0.1	<0.1
Chromium, Cr	µg/L	1	<1
Copper, Cu	µg/L	1	<1
Lead, Pb	µg/L	1	<1
Nickel, Ni	µg/L	1	<1
Zinc, Zn	µg/L	5	<5

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 10/8/2020

PARAMETER	UOM	LOR	QR1 SOIL - 5/8/2020 SE209734.015
Mercury	mg/L	0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid , mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser . Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN318	Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4).
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS /ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."

AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Ian Watts
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Ian.watts@eiaustralia.com.au
Project	**E24782 The Hills Bowling Club, Baulkham**
Order Number	**E24782**
Samples	9

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE209734 R0**
Date Received	06 Aug 2020
Date Reported	14 Aug 2020

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

Sample #10: Asbestos found in approx 8x2x2mm fibrous rope material.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Bennet LO
Senior Organic Chemist/Metals Chemis

Kamrul AHSAN
Senior Chemist

Ly Kim HA
Organic Section Head

Ravee SIVASUBRAMANIAM
Hygiene Team Leader

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE209734.001	BH1M_0.7-0.8	Soil	81g Clay, Sand, Soil, Rocks	05 Aug 2020	No Asbestos Found	<0.01
SE209734.002	BH2M_0.1-0.2	Soil	225g Sand, Soil, Rocks	05 Aug 2020	No Asbestos Found Organic Fibres Detected	<0.01
SE209734.004	BH3_0.2-0.3	Soil	88g Clay, Sand, Soil, Rocks	05 Aug 2020	No Asbestos Found	<0.01
SE209734.005	BH4_0.5-0.6	Soil	80g Clay, Rocks	05 Aug 2020	No Asbestos Found	<0.01
SE209734.007	BH5_0.1-0.2	Soil	134g Clay, Sand, Soil, Rocks	05 Aug 2020	No Asbestos Found	<0.01
SE209734.009	BH6_0.6-0.7	Soil	109g Clay, Soil, Rocks	05 Aug 2020	No Asbestos Found	<0.01
SE209734.010	BH7_1.0-1.1	Soil	87g Clay, Sand, Soil, Rocks	05 Aug 2020	Chrysotile Asbestos Found Organic Fibres Detected	<0.01
SE209734.012	BH8_0.1-0.2	Soil	90g Clay, Sand, Soil, Rocks	05 Aug 2020	No Asbestos Found	<0.01
SE209734.013	BH9_0.1-0.2	Soil	110g Clay, Sand, Soil, Rocks	05 Aug 2020	No Asbestos Found	<0.01

METHOD SUMMARY

SE209734 R0

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable ’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service .
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos -containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Ian Watts
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Ian.watts@eiaustralia.com.au
Project	**E24782 The Hills Bowling Club, Baulkham**
Order Number	**E24782**
Samples	18

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE209734A R0**
Date Received	20/8/2020
Date Reported	27/8/2020

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Bennet LO
Senior Organic Chemist/Metals Chemist

Ly Kim HA
Organic Section Head

TCLP (Toxicity Characteristic Leaching Procedure) for Organics/SVOC [AN006] Tested: 25/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734A.001	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734A.010
pH 1:20	pH Units	-	6.8	6.6
pH 1:20 plus HCL	pH Units	-	1.7	1.8
Extraction Solution Used	No unit	-	1	1
Mass of Sample Used*	g	-	25	25
Volume of ExtractionSolution Used*	mL	-	500	500
pH TCLP after 18 hours	pH Units	-	4.7	5.0

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract [AN420] Tested: 21/8/2020

PARAMETER	UOM	LOR	BH1M_0.7-0.8 SOIL - 5/8/2020 SE209734A.001	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734A.010
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1

TCLP (Toxicity Characteristic Leaching Procedure) for Metals [AN006] Tested: 25/8/2020

PARAMETER	UOM	LOR	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734A.012
pH 1:20	pH Units	-	**8.8**
pH 1:20 plus HCL	pH Units	-	**1.9**
Extraction Solution Used	No unit	-	**1**
Mass of Sample Used*	g	-	**13**
Volume of ExtractionSolution Used*	mL	-	**250**
pH TCLP after 18 hours	pH Units	-	**4.7**

Metals in TCLP Extract by ICPOES [AN320] Tested: 27/8/2020

PARAMETER	UOM	LOR	BH7_1.0-1.1 SOIL - 5/8/2020 SE209734A.010	BH8_0.1-0.2 SOIL - 5/8/2020 SE209734A.012
Lead, Pb	mg/L	0.02	**0.10**	<0.02

METHOD	METHODOLOGY SUMMARY
AN006	Contaminants of interest in a waste material are leached out of the waste with a selected leaching solution under controlled conditions. The ratio of sample to extraction fluid is 100g to 2L (1 to 20 by mass). The concentration of each contaminant of interest is determined in the leachate by appropriate methods after separation from the sample by filtering. Base on USEPA 1311.
AN006	Extraction Fluid #1: This fluid is made by combining 128.6mL of dilute sodium hydroxide solution and 11.5mL glacial acetic acid with water and diluting to a volume of 2 litres. The pH of this fluid should be 4.93 ± 0.05.
AN006	Extraction Fluid #2: This fluid is made by diluting 5.7mL glacial acetic acid with water to a volume of 1 litre. The pH of this fluid should be 2.88 ± 0.05.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN320	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components .
AN320	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements . Reference APHA 3120 B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicative data, theoretical holding time exceeded and NATA accreditation does not cover the performance of this service.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

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 248695

Client Details

Client	EI Australia
Attention	Ben Aggar, Lance Chen
Address	Suite 6.01, 55 Miller Street, Pyrmont, NSW, 2009

Sample Details

Your Reference	**E24782, The Hills Bowling Club, Baulkham Hills**
Number of Samples	1 Soil
Date samples received	11/08/2020
Date completed instructions received	11/08/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	18/08/2020
Date of Issue	17/08/2020

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

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

Results Approved By
Hannah Nguyen, Senior Chemist
Josh Williams, Senior Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		248695-1
Your Reference	UNITS	QT1
Date Sampled		05/08/2020
Type of sample		Soil
Date extracted	-	12/08/2020
Date analysed	-	12/08/2020
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<3
Surrogate aaa-Trifluorotoluene	%	94

svTRH (C10-C40) in Soil		
Our Reference		248695-1
Your Reference	UNITS	QT1
Date Sampled		05/08/2020
Type of sample		Soil
Date extracted	-	12/08/2020
Date analysed	-	13/08/2020
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	89

Acid Extractable metals in soil		
Our Reference		248695-1
Your Reference	UNITS	QT1
Date Sampled		05/08/2020
Type of sample		Soil
Date prepared	-	12/08/2020
Date analysed	-	12/08/2020
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	8
Copper	mg/kg	6
Lead	mg/kg	9
Mercury	mg/kg	0.2
Nickel	mg/kg	4
Zinc	mg/kg	17

Moisture		
Our Reference		248695-1
Your Reference	UNITS	QT1
Date Sampled		05/08/2020
Type of sample		Soil
Date prepared	-	12/08/2020
Date analysed	-	13/08/2020
Moisture	%	13

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			12/08/2020	[NT]	[NT]	[NT]	[NT]	12/08/2020	[NT]
Date analysed	-			12/08/2020	[NT]	[NT]	[NT]	[NT]	12/08/2020	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	93	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	87	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	89	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	97	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			12/08/2020	[NT]	[NT]	[NT]	[NT]	12/08/2020	[NT]
Date analysed	-			13/08/2020	[NT]	[NT]	[NT]	[NT]	13/08/2020	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
Surrogate o-Terphenyl	%		Org-020	94	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			12/08/2020	[NT]	[NT]	[NT]	[NT]	12/08/2020	[NT]
Date analysed	-			12/08/2020	[NT]	[NT]	[NT]	[NT]	12/08/2020	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	93	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	89	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	78	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]

Result Definitions

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

Quality Control Definitions

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

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

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Lan Ye
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Lan.ye@eiaustralia.com.au
Project	**E24782 The Hills Bowling Club, Baulkhan**
Order Number	**E24782**
Samples	7

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE209989 R0**
Date Received	14/8/2020
Date Reported	21/8/2020

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Ly Kim HA
Organic Section Head

Shane MCDERMOTT
Inorganic/Metals Chemist

VOC's in Soil [AN433] Tested: 17/8/2020

PARAMETER	UOM	LOR	GWQTS1 SOIL - 14/8/2020 SE209989.005	GWQTB1 SOIL - 14/8/2020 SE209989.006
Benzene	mg/kg	0.1	[100%]	<0.1
Toluene	mg/kg	0.1	[99%]	<0.1
Ethylbenzene	mg/kg	0.1	[97%]	<0.1
m/p-xylene	mg/kg	0.2	[97%]	<0.2
o-xylene	mg/kg	0.1	[97%]	<0.1
Naphthalene	mg/kg	0.1	-	<0.1
Total Xylenes	mg/kg	0.3	-	<0.3
Total BTEX	mg/kg	0.6	-	<0.6

Moisture Content [AN002] Tested: 17/8/2020

PARAMETER	UOM	LOR	GWQTB1 SOIL - 14/8/2020 SE209989.006
% Moisture	%w/w	1	<1.0

VOCs in Water [AN433] Tested: 18/8/2020

PARAMETER	UOM	LOR	BH1M WATER - 14/8/2020 SE209989.001	BH2M WATER - 14/8/2020 SE209989.002	BH4M WATER - 14/8/2020 SE209989.003	GWQD1 WATER - 14/8/2020 SE209989.004	GWQR1 WATER - 14/8/2020 SE209989.007
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	**1.7**	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	**0.5**	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	**6**	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5	**2.2**	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5	**8.0**	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3	**10**	<3	<3
Naphthalene	µg/L	0.5	<0.5	<0.5	**0.8**	<0.5	<0.5
Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	<5	-	-
Chloromethane	µg/L	5	<5	<5	<5	-	-
Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	<0.3	-	-
Bromomethane	µg/L	10	<10	<10	<10	-	-
Chloroethane	µg/L	5	<5	<5	<5	-	-
Trichlorofluoromethane	µg/L	1	<1	<1	<1	-	-
Acetone (2-propanone)	µg/L	10	<10	<10	<10	-	-
Iodomethane	µg/L	5	<5	<5	<5	-	-
1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Acrylonitrile	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	<5	-	-
Allyl chloride	µg/L	2	<2	<2	<2	-	-
Carbon disulfide	µg/L	2	<2	<2	<2	-	-
trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<2	<2	-	-
1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Vinyl acetate	µg/L	10	<10	<10	<10	-	-
MEK (2-butanone)	µg/L	10	<10	<10	<10	-	-
cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Bromochloromethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Chloroform (THM)	µg/L	0.5	<0.5	<0.5	**7.2**	-	-
2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Dibromomethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
2-nitropropane	µg/L	100	<100	<100	<100	-	-
Bromodichloromethane (THM)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	<5	-	-
cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Dibromochloromethane (THM)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
2-hexanone (MBK)	µg/L	5	<5	<5	<5	-	-
1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Chlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Bromoform (THM)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	<1	-	-
Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	<1	-	-

VOCs in Water [AN433] Tested: 18/8/2020 (continued)

PARAMETER	UOM	LOR	BH1M WATER - 14/8/2020 SE209989.001	BH2M WATER - 14/8/2020 SE209989.002	BH4M WATER - 14/8/2020 SE209989.003	GWQD1 WATER - 14/8/2020 SE209989.004	GWQR1 WATER - 14/8/2020 SE209989.007
Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Bromobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
n-propylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
2-chlorotoluene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
4-chlorotoluene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	**1.5**	-	-
tert-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	**3.4**	-	-
sec-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	<0.3	-	-
p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
n-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	-	-
Total VOC	µg/L	10	<10	<10	**25**	-	-

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 18/8/2020

PARAMETER	UOM	LOR	BH1M WATER - 14/8/2020 SE209989.001	BH2M WATER - 14/8/2020 SE209989.002	BH4M WATER - 14/8/2020 SE209989.003	GWQD1 WATER - 14/8/2020 SE209989.004	GWQR1 WATER - 14/8/2020 SE209989.007
TRH C6-C9	µg/L	40	<40	<40	**70**	<40	<40
Benzene (F0)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRH C6-C10	µg/L	50	<50	<50	**77**	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	**66**	<50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 17/8/2020

PARAMETER	UOM	LOR	BH1M WATER - 14/8/2020 SE209989.001	BH2M WATER - 14/8/2020 SE209989.002	BH4M WATER - 14/8/2020 SE209989.003	GWQD1 WATER - 14/8/2020 SE209989.004	GWQR1 WATER - 14/8/2020 SE209989.007
TRH C10-C14	µg/L	50	<50	**260**	<50	**86**	<50
TRH C15-C28	µg/L	200	<200	**280**	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200	<200	<200
TRH >C10-C16	µg/L	60	<60	**290**	<60	**94**	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	**290**	<60	**94**	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500	<500	<500
TRH C10-C40	µg/L	320	<320	**540**	<320	<320	<320

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 17/8/2020

PARAMETER	UOM	LOR	BH1M WATER - 14/8/2020 SE209989.001	BH2M WATER - 14/8/2020 SE209989.002	BH4M WATER - 14/8/2020 SE209989.003
Naphthalene	µg/L	0.1	<0.1	<0.1	**0.3**
2-methylnaphthalene	µg/L	0.1	<0.1	**0.1**	**0.6**
1-methylnaphthalene	µg/L	0.1	<0.1	**0.1**	**0.8**
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	**0.1**
Phenanthrene	µg/L	0.1	<0.1	**0.4**	**0.2**
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	**0.1**	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	**1**	**2**

Total Phenolics in Water [AN289] Tested: 18/8/2020

PARAMETER	UOM	LOR	BH1M WATER - 14/8/2020 SE209989.001	BH2M WATER - 14/8/2020 SE209989.002	BH4M WATER - 14/8/2020 SE209989.003
Total Phenols	mg/L	0.01	<0.01	<0.01	<0.01

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 14/8/2020

PARAMETER	UOM	LOR	BH1M WATER - 14/8/2020 SE209989.001	BH2M WATER - 14/8/2020 SE209989.002	BH4M WATER - 14/8/2020 SE209989.003	GWQD1 WATER - 14/8/2020 SE209989.004	GWQR1 WATER - 14/8/2020 SE209989.007
Arsenic, As	µg/L	1	<1	6	4	5	<1
Cadmium, Cd	µg/L	0.1	<0.1	0.3	<0.1	0.2	<0.1
Chromium, Cr	µg/L	1	<1	27	4	14	<1
Copper, Cu	µg/L	1	5	96	1	62	1
Lead, Pb	µg/L	1	<1	37	2	23	<1
Nickel, Ni	µg/L	1	7	24	3	19	<1
Zinc, Zn	µg/L	5	69	170	28	120	<5

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 17/8/2020

PARAMETER	UOM	LOR	BH1M WATER - 14/8/2020 SE209989.001	BH2M WATER - 14/8/2020 SE209989.002	BH4M WATER - 14/8/2020 SE209989.003	GWQD1 WATER - 14/8/2020 SE209989.004	GWQR1 WATER - 14/8/2020 SE209989.007
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN289	Analysis of Total Phenols in Soil Sediment and Water: Steam distillable phenols react with 4-aminoantipyrine at pH 7.9±0.1 in the presence of potassium ferricyanide to form a coloured antipyrine dye analysed by Discrete Analyser. Reference APHA 5530 B/D.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4).
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). Where F2 is corrected for Naphthalene, the VOC data for Naphthalene is used.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoveerable Hydrocarbons - Silica (TRH-Silica) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

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 249161

Client Details

Client	EI Australia
Attention	Lan Ye
Address	Suite 6.01, 55 Miller Street, Pyrmont, NSW, 2009

Sample Details

Your Reference	**E24782, Baulkham Hills**
Number of Samples	1 Water
Date samples received	17/08/2020
Date completed instructions received	17/08/2020

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

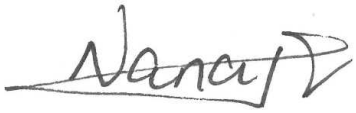
Date results requested by	24/08/2020
Date of Issue	24/08/2020

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

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

Results Approved By
Dragana Tomas, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Steven Luong, Organics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water		
Our Reference		249161-1
Your Reference	UNITS	GWQT1
Date Sampled		14/08/2020
Type of sample		Water
Date extracted	-	18/08/2020
Date analysed	-	18/08/2020
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	120
Surrogate toluene-d8	%	95
Surrogate 4-BFB	%	84

svTRH (C10-C40) in Water		
Our Reference		249161-1
Your Reference	UNITS	GWQT1
Date Sampled		14/08/2020
Type of sample		Water
Date extracted	-	21/08/2020
Date analysed	-	24/08/2020
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Surrogate o-Terphenyl	%	99

HM in water - dissolved		
Our Reference		249161-1
Your Reference	UNITS	GWQT1
Date Sampled		14/08/2020
Type of sample		Water
Date prepared	-	18/08/2020
Date analysed	-	18/08/2020
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	1
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	6
Zinc-Dissolved	µg/L	13

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			18/08/2020	[NT]	[NT]	[NT]	[NT]	18/08/2020	[NT]
Date analysed	-			18/08/2020	[NT]	[NT]	[NT]	[NT]	18/08/2020	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	107	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	108	[NT]	[NT]	[NT]	[NT]	96	[NT]
Surrogate toluene-d8	%		Org-023	94	[NT]	[NT]	[NT]	[NT]	95	[NT]
Surrogate 4-BFB	%		Org-023	83	[NT]	[NT]	[NT]	[NT]	110	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			21/08/2020	[NT]	[NT]	[NT]	[NT]	21/08/2020	[NT]
Date analysed	-			24/08/2020	[NT]	[NT]	[NT]	[NT]	24/08/2020	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
Surrogate o-Terphenyl	%		Org-020	73	[NT]	[NT]	[NT]	[NT]	76	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			18/08/2020	[NT]	[NT]	[NT]	[NT]	18/08/2020	[NT]
Date analysed	-			18/08/2020	[NT]	[NT]	[NT]	[NT]	18/08/2020	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	102	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]

Result Definitions

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

Quality Control Definitions

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

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

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab. Note: there is a possibility some elements may be underestimated.

Appendix L – QA/QC Assessment

QUALITY CONTROL PROGRAM

L1.1 INTRODUCTION

For the purpose of assessing the quality of data presented in this Contaminant Delineation Report, EI collected field QC samples for analysis. The primary laboratory, SGS Australia Pty Ltd (SGS) and secondary laboratory, Envirolab Services Pty Ltd (Envirolab) also prepared and analysed internal QC samples. Details of the field and laboratory QC samples, with the allowable data acceptance ranges are presented in **Table L-1**.

Table L-1 Sampling Data Quality Indicators

QA/QC Measures	Data Quality Indicators
Precision – A quantitative measure of the variability (or reproducibility) of data	Data precision would be assessed by reviewing the performance of blind field duplicate sample sets, through calculation of relative percentage differences (RPD). Data precision would be deemed acceptable if RPDs are found to be less than 30%. RPDs that exceed this range may be considered acceptable where: ▪ Results are less than 10 times the limits of reporting (LOR); ▪ Results are less than 20 times the LOR and the RPD is less than 50%; or ▪ Heterogeneous materials or volatile compounds are encountered.
Accuracy – A quantitative measure of the closeness of reported data to the "true" value	Data accuracy would be assessed through the analysis of: • Method blanks, which are analysed for the analytes targeted in the primary samples; • Matrix spike and matrix spike duplicate sample sets; • Laboratory control samples; and • Calibration of instruments against known standards.
Representativeness – The confidence (expressed qualitatively) that data are representative of each medium present onsite	To ensure the data produced by the laboratory is representative of conditions encountered in the field, the laboratory would carry out the following: • Blank samples will be run in parallel with field samples to confirm there are no unacceptable instances of laboratory artefacts; • Review of relative percentage differences (RPD) values for field and laboratory duplicates to provide an indication that the samples are generally homogeneous, with no unacceptable instances of significant sample matrix heterogeneities; and • The appropriateness of collection methodologies, handling, storage and preservation techniques will be assessed to ensure/confirm there was minimal opportunity for sample interference or degradation (i.e. volatile loss during transport due to incorrect preservation / transport methods).
Completeness – A measure of the amount of useable data from a data collection activity	Analytical data sets acquired during the assessment will be evaluated as complete, upon confirmation that: • Standard operating procedures (SOPs) for sampling protocols were adhered to; and • Copies of all COC documentation are presented, reviewed and found to be properly completed. It can therefore be considered whether the proportion of "useable data" generated in the data collection activities is sufficient for the purposes of the land use assessment.

QA/QC Measures	Data Quality Indicators
Comparability – The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event	Given that a reported data set can comprise several data sets from separate sampling episodes, issues of comparability between data sets are reduced through adherence to SOPs and regulator-endorsed or published guidelines and standards on each data gathering activity. In addition the data will be collected by experienced samplers and NATA-accredited laboratory methodologies will be employed in all laboratory testing programs.

L1.2 CALCULATION OF RELATIVE PERCENTAGE DIFFERENCE (RPD)

The RPD values were calculated using the following equation:

$$RPD = \frac{|C_O - C_R|}{[(C_O + C_R)/2]} \times 100$$

Where:

C_O = Concentration obtained for the primary sample; and

C_R = Concentration obtained for the blind replicate or split duplicate sample.

L2 FIELD QA/QC DATA EVALUATION

The field quality assurance/quality control (QA/QC) soil samples collected during the investigations were as follows:

- Blind field duplicate;
- Inter-laboratory duplicate;
- Trip spike;
- Trip blank; and
- Rinsate;

Analytical results for tested soil and groundwater QA/QC samples, including calculated RPD values between primary and duplicate samples, are presented in **Table L-2**.

L2.1 SOIL INVESTIGATION & SOIL VALIDATION

L2.1.1 Blind Field Duplicate

A blind field duplicate (BFD) was collected, including:

- Sample QD1 was collected from primary sample BH1M_0.7-0.8.

The preparation of the BFD samples involved the collection of a bulk quantity of soil from the same sampling point without mixing, before dividing the material into identical sampling vessels. The duplicate samples were then presented blind to the primary laboratory (SGS) to avoid any potential analytical bias. BFD soil samples were analysed for TRHs, BTEX and selected heavy metals, and calculated RPD values were found to be generally within the Data Acceptance Criteria (**Appendix L**, **Table QC5**), with the exception of various metals due to fill sample heterogeneity.

L2.1.2 Inter-Laboratory Duplicate

- Sample QT1 was collected from primary sample BH1M_0.7-0.8.

The preparation of the ILD sample was identical to the BFD sample, as described above, and was analysed for TRHs, BTEX and selected heavy metals. The calculated RPD values were found to be within the Data Acceptance Criteria (75% RPD, **Appendix L, Table QC5**), with the exception of various metals due to fill sample heterogeneity.

L2.1.3 Trip Blank

One trip blank (TB) sample QTB1 was prepared and analysed by the primary laboratory for BTEX. Analytical results for this sample were below the laboratory LOR, indicating that ideal sample transport and handling conditions were achieved.

L2.1.4 Trip Spike

One trip spike (QTS1) sample was submitted to the primary laboratory for BTEX analysis, the results for which were reported within the RPD acceptance levels for trip spike recovery. It was therefore concluded that satisfactory sample transport and handling conditions were achieved.

L2.1.5 Rinsate

One rinsate blank (QR1) sample was submitted to the primary laboratory for selected priority metals, TRH and BTEX analysis. The results for which were reported below laboratory LOR.

L2.2 GROUNDWATER INVESTIGATION

L2.2.1 Intra-Laboratory Duplicate

One BFD sample was collected. The BFD sample was analysed for TRHs, BTEX and heavy metals. The RPD values calculated were found to be within the Data Acceptance Criteria, with the exception of F2 and Chromium due to the low concentration detected. Overall data quality was considered to be acceptable, in accordance with the laboratory DQOs presented in **Appendix L, Table QC5**.

L2.2.1 Inter-Laboratory Duplicate

One ILD sample was collected. The preparation of a groundwater ILD sample was identical to the BFD sample as described above and also analysed for TRHs, BTEX and heavy metals. The RPD values calculated for the ILD samples were found to be within the Data Acceptance Criteria, with the exception of some heavy metals due to the low concentration detected. Despite the discrepancies, overall data quality was considered to be acceptable, in accordance with the laboratory DQOs presented in **Appendix L, Table QC5**.

L2.2.2 Trip Blank

One trip blank (TB) samples (GWQTB1), prepared by the primary laboratory, were analysed for BTEX and VOCs by the primary laboratory during groundwater testing. TB result was reported below the laboratory LOR, indicating that ideal sample transport and handling conditions were achieved.

L2.2.3 Trip Spike

One TS sample (GWQTS1) was submitted to the primary laboratory for BTEX analysis, the results for which were all reported within the RPD acceptance levels for trip spike recovery. It was therefore concluded that satisfactory sample transport and handling conditions were achieved.

L2.2.4 Rinsate Blanks

One field rinsate blank (GWQR1) was submitted to the primary laboratory for TRHs, BTEX and heavy metals analysis, the results for which were reported below laboratory LOR.

L2.3 Assessment of Field QA/QC Data

All samples were classified in the field with respect to any observable signs of contamination based on visual and odour assessment and observable characteristics, in regards to soil. Furthermore, samples were placed immediately into laboratory supplied containers to reduce the loss of volatiles. Results of sampling indicated that the samples collected were representative of the conditions present at the time of sampling. EI conclude that the samples collected are representative of the soils present at the respective sampling locations.

All samples, including field QC samples, were transported to the primary and secondary laboratories under strict Chain-of-Custody conditions and appropriate copies of relevant documentation were included in the respective reports.

The overall completeness of documentation produced under the field program of the subject assessment was considered to be adequate for the purposes of drawing valid conclusions regarding the environmental condition of the site.

Based on the results of the field QA/QC data EI considered the field QA/QC programme carried out during the data gap closure investigations to be appropriate and the results to be acceptable.

L3 LABORATORY QA/QC

L3.1 LABORATORY ACCREDITATION

To undertake all analytical testing, EI commissioned SGS as the primary laboratory and Envirolab as the secondary laboratory. SGS and Envirolab, both established analytical laboratories which operate in accordance with the guidelines set out in ISO/IEC Guide 25 “General requirements for the competence of calibration and testing laboratories”, conducted all respective analyses using National Association Testing Authorities (NATA)-registered procedures.

In relation to contingencies, should the pre-determined DQOs not be achieved, in accordance with each laboratory’s QC policy (**Appendix M**), respective tests would be accordingly repeated. Should the results again fall outside the DQOs, then sample heterogeneity may be assumed and written comment will be provided to this effect on the final laboratory certificate. The laboratory QA/QC reports are included in **Appendix M**.

L3.2 SAMPLE HOLDING TIMES

All sample holding times were generally within standard environmental protocols as tabulated in **Appendix M, Tables QC1 and QC2**.

L3.3 TEST METHODS AND PRACTICAL QUANTITATION LIMITS (PQLS)

Practical Quantitation Limits for all tested parameters during the assessment of soils and groundwater are presented in **Appendix M**, **Tables QC3** and **QC4**.

L3.4 METHOD BLANKS

Concentrations of all parameters in method blanks during the assessment were below the laboratory PQLs and were therefore within the DAC.

L3.5 LABORATORY DUPLICATE SAMPLES

The Laboratory Duplicate Samples (LDS) for the analysis batches showed calculated RPDs that were within acceptable ranges and conformed to the DAC, with the exception of Phenanthrene in sample SE209734.010 due to sample heterogeneity.

L3.6 LABORATORY CONTROL SAMPLES

The Laboratory Control Samples for the analysis batches were within acceptable ranges and conformed to the DAC, with the exception of 1 metal.

L3.7 MATRIX SPIKES

All matrix spikes for the respective sample batches were within acceptable ranges and conformed to the DAC, with the exception for 1 OCP due to the presence of significant concentration of analyte and 2 heavy metals due to matrix interference.

L3.8 SURROGATE

Recovery results for all surrogate samples conformed to the DAC, with the exception for 4 PAHs. However, at least 2 of 3 surrogates are within acceptance criteria.

L3.9 CONCLUDING REMARK

Based on the laboratory QA/QC results EI considers that although a small number of discrepancies were identified, which in most cases could be attributed to the sample heterogeneity of the submitted samples, the data generally confirms that the analytical results for the various phases of laboratory testing were valid and useable for interpretation purposes.

Table L-2 Summary of QA/QC results for Investigation samples

Sample identification	Sampled Date	Description	TRH				BTEX						Heavy Metals							
			F1*	F2**	F3 (>C_{16} - C_{34})	F4 (>C_{34} - C_{40})	Benzene	Toluene	Ethylbenzene	Xylene (total)	m/p-xylene	o-xylene	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc
Intra-laboratory Duplicate																				
BH1M_0.7-0.8	3/8/2020	Fill Material	<25	<25	100	<120	<0.1	<0.1	<0.1	<0.3	<0.2	<0.1	8	<0.3	8.3	21	42	<0.05	4.6	26
QD1	3/8/2020	Replicate of BH1M_0.7-0.8	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.2	<0.1	3	<0.3	6.3	4.7	9	0.2	3	14
RPD			***0.00***	***0.00***	***13.79***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	**90.91**	***0.00***	***27.40***	**126.85**	**129.41**	**133.33**	***42.11***	**60.00**
Inter-laboratory Duplicate																				
BH1M_0.7-0.8	3/8/2020	Fill Material	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.2	<0.1	8	<0.3	8.3	21	42	<0.05	4.6	26
QT1	3/8/2020	Replicate of BH1M_0.7-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<2	<1	<4	<0.4	8	6	9	0.2	4	17
RPD			***0.00***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	**80.00**	***NA***	***3.68***	**111.11**	**129.41**	**133.33**	***13.95***	***41.86***
Intra-laboratory Duplicate																				
BH2M	14/8/2020	Groundwater	<50	290	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	6	0.3	27	96	37	24	170	210
GWQD1	14/8/2020	Replicate of BH2M	<50	94	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	5	0.2	14	62	23	19	120	160
RPD			***0.00***	**102.08**	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***18.18***	***40.00***	**63.41**	***43.04***	***46.67***	***23.26***	***34.48***	***27.03***
Inter-laboratory Duplicate																				
BH2M	14/8/2020	Groundwater	<50	<60	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	6	0.3	27	96	37	24	170	210
GWQT1	14/8/2020	Replicate of BH2M	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.5	<1	<0.1	<1	1	<1	<0.05	6	13
RPD			***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***0.00***	***0.00***	**153.85**	**114.29**	**189.09**	**195.88**	**192.00**	**199.38**	**186.36**	**176.68**
Trip Blank																				
QTB1	-	Soil	-	-	-	-	<0.1	<0.1	<0.1	<0.3	-	-	-	-	-	-	-	-	-	-
GWQTB1	-	Water	-	-	-	-	<0.1	<0.1	<0.1	<0.3	-	-	-	-	-	-	-	-	-	-
Trip Spike																				
QTS1	-	Soil	-	-	-	-	[99%]	[106%]	[107%]	N.A.	[108%]	[110%]	-	-	-	-	-	-	-	-
GWQTS1	-	Water	-	-	-	-	[100%]	[99%]	[97%]	N.A.	[97%]	[97%]	-	-	-	-	-	-	-	-
Rinsate																				
GWQR1	14/8/2020	De-ionised water	<50	<60	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	<1	<0.1	<1	1	<1	<0.1	<1	<5
QR1	3/8/2020	De-ionised water	<50	<60	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	<1	<0.1	<1	<1	<1	<0.1	<1	<5

52.17	Indicates values where a single result is found to be less than detection, with the duplicate sample found to be over the detection limit.
82.35	RPD exceeds 30-50% range referenced from AS4482.1 (2005)

NOTE:
All soil results are reported in mg/kg . All water results are reported in µg/L.
* - to obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction
** - to obtain F2 subtract naphthalene from the > C_{10}-C_{16} fraction

Appendix M– Laboratory QA/AC Policies and DQOS

Table QC1 - Containers, Preservation Requirements and Holding Times - Soil			
Parameter	Container	Preservation	Maximum Holding Time
Acid digestible metals and metalloids - Total and TCLP (As,Cd.,Cu,Cr,Ni,Pb,Zn)	Glass with Teflon Lid	Nil	6 months
Mercury	Glass with Teflon Lid	Nil	28 days
TPH / BTEX / VOC / SVOC / CHC	Glass with Teflon Lid	4°C, zero headspace	14 days
PAHs (total and TCLP)	Glass with Teflon Lid	4°C [1]	14 days
Phenols	Glass with Teflon Lid	4°C [1]	14 days
OCPs, OPPs and total PCBs	Glass with Teflon Lid	4°C [1]	14 days
Asbestos	Sealed Plastic Bag	Nil	N/A

Table QC2 - Containers, Preservation Requirements and Holding Times - Water			
Parameter	Container Volume (mL)	Preservation	Maximum Holding Time
Heavy Metals	125mL Plastic	Field filtration 0.45μm HNO_3 / 4°C	6 months
Cyanide	125mL Amber Glass	pH > 12 NaOH / 4°C	6 months
TPH (C6-C9) / BTEX / VOCs SVOCs / CHCs	4 x 43mL Glass	HCl / 4°C [1]	14 days
TPH (C10-C36) / PAH / Phenolics OCP / OPP / TDS / pH	3 x 1L Amber Glass	None / 4°C [1]	28 days

Notes: [1] = Extraction within 14 days, Analysis within 40 days.

Table QC3 - Analytical Parameters, PQLs and Methods - Soil			
Parameter	**Unit**	**PQL**	**Method Reference**
Metals in Soil			
Arsenic - As[1]	mg / kg	1	USEPA 200.7
Cadmium - Cd[1]	mg / kg	0.5	USEPA 200.7
Chromium - Cr[1]	mg / kg	1	USEPA 200.7
Copper - Cu[1]	mg / kg	1	USEPA 200.7
Lead - Pb[1]	mg / kg	1	USEPA 200.7
Mercury - Hg[2]	mg / kg	0.1	USEPA 7471A
Nickel - Ni[1]	mg / kg	1	USEPA 200.7
Zinc - Zn[1]	mg / kg	1	USEPA 200.7
Total Petroleum Hydrocarbons (TPHs) in Soil			
C_6-C_9 fraction	mg / kg	25	USEPA 8260
C_{10}-C_{14} fraction	mg / kg	50	USEPA 8000
C_{15}-C_{28} fraction	mg / kg	100	USEPA 8000
C_{29}-C_{36} fraction	mg / kg	100	USEPA 8000
BTEX in Soil			
Benzene	mg / kg	1	USEPA 8260
Toluene	mg / kg	1	USEPA 8260
Ethylbenzene	mg / kg	1	USEPA 8260
m & p Xylene	mg / kg	2	USEPA 8260
o- Xylene	mg / kg	1	USEPA 8260
Other Organic Contaminants in Soil			
PAHs	mg / kg	0.05-0.2	USEPA 8270
CHCs	mg / kg	1	USEPA 8260
VOCs	mg / kg	1	USEPA 8260
SVOCs	mg / kg	1	USEPA 8260
OCPs	mg / kg	0.1	USEPA 8140, 8080
OPPs	mg / kg	0.1	USEPA 8140, 8080
PCBs	mg / kg	0.1	USEPA 8080
Phenolics	mg / kg	5	APHA 5530
Asbestos			
Asbestos	mg / kg	Presence / Absence	AS4964-2004

Notes:

1. Acid Soluble Metals by ICP-AES
2. Total Recoverable Mercury

Table QC4 - Analytical Parameters, PQLs and Methods - Groundwater

Parameter	Unit	PQL	Method
Heavy Metals			
Antimony - Sb	µg/L	1	USEPA 200.8
Arsenic - As	µg/L	1	USEPA 200.8
Beryllium - Be	µg/L	0.5	USEPA 200.8
Cadmium - Cd	µg/L	0.1	USEPA 200.8
Chromium - Cr	µg/L	1	USEPA 200.8
Cobalt - Co	µg/L	1	USEPA 200.8
Copper - Cu	µg/L	1	USEPA 200.8
Lead - Pb	µg/L	1	USEPA 200.8
Mercury - Hg	µg/L	0.5	USEPA 7471A
Molybdenum - Mo	µg/L	1	USEPA 200.8
Nickel - Ni	µg/L	1	USEPA 200.8
Selenium - Se	µg/L	1	USEPA 200.8
Silver - Ag	µg/L	1	USEPA 200.8
Tin (inorg.) - Sn	µg/L	1	USEPA 200.8
Nickel - Ni	µg/L	1	USEPA 200.8
Zinc - Zn	µg/L	1	USEPA 200.8
Total Petroleum Hydrocarbons (TPHs)			
C_6-C_9 fraction	µg/L	10	USEPA 8220A / 8000
C_{10}-C_{14} fraction	µg/L	50	USEPA 8000
C_{15}-C_{28} fraction	µg/L	100	USEPA 8000
C_{29}-C_{36} fraction	µg/L	100	USEPA 8000
BTEX			
Benzene	µg/L	1	USEPA 8220A
Toluene	µg/L	1	USEPA 8220A
Ethylbenzene	µg/L	1	USEPA 8220A
m- & p-Xylene	µg/L	2	USEPA 8220A
o-Xylene	µg/L	1	USEPA 8220A
Polyciclic Aromatic Hydrocarbons (PAHs)			
PAHs	µg/L	0.1	USEPA 8270
Benzo(a)pyrene	µg/L	0.01	USEPA 8270
OrganoChlorine Pesticides (OCPs)			
Aldrin	µg/L	0.001	USEPA 8081
Chlordane	µg/L	0.001	USEPA 8081
DDT	µg/L	0.001	USEPA 8081
Dieldrin	µg/L	0.001	USEPA 8081
Endosulfan	µg/L	0.001	USEPA 8081
Endrin	µg/L	0.001	USEPA 8081
Heptachlor	µg/L	0.001	USEPA 8081
Lindane	µg/L	0.001	USEPA 8081
Toxaphene	µg/L	0.001	USEPA 8081

Parameter	Unit	PQL	Method
Chlorinated Hydrocarbons (CHCs)			
1,2-dichlorobenzene	µg/L	1	USEPA 8260B
1,3-dichlorobenzene	µg/L	1	USEPA 8260B
1,4-dichlorobenzene	µg/L	1	USEPA 8260B
1,2,3-trichlorobenzene	µg/L	1	USEPA 8260B
1,2,4-trichlorobenzene	µg/L	1	USEPA 8260B
Hexachlorobutadeine	µg/L	1	USEPA 8260B
1,1,2-trichloroethane	µg/L	1	USEPA 8260B
Hexachloroethane	µg/L	10	USEPA 8270D
Other CHCs	µg/L	1	USEPA 8260B
Volatile Organic Compounds (VOCs)			
Aniline	µg/L	10	USEPA 8260B
2,4-dichloroaniline	µg/L	10	USEPA 8260B
3,4-dichloroaniline	µg/L	10	USEPA 8260B
Nitrobenzene	µg/L	50	USEPA 8260B
2,4-dinitrotoluene	µg/L	50	USEPA 8260B
2,4,6-trinitrotoluene	µg/L	50	USEPA 8260B
Phenolic Compounds			
Phenol	µg/L	10	USEPA 8041
2-chlorophenol	µg/L	10	USEPA 8041
4-chlorophenol	µg/L	10	USEPA 8041
2, 4-dichlorophenol	µg/L	10	USEPA 8041
2,4,6-trichlorophenol	µg/L	10	USEPA 8041
2,3,4,6-tetrachlorophenol	µg/L	10	USEPA 8041
Pentachlorophenol	µg/L	10	USEPA 8041
2,4-dinitrophenol	µg/L	10	USEPA 8041
Miscellaneous Parameters			
Total Cyanide	µg/L	5	APHA 4500C&E-CN
Fluoride	µg/L	10	APHA 4500 F-C
Salinity (TDS)	mg/L	1	APHA 2510
pH	units	0.1	APHA 4500H+
OrganoPhosphate Pesticides (OPPs)			
Azinphos Methyl	µg/L	0.01	USEPA 8141
Chloropyrifos	µg/L	0.01	USEPA 8141
Diazinon	µg/L	0.01	USEPA 8141
Dimethoate	µg/L	0.01	USEPA 8141
Fenitrothion	µg/L	0.01	USEPA 8141
Malathion	µg/L	0.01	USEPA 8141
Parathion	µg/L	0.01	USEPA 8141
Temephos	µg/L	0.01	USEPA 8141
Polychlorinated Biphenyls (PCBs)			
Individual PCBs	µg/L	0.01	USEPA 8081

Table QC5 - QC Sample Data Acceptance Criteria

QC Sample Type	Method of Assessment	Acceptable Range
Field QC		
Blind Duplicates and Split Samples	The assessment of split duplicate is undertaken by calculating the Relative Percent Difference (RPD) of the duplicate concentration compared with the primary sample concentration. The RPD is defined as: $RPD = 100 \times \frac{\lvert X_1 - X_2 \rvert}{\text{mean}(X1, X2)}$ Where: X_1 and X_2 are the concentrations of the primary and duplicate samples.	The acceptable range depends upon the levels detected: - 0-150% RPD (when the average concentration is <5 times the LOR/PQL) - 0-75% RPD (when the average concentration is 5 to 10 times the LOR/PQL) - 0-50% RPD (when the average concentration is >10 times the LOR/PQL)
Rinsate & Trip Blanks	Each blank is analysed as per the original samples.	Analytical Result <LOR/PQL
Laboratory prepared Trip Spike	The Trip Spike is analysed after returning from the field and the % recovery of the known spike is calculated.	70 - 130%
Laboratory QC		
Laboratory Duplicates	Assessment of Lab Duplicate RPD as per Blind Duplicates and Split Samples.	Lab Duplicate RPD < 15% (Inorganics) Lab Duplicate RPD < 30% (Organics) for sample results > 10 LOR
Surrogates Matrix Spikes Laboratory Control Samples	Assessment is undertaken by determining the percent recovery of the known surrogate spike (SS) or addition to the sample. $\%\ Recovery = 100 \times \frac{C - A}{B}$ Where: A = Concentration of analyte determined in the original sample; B = Added Concentration; and C = Calculated Concentration.	at least 2 SS recoveries to be within 70-130% subject to matrix effects (Organics) 80-120% (Inorganics / Metals) 60-140% (Organics) 10-140% (SVOC and Speciated Phenols) If the result is outside the above ranges, the result must be <3x Standard Deviation of the Historical Mean (calculated over the past 12 months).
Sample Matrix Spike Duplicates	Recovery RPD	<30% (Inorganics & Organics)
Calibration Check Standars	Continuous Calibration Verification (CCV)	CCV must be within ±15% (inorganics) CCV must be within ±25% (inorganics)
Reagent, Method & Calibration Check Blanks	Each blank is analysed as per the original samples.	Analytical Result <LOR/PQL

Note: PQL - Laboratory Practical Quantitation Limit (PQL) or the minimum detection limit for a particular analyte.
LOR = Limit of Reporting

STATEMENT OF QA/QC PERFORMANCE

SE209734 R0

CLIENT DETAILS

Contact	Ian Watts
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Ian.watts@eiaustralia.com.au
Project	**E24782 The Hills Bowling Club, Baulkham**
Order Number	**E24782**
Samples	18

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE209734 R0**
Date Received	06 Aug 2020
Date Reported	14 Aug 2020

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Surrogate	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	4 items
Duplicate	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	1 item
Matrix Spike	OC Pesticides in Soil	1 item
	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	2 items

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	16 Sol, 2 Water
Date documentation received	7/8/2020@11:21pm	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	14°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE209734 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206555	05 Aug 2020	06 Aug 2020	05 Aug 2021	12 Aug 2020	05 Aug 2021	13 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206555	05 Aug 2020	06 Aug 2020	05 Aug 2021	12 Aug 2020	05 Aug 2021	13 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206555	05 Aug 2020	06 Aug 2020	05 Aug 2021	12 Aug 2020	05 Aug 2021	13 Aug 2020
BH4_0.5-0.6	SE209734.005	LB206555	05 Aug 2020	06 Aug 2020	05 Aug 2021	12 Aug 2020	05 Aug 2021	13 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206555	05 Aug 2020	06 Aug 2020	05 Aug 2021	12 Aug 2020	05 Aug 2021	13 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206555	05 Aug 2020	06 Aug 2020	05 Aug 2021	12 Aug 2020	05 Aug 2021	13 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206555	05 Aug 2020	06 Aug 2020	05 Aug 2021	12 Aug 2020	05 Aug 2021	13 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206555	05 Aug 2020	06 Aug 2020	05 Aug 2021	12 Aug 2020	05 Aug 2021	13 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206555	05 Aug 2020	06 Aug 2020	05 Aug 2021	12 Aug 2020	05 Aug 2021	13 Aug 2020

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QR1	SE209734.015	LB206307	05 Aug 2020	06 Aug 2020	02 Sep 2020	10 Aug 2020	02 Sep 2020	10 Aug 2020

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH2M_4.5-4.6	SE209734.003	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH4_0.5-0.6	SE209734.005	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH4_5.0-5.5	SE209734.006	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH5_0.7-0.8	SE209734.008	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH7_1.5-1.6	SE209734.011	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206466	05 Aug 2020	06 Aug 2020	02 Sep 2020	11 Aug 2020	02 Sep 2020	13 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206573	05 Aug 2020	06 Aug 2020	02 Sep 2020	12 Aug 2020	02 Sep 2020	13 Aug 2020
QD1	SE209734.014	LB206573	05 Aug 2020	06 Aug 2020	02 Sep 2020	12 Aug 2020	02 Sep 2020	13 Aug 2020

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH2M_4.5-4.6	SE209734.003	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH4_0.5-0.6	SE209734.005	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH4_5.0-5.5	SE209734.006	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH5_0.7-0.8	SE209734.008	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH7_1.5-1.6	SE209734.011	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
QD1	SE209734.014	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020
QTB1	SE209734.017	LB206365	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	15 Aug 2020	13 Aug 2020

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH2M_4.5-4.6	SE209734.003	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH4_0.5-0.6	SE209734.005	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH4_5.0-5.5	SE209734.006	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH5_0.7-0.8	SE209734.008	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020

HOLDING TIME SUMMARY

SE209734 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH7_1.5-1.6	SE209734.011	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
QD1	SE209734.014	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH2M_4.5-4.6	SE209734.003	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH4_0.5-0.6	SE209734.005	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH4_5.0-5.5	SE209734.006	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH5_0.7-0.8	SE209734.008	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH7_1.5-1.6	SE209734.011	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
QD1	SE209734.014	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH2M_4.5-4.6	SE209734.003	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH4_0.5-0.6	SE209734.005	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH4_5.0-5.5	SE209734.006	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH5_0.7-0.8	SE209734.008	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH7_1.5-1.6	SE209734.011	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
QD1	SE209734.014	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH2M_4.5-4.6	SE209734.003	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH4_0.5-0.6	SE209734.005	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH4_5.0-5.5	SE209734.006	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH5_0.7-0.8	SE209734.008	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH7_1.5-1.6	SE209734.011	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020
QD1	SE209734.014	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	14 Aug 2020

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH2M_4.5-4.6	SE209734.003	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020

HOLDING TIME SUMMARY

SE209734 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH4_0.5-0.6	SE209734.005	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH4_5.0-5.5	SE209734.006	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH5_0.7-0.8	SE209734.008	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH7_1.5-1.6	SE209734.011	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206465	05 Aug 2020	06 Aug 2020	01 Feb 2021	11 Aug 2020	01 Feb 2021	13 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206572	05 Aug 2020	06 Aug 2020	01 Feb 2021	12 Aug 2020	01 Feb 2021	13 Aug 2020
QD1	SE209734.014	LB206572	05 Aug 2020	06 Aug 2020	01 Feb 2021	12 Aug 2020	01 Feb 2021	13 Aug 2020

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QR1	SE209734.015	LB206353	05 Aug 2020	06 Aug 2020	01 Feb 2021	10 Aug 2020	01 Feb 2021	11 Aug 2020

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH2M_4.5-4.6	SE209734.003	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH4_0.5-0.6	SE209734.005	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH4_5.0-5.5	SE209734.006	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH5_0.7-0.8	SE209734.008	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH7_1.5-1.6	SE209734.011	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
QD1	SE209734.014	LB206362	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QR1	SE209734.015	LB206302	05 Aug 2020	06 Aug 2020	12 Aug 2020	10 Aug 2020	19 Sep 2020	12 Aug 2020

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH2M_4.5-4.6	SE209734.003	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH4_0.5-0.6	SE209734.005	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH4_5.0-5.5	SE209734.006	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH5_0.7-0.8	SE209734.008	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH7_1.5-1.6	SE209734.011	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
QD1	SE209734.014	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
QTB1	SE209734.017	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
QTS1	SE209734.018	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QR1	SE209734.015	LB206387	05 Aug 2020	06 Aug 2020	12 Aug 2020	10 Aug 2020	19 Sep 2020	11 Aug 2020

HOLDING TIME SUMMARY

SE209734 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734.001	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH2M_0.1-0.2	SE209734.002	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH2M_4.5-4.6	SE209734.003	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH3_0.2-0.3	SE209734.004	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH4_0.5-0.6	SE209734.005	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH4_5.0-5.5	SE209734.006	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH5_0.1-0.2	SE209734.007	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH5_0.7-0.8	SE209734.008	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH6_0.6-0.7	SE209734.009	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH7_1.0-1.1	SE209734.010	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH7_1.5-1.6	SE209734.011	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH8_0.1-0.2	SE209734.012	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
BH9_0.1-0.2	SE209734.013	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
QD1	SE209734.014	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
QTB1	SE209734.017	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020
QTS1	SE209734.018	LB206360	05 Aug 2020	06 Aug 2020	19 Aug 2020	10 Aug 2020	19 Sep 2020	13 Aug 2020

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QR1	SE209734.015	LB206387	05 Aug 2020	06 Aug 2020	12 Aug 2020	10 Aug 2020	19 Sep 2020	11 Aug 2020

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	60 - 130%	108
	BH2M_0.1-0.2	SE209734.002	%	60 - 130%	108
	BH3_0.2-0.3	SE209734.004	%	60 - 130%	114
	BH4_0.5-0.6	SE209734.005	%	60 - 130%	106
	BH4_5.0-5.5	SE209734.006	%	60 - 130%	103
	BH5_0.1-0.2	SE209734.007	%	60 - 130%	107
	BH6_0.6-0.7	SE209734.009	%	60 - 130%	107
	BH7_1.0-1.1	SE209734.010	%	60 - 130%	105
	BH8_0.1-0.2	SE209734.012	%	60 - 130%	102
	BH9_0.1-0.2	SE209734.013	%	60 - 130%	102

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	60 - 130%	70
	BH2M_0.1-0.2	SE209734.002	%	60 - 130%	73
	BH3_0.2-0.3	SE209734.004	%	60 - 130%	73
	BH4_0.5-0.6	SE209734.005	%	60 - 130%	76
	BH4_5.0-5.5	SE209734.006	%	60 - 130%	78
	BH5_0.1-0.2	SE209734.007	%	60 - 130%	76
	BH6_0.6-0.7	SE209734.009	%	60 - 130%	73
	BH7_1.0-1.1	SE209734.010	%	60 - 130%	71
	BH8_0.1-0.2	SE209734.012	%	60 - 130%	77
	BH9_0.1-0.2	SE209734.013	%	60 - 130%	77
d14-p-terphenyl (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	60 - 130%	87
	BH2M_0.1-0.2	SE209734.002	%	60 - 130%	107
	BH3_0.2-0.3	SE209734.004	%	60 - 130%	99
	BH4_0.5-0.6	SE209734.005	%	60 - 130%	84
	BH4_5.0-5.5	SE209734.006	%	60 - 130%	86
	BH5_0.1-0.2	SE209734.007	%	60 - 130%	97
	BH6_0.6-0.7	SE209734.009	%	60 - 130%	84
	BH7_1.0-1.1	SE209734.010	%	60 - 130%	86
	BH8_0.1-0.2	SE209734.012	%	60 - 130%	78
	BH9_0.1-0.2	SE209734.013	%	60 - 130%	92

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	70 - 130%	70 †
	BH2M_0.1-0.2	SE209734.002	%	70 - 130%	73
	BH2M_4.5-4.6	SE209734.003	%	70 - 130%	73
	BH3_0.2-0.3	SE209734.004	%	70 - 130%	73
	BH4_0.5-0.6	SE209734.005	%	70 - 130%	76
	BH4_5.0-5.5	SE209734.006	%	70 - 130%	78
	BH5_0.1-0.2	SE209734.007	%	70 - 130%	76
	BH5_0.7-0.8	SE209734.008	%	70 - 130%	71
	BH6_0.6-0.7	SE209734.009	%	70 - 130%	73
	BH7_1.0-1.1	SE209734.010	%	70 - 130%	71
	BH7_1.5-1.6	SE209734.011	%	70 - 130%	72
	BH8_0.1-0.2	SE209734.012	%	70 - 130%	77
	BH9_0.1-0.2	SE209734.013	%	70 - 130%	77
d14-p-terphenyl (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	70 - 130%	87
	BH2M_0.1-0.2	SE209734.002	%	70 - 130%	107
	BH2M_4.5-4.6	SE209734.003	%	70 - 130%	91
	BH3_0.2-0.3	SE209734.004	%	70 - 130%	99
	BH4_0.5-0.6	SE209734.005	%	70 - 130%	84
	BH4_5.0-5.5	SE209734.006	%	70 - 130%	86
	BH5_0.1-0.2	SE209734.007	%	70 - 130%	97
	BH5_0.7-0.8	SE209734.008	%	70 - 130%	83
	BH6_0.6-0.7	SE209734.009	%	70 - 130%	84
	BH7_1.0-1.1	SE209734.010	%	70 - 130%	86
	BH7_1.5-1.6	SE209734.011	%	70 - 130%	95
	BH8_0.1-0.2	SE209734.012	%	70 - 130%	78
	BH9_0.1-0.2	SE209734.013	%	70 - 130%	92

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d5-nitrobenzene (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	70 - 130%	75
	BH2M_0.1-0.2	SE209734.002	%	70 - 130%	72
	BH2M_4.5-4.6	SE209734.003	%	70 - 130%	77
	BH3_0.2-0.3	SE209734.004	%	70 - 130%	77
	BH4_0.5-0.6	SE209734.005	%	70 - 130%	69 ①
	BH4_5.0-5.5	SE209734.006	%	70 - 130%	70 ①
	BH5_0.1-0.2	SE209734.007	%	70 - 130%	77
	BH5_0.7-0.8	SE209734.008	%	70 - 130%	68 ①
	BH6_0.6-0.7	SE209734.009	%	70 - 130%	82
	BH7_1.0-1.1	SE209734.010	%	70 - 130%	72
	BH7_1.5-1.6	SE209734.011	%	70 - 130%	72
	BH8_0.1-0.2	SE209734.012	%	70 - 130%	72
	BH9_0.1-0.2	SE209734.013	%	70 - 130%	78

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	60 - 130%	108
	BH2M_0.1-0.2	SE209734.002	%	60 - 130%	108
	BH3_0.2-0.3	SE209734.004	%	60 - 130%	114
	BH4_0.5-0.6	SE209734.005	%	60 - 130%	106
	BH4_5.0-5.5	SE209734.006	%	60 - 130%	103
	BH5_0.1-0.2	SE209734.007	%	60 - 130%	107
	BH6_0.6-0.7	SE209734.009	%	60 - 130%	107
	BH7_1.0-1.1	SE209734.010	%	60 - 130%	105
	BH8_0.1-0.2	SE209734.012	%	60 - 130%	102
	BH9_0.1-0.2	SE209734.013	%	60 - 130%	102

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	60 - 130%	88
	BH2M_0.1-0.2	SE209734.002	%	60 - 130%	88
	BH2M_4.5-4.6	SE209734.003	%	60 - 130%	87
	BH3_0.2-0.3	SE209734.004	%	60 - 130%	93
	BH4_0.5-0.6	SE209734.005	%	60 - 130%	86
	BH4_5.0-5.5	SE209734.006	%	60 - 130%	90
	BH5_0.1-0.2	SE209734.007	%	60 - 130%	90
	BH5_0.7-0.8	SE209734.008	%	60 - 130%	92
	BH6_0.6-0.7	SE209734.009	%	60 - 130%	79
	BH7_1.0-1.1	SE209734.010	%	60 - 130%	84
	BH7_1.5-1.6	SE209734.011	%	60 - 130%	93
	BH8_0.1-0.2	SE209734.012	%	60 - 130%	86
	BH9_0.1-0.2	SE209734.013	%	60 - 130%	84
	QD1	SE209734.014	%	60 - 130%	87
	QTB1	SE209734.017	%	60 - 130%	92
	QTS1	SE209734.018	%	60 - 130%	82
d4-1,2-dichloroethane (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	60 - 130%	84
	BH2M_0.1-0.2	SE209734.002	%	60 - 130%	90
	BH2M_4.5-4.6	SE209734.003	%	60 - 130%	85
	BH3_0.2-0.3	SE209734.004	%	60 - 130%	91
	BH4_0.5-0.6	SE209734.005	%	60 - 130%	84
	BH4_5.0-5.5	SE209734.006	%	60 - 130%	94
	BH5_0.1-0.2	SE209734.007	%	60 - 130%	86
	BH5_0.7-0.8	SE209734.008	%	60 - 130%	83
	BH6_0.6-0.7	SE209734.009	%	60 - 130%	78
	BH7_1.0-1.1	SE209734.010	%	60 - 130%	89
	BH7_1.5-1.6	SE209734.011	%	60 - 130%	87
	BH8_0.1-0.2	SE209734.012	%	60 - 130%	81
	BH9_0.1-0.2	SE209734.013	%	60 - 130%	82
	QD1	SE209734.014	%	60 - 130%	79
	QTB1	SE209734.017	%	60 - 130%	94
	QTS1	SE209734.018	%	60 - 130%	87
d8-toluene (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	60 - 130%	79

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	BH2M_0.1-0.2	SE209734.002	%	60 - 130%	77
	BH2M_4.5-4.6	SE209734.003	%	60 - 130%	82
	BH3_0.2-0.3	SE209734.004	%	60 - 130%	78
	BH4_0.5-0.6	SE209734.005	%	60 - 130%	83
	BH4_5.0-5.5	SE209734.006	%	60 - 130%	84
	BH5_0.1-0.2	SE209734.007	%	60 - 130%	75
	BH5_0.7-0.8	SE209734.008	%	60 - 130%	83
	BH6_0.6-0.7	SE209734.009	%	60 - 130%	73
	BH7_1.0-1.1	SE209734.010	%	60 - 130%	85
	BH7_1.5-1.6	SE209734.011	%	60 - 130%	81
	BH8_0.1-0.2	SE209734.012	%	60 - 130%	81
	BH9_0.1-0.2	SE209734.013	%	60 - 130%	75
	QD1	SE209734.014	%	60 - 130%	75
	QTB1	SE209734.017	%	60 - 130%	85
	QTS1	SE209734.018	%	60 - 130%	78

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QR1	SE209734.015	%	40 - 130%	100
d4-1,2-dichloroethane (Surrogate)	QR1	SE209734.015	%	40 - 130%	102
d8-toluene (Surrogate)	QR1	SE209734.015	%	40 - 130%	98

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	60 - 130%	88
	BH2M_0.1-0.2	SE209734.002	%	60 - 130%	88
	BH2M_4.5-4.6	SE209734.003	%	60 - 130%	87
	BH3_0.2-0.3	SE209734.004	%	60 - 130%	93
	BH4_0.5-0.6	SE209734.005	%	60 - 130%	86
	BH4_5.0-5.5	SE209734.006	%	60 - 130%	90
	BH5_0.1-0.2	SE209734.007	%	60 - 130%	90
	BH5_0.7-0.8	SE209734.008	%	60 - 130%	92
	BH6_0.6-0.7	SE209734.009	%	60 - 130%	79
	BH7_1.0-1.1	SE209734.010	%	60 - 130%	84
	BH7_1.5-1.6	SE209734.011	%	60 - 130%	93
	BH8_0.1-0.2	SE209734.012	%	60 - 130%	86
	BH9_0.1-0.2	SE209734.013	%	60 - 130%	84
	QD1	SE209734.014	%	60 - 130%	87
d4-1,2-dichloroethane (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	60 - 130%	84
	BH2M_0.1-0.2	SE209734.002	%	60 - 130%	90
	BH2M_4.5-4.6	SE209734.003	%	60 - 130%	85
	BH3_0.2-0.3	SE209734.004	%	60 - 130%	91
	BH4_0.5-0.6	SE209734.005	%	60 - 130%	84
	BH4_5.0-5.5	SE209734.006	%	60 - 130%	94
	BH5_0.1-0.2	SE209734.007	%	60 - 130%	86
	BH5_0.7-0.8	SE209734.008	%	60 - 130%	83
	BH6_0.6-0.7	SE209734.009	%	60 - 130%	78
	BH7_1.0-1.1	SE209734.010	%	60 - 130%	89
	BH7_1.5-1.6	SE209734.011	%	60 - 130%	87
	BH8_0.1-0.2	SE209734.012	%	60 - 130%	81
	BH9_0.1-0.2	SE209734.013	%	60 - 130%	82
	QD1	SE209734.014	%	60 - 130%	79
d8-toluene (Surrogate)	BH1M_0.7-0.8	SE209734.001	%	60 - 130%	79
	BH2M_0.1-0.2	SE209734.002	%	60 - 130%	77
	BH2M_4.5-4.6	SE209734.003	%	60 - 130%	82
	BH3_0.2-0.3	SE209734.004	%	60 - 130%	78
	BH4_0.5-0.6	SE209734.005	%	60 - 130%	83
	BH4_5.0-5.5	SE209734.006	%	60 - 130%	84
	BH5_0.1-0.2	SE209734.007	%	60 - 130%	75
	BH5_0.7-0.8	SE209734.008	%	60 - 130%	83
	BH6_0.6-0.7	SE209734.009	%	60 - 130%	73
	BH7_1.0-1.1	SE209734.010	%	60 - 130%	85

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	BH7_1.5-1.6	SE209734.011	%	60 - 130%	81
	BH8_0.1-0.2	SE209734.012	%	60 - 130%	81
	BH9_0.1-0.2	SE209734.013	%	60 - 130%	75
	QD1	SE209734.014	%	60 - 130%	75

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QR1	SE209734.015	%	40 - 130%	100
d4-1,2-dichloroethane (Surrogate)	QR1	SE209734.015	%	60 - 130%	102
d8-toluene (Surrogate)	QR1	SE209734.015	%	40 - 130%	98

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB206307.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB206466.001	Mercury	mg/kg	0.05	<0.05
LB206573.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB206362.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	95

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB206362.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	74
		d14-p-terphenyl (Surrogate)	%	-	103

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB206362.001	Naphthalene	mg/kg	0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1	<0.1
	1-methylnaphthalene	mg/kg	0.1	<0.1
	Acenaphthylene	mg/kg	0.1	<0.1
	Acenaphthene	mg/kg	0.1	<0.1
	Fluorene	mg/kg	0.1	<0.1
	Phenanthrene	mg/kg	0.1	<0.1
	Anthracene	mg/kg	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB206362.001		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	78
		2-fluorobiphenyl (Surrogate)	%	-	74
		d14-p-terphenyl (Surrogate)	%	-	103

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB206362.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	95

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB206465.001	Arsenic, As	mg/kg	1	<1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.5	<0.5
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0
LB206572.001	Arsenic, As	mg/kg	1	<1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.5	<0.5
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB206353.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB206362.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB206302.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB206360.001	Fumigants	2,2-dichloropropane	mg/kg	0.1	<0.1
		1,2-dichloropropane	mg/kg	0.1	<0.1
		cis-1,3-dichloropropene	mg/kg	0.1	<0.1
		trans-1,3-dichloropropene	mg/kg	0.1	<0.1
		1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1
		Chloromethane	mg/kg	1	<1
		Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1
		Bromomethane	mg/kg	1	<1
		Chloroethane	mg/kg	1	<1
		Trichlorofluoromethane	mg/kg	1	<1
		Iodomethane	mg/kg	5	<5
		1,1-dichloroethene	mg/kg	0.1	<0.1
		Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5
		Allyl chloride	mg/kg	0.1	<0.1
		trans-1,2-dichloroethene	mg/kg	0.1	<0.1
		1,1-dichloroethane	mg/kg	0.1	<0.1
		cis-1,2-dichloroethene	mg/kg	0.1	<0.1
		Bromochloromethane	mg/kg	0.1	<0.1
		1,2-dichloroethane	mg/kg	0.1	<0.1
		1,1,1-trichloroethane	mg/kg	0.1	<0.1
		1,1-dichloropropene	mg/kg	0.1	<0.1
		Carbon tetrachloride	mg/kg	0.1	<0.1
		Dibromomethane	mg/kg	0.1	<0.1
		Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.1
		1,1,2-trichloroethane	mg/kg	0.1	<0.1
		1,3-dichloropropane	mg/kg	0.1	<0.1
		Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1
		1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1
		cis-1,4-dichloro-2-butene	mg/kg	1	<1
		1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1
		1,2,3-trichloropropane	mg/kg	0.1	<0.1
		trans-1,4-dichloro-2-butene	mg/kg	1	<1
		1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1
		Hexachlorobutadiene	mg/kg	0.1	<0.1
	Halogenated Aromatics	Chlorobenzene	mg/kg	0.1	<0.1
		Bromobenzene	mg/kg	0.1	<0.1
		2-chlorotoluene	mg/kg	0.1	<0.1
		4-chlorotoluene	mg/kg	0.1	<0.1
		1,3-dichlorobenzene	mg/kg	0.1	<0.1
		1,4-dichlorobenzene	mg/kg	0.1	<0.1
		1,2-dichlorobenzene	mg/kg	0.1	<0.1
		1,2,4-trichlorobenzene	mg/kg	0.1	<0.1
		1,2,3-trichlorobenzene	mg/kg	0.1	<0.1
	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
		Styrene (Vinyl benzene)	mg/kg	0.1	<0.1
		Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1
		n-propylbenzene	mg/kg	0.1	<0.1
		1,3,5-trimethylbenzene	mg/kg	0.1	<0.1
		tert-butylbenzene	mg/kg	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB206360.001	Monocyclic Aromatic Hydrocarbons	1,2,4-trimethylbenzene	mg/kg	0.1	<0.1
		sec-butylbenzene	mg/kg	0.1	<0.1
		p-isopropyltoluene	mg/kg	0.1	<0.1
		n-butylbenzene	mg/kg	0.1	<0.1
	Nitrogenous Compounds	Acrylonitrile	mg/kg	0.1	<0.1
		2-nitropropane	mg/kg	10	<10
	Oxygenated Compounds	Acetone (2-propanone)	mg/kg	10	<10
		MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1
		Vinyl acetate	mg/kg	10	<10
		MEK (2-butanone)	mg/kg	10	<10
		MIBK (4-methyl-2-pentanone)	mg/kg	1	<1
		2-hexanone (MBK)	mg/kg	5	<5
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Sulphonated	Carbon disulfide	mg/kg	0.5	<0.5
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	92
		d8-toluene (Surrogate)	%	-	82
		Bromofluorobenzene (Surrogate)	%	-	94
	Totals	Total BTEX	mg/kg	0.6	<0.6
		Total Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8
		Total Other Chlorinated Hydrocarbons VIC EPA*	mg/kg	1.8	<1.8
	Trihalomethanes	Chloroform	mg/kg	0.1	<0.1
		Bromodichloromethane	mg/kg	0.1	<0.1
		Chlorodibromomethane	mg/kg	0.1	<0.1
		Bromoform	mg/kg	0.1	<0.1

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB206387.001	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		o-xylene	µg/L	0.5	<0.5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	94
		Bromofluorobenzene (Surrogate)	%	-	95

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB206360.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	92

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB206387.001		TRH C6-C9	µg/L	40	<40
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	94
		Bromofluorobenzene (Surrogate)	%	-	95

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209719.004	LB206307.014	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	198

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.003	LB206466.014	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE209734.012	LB206466.024	Mercury	mg/kg	0.05	0.99	1.3	34	24
SE209734.014	LB206573.006	Mercury	mg/kg	0.05	0.20	0.15	59	29

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.010	LB206365.011	% Moisture	%w/w	1	15.3	14.4	37	6

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.013	LB206362.021		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	0	200	0
			Alpha BHC	mg/kg	0.1	<0.1	0	200	0
			Lindane	mg/kg	0.1	<0.1	0	200	0
			Heptachlor	mg/kg	0.1	<0.1	0	200	0
			Aldrin	mg/kg	0.1	<0.1	0.0008509035	200	0
			Beta BHC	mg/kg	0.1	<0.1	0	200	0
			Delta BHC	mg/kg	0.1	<0.1	0.0007322894	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	0.0011197936	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	0.000406796	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	0.00089801	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	0.003863919	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	0.009634439	200	0
			Dieldrin	mg/kg	0.2	<0.2	0.0104497652	200	0
			Endrin	mg/kg	0.2	<0.2	0.0044798038	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	0	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	0.003292702	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	0	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	0.0063093103	200	0
			Methoxychlor	mg/kg	0.1	<0.1	0	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	0.0138691126	200	0
			Isodrin	mg/kg	0.1	<0.1	0.0006231565	200	0
			Mirex	mg/kg	0.1	<0.1	0.0271911496	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	0.0362470776	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.15722466	30	2

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.010	LB206362.014	Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
		Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
		Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
		Malathion	mg/kg	0.2	<0.2	<0.2	200	0
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
		Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
		Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
		Ethion	mg/kg	0.2	0.2	<0.2	148	3
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
		Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OP Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.010	LB206362.014	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	3

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.010	LB206362.014		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	0.3	0.2	72	27
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	179	0
			Phenanthrene	mg/kg	0.1	1.5	1.0	38	44 ⑨
			Anthracene	mg/kg	0.1	0.7	0.5	48	33
			Fluoranthene	mg/kg	0.1	3.1	2.5	34	20
			Pyrene	mg/kg	0.1	2.9	2.3	34	24
			Benzo(a)anthracene	mg/kg	0.1	1.2	0.9	40	22
			Chrysene	mg/kg	0.1	1.2	1.0	39	14
			Benzo(b&j)fluoranthene	mg/kg	0.1	1.1	1.0	40	8
			Benzo(k)fluoranthene	mg/kg	0.1	0.6	0.6	46	6
			Benzo(a)pyrene	mg/kg	0.1	1.0	0.9	41	9
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.5	0.5	50	2
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	191	0
			Benzo(ghi)perylene	mg/kg	0.1	0.7	0.7	44	2
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	1.3	1.2	26	9
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	1.4	1.3	32	8
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	1.4	1.3	25	9
			Total PAH (18)	mg/kg	0.8	15	12	36	19
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	2
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	3

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.013	LB206362.021		Arochlor 1016	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	0	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0.15722466	30	2

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.003	LB206465.014		Arsenic, As	mg/kg	1	1	1	111	30
			Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
			Chromium, Cr	mg/kg	0.5	2.4	2.7	50	13
			Copper, Cu	mg/kg	0.5	12	14	34	9
			Nickel, Ni	mg/kg	0.5	1.4	1.7	62	17
			Lead, Pb	mg/kg	1	12	12	38	2
			Zinc, Zn	mg/kg	2	8.5	11	51	23
SE209734.012	LB206465.024		Arsenic, As	mg/kg	1	35	44	33	24
			Cadmium, Cd	mg/kg	0.3	0.5	0.7	82	29
			Chromium, Cr	mg/kg	0.5	10	10	35	1
			Copper, Cu	mg/kg	0.5	30	34	32	13
			Nickel, Ni	mg/kg	0.5	4.7	5.7	40	20
			Lead, Pb	mg/kg	1	130	140	31	1
			Zinc, Zn	mg/kg	2	160	140	31	13
SE209734.014	LB206572.024		Arsenic, As	mg/kg	1	3	2	67	35

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.014	LB206572.024	Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.5	6.3	5.6	38	11
		Copper, Cu	mg/kg	0.5	4.7	4.4	41	8
		Nickel, Ni	mg/kg	0.5	3.0	2.9	47	4
		Lead, Pb	mg/kg	1	9	7	42	20
		Zinc, Zn	mg/kg	2	14	14	44	5
SE209889.010	LB206572.014	Lead, Pb	mg/kg	1	1300	1400	30	10
		Zinc, Zn	mg/kg	2	220	250	31	10

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209719.003	LB206353.014	Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
		Copper, Cu	µg/L	1	<1	<1	200	0
		Zinc, Zn	µg/L	5	12	13	55	7
SE209738.002	LB206353.028	Arsenic, As	µg/L	1	<1	<1	126	0
		Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
		Chromium, Cr	µg/L	1	1	1	97	3
		Copper, Cu	µg/L	1	6	6	31	3
		Lead, Pb	µg/L	1	<1	<1	200	0
		Nickel, Ni	µg/L	1	4	4	39	2
		Zinc, Zn	µg/L	5	10	10	65	2
SE209758.001	LB206353.033	Arsenic, As	µg/L	1	3	4	44	2
		Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
		Chromium, Cr	µg/L	1	4	4	42	5
		Copper, Cu	µg/L	1	3	3	50	8
		Lead, Pb	µg/L	1	3	4	44	24
		Nickel, Ni	µg/L	1	<1	<1	160	0
		Zinc, Zn	µg/L	5	6	8	88	24

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.010	LB206362.014		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0
SE209734.014	LB206362.019		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209738.001	LB206302.025		TRH C10-C14	µg/L	50	<50	0	200	0
			TRH C15-C28	µg/L	200	<200	0	200	0
			TRH C29-C36	µg/L	200	<200	0	200	0
			TRH C37-C40	µg/L	200	<200	0	200	0
			TRH C10-C40	µg/L	320	<320	0	200	0
		TRH F Bands	TRH >C10-C16	µg/L	60	<60	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	0	200	0
			TRH >C16-C34 (F3)	µg/L	500	<500	0	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

TRH (Total Recoverable Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209738.001	LB206302.025	TRH F Bands	TRH >C34-C40 (F4)	µg/L	500	<500	0	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.010	LB206360.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	8.9	8.3	50	7
			d8-toluene (Surrogate)	mg/kg	-	8.5	7.9	50	7
			Bromofluorobenzene (Surrogate)	mg/kg	-	8.4	9.4	50	10
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE209734.014	LB206360.022	Monocyclic	Benzene	mg/kg	0.1	<0.1	0	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	0	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	0	200	0
			m/p-xylene	mg/kg	0.2	<0.2	0	200	0
			o-xylene	mg/kg	0.1	<0.1	0	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	0	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.9	8.2077633525	50	4
			d8-toluene (Surrogate)	mg/kg	-	7.5	8.0183387572	50	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	8.7	8.2731268813	50	5
		Totals	Total Xylenes	mg/kg	0.3	<0.3	0	200	0
			Total BTEX	mg/kg	0.6	<0.6	0	200	0

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209758.001	LB206387.022	Monocyclic	Benzene	µg/L	0.5	<0.5	0	200	0
		Aromatic	Toluene	µg/L	0.5	<0.5	0.0812195947	200	0
			Ethylbenzene	µg/L	0.5	<0.5	0	200	0
			m/p-xylene	µg/L	1	<1	0	200	0
			o-xylene	µg/L	0.5	<0.5	0	200	0
		Polycyclic	Naphthalene	µg/L	0.5	<0.5	0	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.2	9.0407004248	30	12
			d8-toluene (Surrogate)	µg/L	-	9.8	10.5603907184	30	8
			Bromofluorobenzene (Surrogate)	µg/L	-	10.2	10.3156820185	30	1

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209734.010	LB206360.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	8.9	8.3	30	7
			d8-toluene (Surrogate)	mg/kg	-	8.5	7.9	30	7
			Bromofluorobenzene (Surrogate)	mg/kg	-	8.4	9.4	30	10
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE209734.014	LB206360.022		TRH C6-C10	mg/kg	25	<25	0	200	0
			TRH C6-C9	mg/kg	20	<20	0	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.9	8.2077633525	30	4
			d8-toluene (Surrogate)	mg/kg	-	7.5	8.0183387572	30	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	8.7	8.2731268813	30	5
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	0	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	0	200	0

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209644.001	LB206387.021	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10	10	30	3
			d8-toluene (Surrogate)	µg/L	-	10	10	30	5
			Bromofluorobenzene (Surrogate)	µg/L	-	10	11	30	12
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	<0.5	200	0
SE209758.001	LB206387.022		TRH C6-C10	µg/L	50	<50	0	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209758.001	LB206387.022		TRH C6-C9	µg/L	40	<40	0	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.2	9.0407004248	30	12
			d8-toluene (Surrogate)	µg/L	-	9.8	10.5603907184	30	8
			Bromofluorobenzene (Surrogate)	µg/L	-	10.2	10.3156820185	30	1
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	0	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	0	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206466.002	Mercury	mg/kg	0.05	0.21	0.2	70 - 130	105
LB206573.002	Mercury	mg/kg	0.05	0.22	0.2	70 - 130	109

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206362.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	104
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	94
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	95
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	97
		Endrin	mg/kg	0.2	0.2	0.2	60 - 140	101
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	88
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.14	0.15	40 - 130	91

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206362.002		Dichlorvos	mg/kg	0.5	1.6	2	60 - 140	78
		Diazinon (Dimpylate)	mg/kg	0.5	1.6	2	60 - 140	81
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	1.5	2	60 - 140	77
		Ethion	mg/kg	0.2	1.5	2	60 - 140	74
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	78

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206362.002		Naphthalene	mg/kg	0.1	4.1	4	60 - 140	103
		Acenaphthylene	mg/kg	0.1	4.1	4	60 - 140	103
		Acenaphthene	mg/kg	0.1	4.4	4	60 - 140	111
		Phenanthrene	mg/kg	0.1	3.8	4	60 - 140	96
		Anthracene	mg/kg	0.1	4.2	4	60 - 140	106
		Fluoranthene	mg/kg	0.1	4.5	4	60 - 140	113
		Pyrene	mg/kg	0.1	4.4	4	60 - 140	111
		Benzo(a)pyrene	mg/kg	0.1	2.9	4	60 - 140	72
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	80
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	78

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206362.002	Arochlor 1260	mg/kg	0.2	0.3	0.4	60 - 140	84

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206465.002	Arsenic, As	mg/kg	1	320	318.22	80 - 120	99
	Cadmium, Cd	mg/kg	0.3	5.2	5.41	80 - 120	97
	Chromium, Cr	mg/kg	0.5	38	38.31	80 - 120	99
	Copper, Cu	mg/kg	0.5	290	290	80 - 120	99
	Nickel, Ni	mg/kg	0.5	190	187	80 - 120	99
	Lead, Pb	mg/kg	1	91	89.9	80 - 120	102
	Zinc, Zn	mg/kg	2	250	273	80 - 120	93
LB206572.002	Arsenic, As	mg/kg	1	320	318.22	80 - 120	101
	Cadmium, Cd	mg/kg	0.3	5.0	5.41	80 - 120	92
	Chromium, Cr	mg/kg	0.5	36	38.31	80 - 120	95
	Copper, Cu	mg/kg	0.5	280	290	80 - 120	96
	Nickel, Ni	mg/kg	0.5	180	187	80 - 120	95
	Lead, Pb	mg/kg	1	91	89.9	80 - 120	102
	Zinc, Zn	mg/kg	2	260	273	80 - 120	95

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Dissolved) in Water by ICPMS (continued)

Method: ME-(AU)-[ENV]AN318

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206353.002		Arsenic, As	µg/L	1	18	20	80 - 120	92
		Cadmium, Cd	µg/L	0.1	20	20	80 - 120	101
		Chromium, Cr	µg/L	1	21	20	80 - 120	106
		Copper, Cu	µg/L	1	22	20	80 - 120	108
		Lead, Pb	µg/L	1	21	20	80 - 120	105
		Nickel, Ni	µg/L	1	21	20	80 - 120	103
		Zinc, Zn	µg/L	5	21	20	80 - 120	106

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206362.002		TRH C10-C14	mg/kg	20	37	40	60 - 140	93
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	103
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	85
	TRH F Bands	TRH >C10-C16	mg/kg	25	36	40	60 - 140	90
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	103
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	85

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206302.002		TRH C10-C14	µg/L	50	1200	1200	60 - 140	100
		TRH C15-C28	µg/L	200	1500	1200	60 - 140	126
		TRH C29-C36	µg/L	200	1600	1200	60 - 140	132
	TRH F Bands	TRH >C10-C16	µg/L	60	1300	1200	60 - 140	112
		TRH >C16-C34 (F3)	µg/L	500	1600	1200	60 - 140	135
		TRH >C34-C40 (F4)	µg/L	500	820	600	60 - 140	136

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206360.002	Halogenated	1,1-dichloroethene	mg/kg	0.1	4.0	5	60 - 140	80
	Aliphatics	1,2-dichloroethane	mg/kg	0.1	4.9	5	60 - 140	98
		Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	4.5	5	60 - 140	90
	Halogenated	Chlorobenzene	mg/kg	0.1	5.1	5	60 - 140	103
	Monocyclic	Benzene	mg/kg	0.1	4.6	5	60 - 140	92
	Aromatic	Toluene	mg/kg	0.1	4.6	5	60 - 140	93
		Ethylbenzene	mg/kg	0.1	4.8	5	60 - 140	97
		m/p-xylene	mg/kg	0.2	9.7	10	60 - 140	97
		o-xylene	mg/kg	0.1	5.0	5	60 - 140	99
	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.1	10	70 - 130	101
		d8-toluene (Surrogate)	mg/kg	-	9.0	10	70 - 130	90
		Bromofluorobenzene (Surrogate)	mg/kg	-	9.3	10	70 - 130	93
	Trihalomethan	Chloroform	mg/kg	0.1	4.8	5	60 - 140	96

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206387.002	Monocyclic	Benzene	µg/L	0.5	50	45.45	60 - 140	110
	Aromatic	Toluene	µg/L	0.5	50	45.45	60 - 140	110
		Ethylbenzene	µg/L	0.5	49	45.45	60 - 140	108
		m/p-xylene	µg/L	1	97	90.9	60 - 140	107
		o-xylene	µg/L	0.5	50	45.45	60 - 140	109
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.0	10	60 - 140	100
		d8-toluene (Surrogate)	µg/L	-	10.3	10	70 - 130	103
		Bromofluorobenzene (Surrogate)	µg/L	-	10.0	10	70 - 130	100

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206360.002		TRH C6-C10	mg/kg	25	81	92.5	60 - 140	87
		TRH C6-C9	mg/kg	20	70	80	60 - 140	88
	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.1	10	70 - 130	101
		Bromofluorobenzene (Surrogate)	mg/kg	-	9.3	10	70 - 130	93
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	52	62.5	60 - 140	83

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Volatile Petroleum Hydrocarbons in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206387.002		TRH C6-C10	µg/L	50	850	946.63	60 - 140	90
		TRH C6-C9	µg/L	40	740	818.71	60 - 140	91
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.0	10	60 - 140	100
		d8-toluene (Surrogate)	µg/L	-	10.3	10	70 - 130	103
		Bromofluorobenzene (Surrogate)	µg/L	-	10.0	10	70 - 130	100
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	550	639.67	60 - 140	86

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE209716.001	LB206466.004	Mercury	mg/kg	0.05	0.20	<0.05	0.2	96

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE209734.002	LB206362.020		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	<0.1	0.2	119
			Aldrin	mg/kg	0.1	<0.1	0.2	104
			Beta BHC	mg/kg	0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	<0.1	0.2	83
			Heptachlor epoxide	mg/kg	0.1	0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	1.1	-	-
			Alpha Chlordane	mg/kg	0.1	1.3	-	-
			trans-Nonachlor	mg/kg	0.1	0.8	-	-
			p,p'-DDE	mg/kg	0.1	0.2	-	-
			Dieldrin	mg/kg	0.2	0.9	0.2	-163 ⑤
			Endrin	mg/kg	0.2	<0.2	0.2	115
			o,p'-DDD	mg/kg	0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	-	-
			p,p'-DDT	mg/kg	0.1	<0.1	0.2	81
			Endosulfan sulphate	mg/kg	0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	-	-
			Total CLP OC Pesticides	mg/kg	1	4	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.16	-	109

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE209734.002	LB206362.022		Naphthalene	mg/kg	0.1	<0.1	4	108
			2-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	<0.1	4	104
			Acenaphthene	mg/kg	0.1	<0.1	4	111
			Fluorene	mg/kg	0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	<0.1	4	94
			Anthracene	mg/kg	0.1	<0.1	4	105
			Fluoranthene	mg/kg	0.1	<0.1	4	110
			Pyrene	mg/kg	0.1	<0.1	4	112
			Benzo(a)anthracene	mg/kg	0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	<0.1	4	98
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	-	74

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE209734.002	LB206362.022	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	-	73
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	-	77

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE209716.001	LB206465.004	Arsenic, As	mg/kg	1	45	2	50	86
		Cadmium, Cd	mg/kg	0.3	39	<0.3	50	78
		Chromium, Cr	mg/kg	0.5	48	5.3	50	86
		Copper, Cu	mg/kg	0.5	120	76	50	81
		Nickel, Ni	mg/kg	0.5	47	3.9	50	87
		Lead, Pb	mg/kg	1	55	15	50	79
		Zinc, Zn	mg/kg	2	70	31	50	77
SE209889.001	LB206572.004	Lead, Pb	mg/kg	1	80	62	50	37 ④
		Zinc, Zn	mg/kg	2	99	86	50	27 ④

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE209686.018	LB206353.004	Arsenic, As	µg/L	1	20	<1	20	99
		Cadmium, Cd	µg/L	0.1	22	<0.1	20	108
		Chromium, Cr	µg/L	1	22	<1	20	109
		Copper, Cu	µg/L	1	23	<1	20	112
		Lead, Pb	µg/L	1	22	<1	20	111
		Nickel, Ni	µg/L	1	21	<1	20	107
		Zinc, Zn	µg/L	5	24	<5	20	112
SE209738.004	LB206353.030	Arsenic, As	µg/L	1	27	2	20	121
		Cadmium, Cd	µg/L	0.1	21	<0.1	20	106
		Chromium, Cr	µg/L	1	36	15	20	102
		Copper, Cu	µg/L	1	20	<1	20	98
		Lead, Pb	µg/L	1	21	<1	20	104
		Nickel, Ni	µg/L	1	21	2	20	95
		Zinc, Zn	µg/L	5	31	13	20	90

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE209734.002	LB206362.020		TRH C10-C14	mg/kg	20	<20	40	93
			TRH C15-C28	mg/kg	45	<45	40	80
			TRH C29-C36	mg/kg	45	<45	40	85
			TRH C37-C40	mg/kg	100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	-	-
			TRH >C10-C40 Total (F bands)	mg/kg	210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	40	88
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	40	73
			TRH >C34-C40 (F4)	mg/kg	120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE209734.001	LB206360.004	Monocyclic	Benzene	mg/kg	0.1	3.2	<0.1	5	65
		Aromatic	Toluene	mg/kg	0.1	3.4	<0.1	5	68
			Ethylbenzene	mg/kg	0.1	3.6	<0.1	5	73
			m/p-xylene	mg/kg	0.2	7.3	<0.2	10	73
			o-xylene	mg/kg	0.1	3.7	<0.1	5	75
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	8.7	8.4	10	87
			d8-toluene (Surrogate)	mg/kg	-	8.2	7.9	10	82
			Bromofluorobenzene (Surrogate)	mg/kg	-	8.5	8.8	10	85
		Totals	Total Xylenes	mg/kg	0.3	11	<0.3	-	-
			Total BTEX	mg/kg	0.6	21	<0.6	-	-

VOCs in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number	Parameter	Units	LOR

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE209734.015	LB206387.023	Monocyclic	Benzene	µg/L	0.5	53	<0.5	45.45	117
		Aromatic	Toluene	µg/L	0.5	55	<0.5	45.45	120
			Ethylbenzene	µg/L	0.5	54	<0.5	45.45	119
			m/p-xylene	µg/L	1	110	<1	90.9	120
			o-xylene	µg/L	0.5	54	<0.5	45.45	118
		Polycyclic	Naphthalene	µg/L	0.5	50	<0.5	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	9.6	10.2	-	96
			d8-toluene (Surrogate)	µg/L	-	10.1	9.8	-	101
			Bromofluorobenzene (Surrogate)	µg/L	-	10.5	10.0	-	105

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE209734.001	LB206360.004		TRH C6-C10	mg/kg	25	71	<25	92.5	77
			TRH C6-C9	mg/kg	20	62	<20	80	78
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	8.7	8.4	10	87
			d8-toluene (Surrogate)	mg/kg	-	8.2	7.9	10	82
			Bromofluorobenzene (Surrogate)	mg/kg	-	8.5	8.8	-	85
		VPH F	Benzene (F0)	mg/kg	0.1	3.2	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	50	<25	62.5	80

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE209734.015	LB206387.023		TRH C6-C10	µg/L	50	990	<50	946.63	104
			TRH C6-C9	µg/L	40	850	<40	818.71	104
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10	10.2	-	96
			d8-toluene (Surrogate)	µg/L	-	10	9.8	-	101
			Bromofluorobenzene (Surrogate)	µg/L	-	10	10.0	-	105
		VPH F	Benzene (F0)	µg/L	0.5	53	<0.5	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	660	<50	639.67	103

MATRIX SPIKE DUPLICATES

SE209734 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

STATEMENT OF QA/QC PERFORMANCE

SE209734A R0

CLIENT DETAILS

Contact	Ian Watts
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Ian.watts@eiaustralia.com.au
Project	**E24782 The Hills Bowling Club, Baulkham**
Order Number	**E24782**
Samples	18

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE209734A R0**
Date Received	20 Aug 2020
Date Reported	27 Aug 2020

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	TCLP (Toxicity Characteristic Leaching Procedure) for Organics/SVOC	2 items
Analysis Date	TCLP (Toxicity Characteristic Leaching Procedure) for Organics/SVOC	4 items

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	3 Soil
Date documentation received	20/8/2020@11:10an	Type of documentation received	Email
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	14°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE209734A R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Metals in TCLP Extract by ICPOES

Method: ME-(AU)-[ENV]AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH7_1.0-1.1	SE209734A.010	LB207655	05 Aug 2020	20 Aug 2020	01 Feb 2021	27 Aug 2020	01 Feb 2021	27 Aug 2020
BH8_0.1-0.2	SE209734A.012	LB207655	05 Aug 2020	20 Aug 2020	01 Feb 2021	27 Aug 2020	01 Feb 2021	27 Aug 2020

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734A.001	LB207235	05 Aug 2020	20 Aug 2020	26 Aug 2020	21 Aug 2020	30 Sep 2020	27 Aug 2020
BH7_1.0-1.1	SE209734A.010	LB207235	05 Aug 2020	20 Aug 2020	26 Aug 2020	21 Aug 2020	30 Sep 2020	27 Aug 2020

TCLP (Toxicity Characteristic Leaching Procedure) for Metals

Method: ME-(AU)-[ENV]AN006

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH8_0.1-0.2	SE209734A.012	LB207498	05 Aug 2020	20 Aug 2020	01 Feb 2021	25 Aug 2020	01 Feb 2021	27 Aug 2020

TCLP (Toxicity Characteristic Leaching Procedure) for Organics/SVOC

Method: ME-(AU)-[ENV]AN006

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M_0.7-0.8	SE209734A.001	LB207497	05 Aug 2020	20 Aug 2020	19 Aug 2020	25 Aug 2020†	19 Aug 2020	27 Aug 2020†
BH7_1.0-1.1	SE209734A.010	LB207497	05 Aug 2020	20 Aug 2020	19 Aug 2020	25 Aug 2020†	19 Aug 2020	27 Aug 2020†

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract — **Method: ME-(AU)-[ENV]AN420**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1M_0.7-0.8	SE209734A.001	%	40 - 130%	51
	BH7_1.0-1.1	SE209734A.010	%	40 - 130%	65
d14-p-terphenyl (Surrogate)	BH1M_0.7-0.8	SE209734A.001	%	40 - 130%	78
	BH7_1.0-1.1	SE209734A.010	%	40 - 130%	92
d5-nitrobenzene (Surrogate)	BH1M_0.7-0.8	SE209734A.001	%	40 - 130%	42
	BH7_1.0-1.1	SE209734A.010	%	40 - 130%	42

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Metals in TCLP Extract by ICPOES

Method: ME-(AU)-[ENV]AN320

Sample Number	Parameter	Units	LOR	Result
LB207655.001	Lead, Pb	mg/L	0.02	<0.02

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB207235.001		Benzo(a)pyrene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	62
		2-fluorobiphenyl (Surrogate)	%	-	66
		d14-p-terphenyl (Surrogate)	%	-	90

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Original	Duplicate	Parameter	Units	LOR

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Metals in TCLP Extract by ICPOES

Method: ME-(AU)-[ENV]AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB207655.002	Lead, Pb	mg/L	0.02	0.48	0.5	80 - 120	95

PAH (Polynuclear Aromatic Hydrocarbons) in TCLP Extract

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB207235.002		Benzo(a)pyrene	µg/L	0.1	44	40	60 - 140	110
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.3	0.5	40 - 130	60
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	64
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	84

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

QC Sample	Sample Number	Parameter	Units	LOR

MATRIX SPIKE DUPLICATES

SE209734A R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicative data, theoretical holding time exceeded and NATA accreditation does not cover the performance of this service.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

STATEMENT OF QA/QC PERFORMANCE

SE209989 R0

CLIENT DETAILS

Contact	Lan Ye
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Lan.ye@eiaustralia.com.au
Project	**E24782 The Hills Bowling Club, Baulkhan**
Order Number	**E24782**
Samples	7

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE209989 R0**
Date Received	14 Aug 2020
Date Reported	21 Aug 2020

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	2 Soil, 5 Water
Date documentation received	14/8/2020	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	14°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE209989 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE209989.001	LB206793	14 Aug 2020	14 Aug 2020	11 Sep 2020	17 Aug 2020	11 Sep 2020	17 Aug 2020
BH2M	SE209989.002	LB206793	14 Aug 2020	14 Aug 2020	11 Sep 2020	17 Aug 2020	11 Sep 2020	17 Aug 2020
BH4M	SE209989.003	LB206793	14 Aug 2020	14 Aug 2020	11 Sep 2020	17 Aug 2020	11 Sep 2020	17 Aug 2020
GWQD1	SE209989.004	LB206793	14 Aug 2020	14 Aug 2020	11 Sep 2020	17 Aug 2020	11 Sep 2020	17 Aug 2020
GWQR1	SE209989.007	LB206793	14 Aug 2020	14 Aug 2020	11 Sep 2020	17 Aug 2020	11 Sep 2020	17 Aug 2020

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWQTB1	SE209989.006	LB206845	14 Aug 2020	14 Aug 2020	28 Aug 2020	17 Aug 2020	22 Aug 2020	20 Aug 2020

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE209989.001	LB206800	14 Aug 2020	14 Aug 2020	21 Aug 2020	17 Aug 2020	26 Sep 2020	21 Aug 2020
BH2M	SE209989.002	LB206800	14 Aug 2020	14 Aug 2020	21 Aug 2020	17 Aug 2020	26 Sep 2020	21 Aug 2020
BH4M	SE209989.003	LB206800	14 Aug 2020	14 Aug 2020	21 Aug 2020	17 Aug 2020	26 Sep 2020	21 Aug 2020
GWQD1	SE209989.004	LB206800	14 Aug 2020	14 Aug 2020	21 Aug 2020	17 Aug 2020	26 Sep 2020	21 Aug 2020
GWQR1	SE209989.007	LB206800	14 Aug 2020	14 Aug 2020	21 Aug 2020	17 Aug 2020	26 Sep 2020	21 Aug 2020

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE209989.001	LB206871	14 Aug 2020	14 Aug 2020	11 Sep 2020	18 Aug 2020	11 Sep 2020	18 Aug 2020
BH2M	SE209989.002	LB206871	14 Aug 2020	14 Aug 2020	11 Sep 2020	18 Aug 2020	11 Sep 2020	18 Aug 2020
BH4M	SE209989.003	LB206871	14 Aug 2020	14 Aug 2020	11 Sep 2020	18 Aug 2020	11 Sep 2020	18 Aug 2020

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE209989.001	LB206783	14 Aug 2020	14 Aug 2020	10 Feb 2021	14 Aug 2020	10 Feb 2021	17 Aug 2020
BH2M	SE209989.002	LB206783	14 Aug 2020	14 Aug 2020	10 Feb 2021	14 Aug 2020	10 Feb 2021	17 Aug 2020
BH4M	SE209989.003	LB206783	14 Aug 2020	14 Aug 2020	10 Feb 2021	14 Aug 2020	10 Feb 2021	17 Aug 2020
GWQD1	SE209989.004	LB206783	14 Aug 2020	14 Aug 2020	10 Feb 2021	14 Aug 2020	10 Feb 2021	17 Aug 2020
GWQR1	SE209989.007	LB206783	14 Aug 2020	14 Aug 2020	10 Feb 2021	14 Aug 2020	10 Feb 2021	17 Aug 2020

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE209989.001	LB206800	14 Aug 2020	14 Aug 2020	21 Aug 2020	17 Aug 2020	26 Sep 2020	20 Aug 2020
BH2M	SE209989.002	LB206800	14 Aug 2020	14 Aug 2020	21 Aug 2020	17 Aug 2020	26 Sep 2020	20 Aug 2020
BH4M	SE209989.003	LB206800	14 Aug 2020	14 Aug 2020	21 Aug 2020	17 Aug 2020	26 Sep 2020	20 Aug 2020
GWQD1	SE209989.004	LB206800	14 Aug 2020	14 Aug 2020	21 Aug 2020	17 Aug 2020	26 Sep 2020	20 Aug 2020
GWQR1	SE209989.007	LB206800	14 Aug 2020	14 Aug 2020	21 Aug 2020	17 Aug 2020	26 Sep 2020	20 Aug 2020

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWQTS1	SE209989.005	LB206842	14 Aug 2020	14 Aug 2020	28 Aug 2020	17 Aug 2020	26 Sep 2020	20 Aug 2020
GWQTB1	SE209989.006	LB206842	14 Aug 2020	14 Aug 2020	28 Aug 2020	17 Aug 2020	26 Sep 2020	20 Aug 2020

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE209989.001	LB206946	14 Aug 2020	14 Aug 2020	21 Aug 2020	18 Aug 2020	27 Sep 2020	20 Aug 2020
BH2M	SE209989.002	LB206946	14 Aug 2020	14 Aug 2020	21 Aug 2020	18 Aug 2020	27 Sep 2020	20 Aug 2020
BH4M	SE209989.003	LB206946	14 Aug 2020	14 Aug 2020	21 Aug 2020	18 Aug 2020	27 Sep 2020	20 Aug 2020
GWQD1	SE209989.004	LB206946	14 Aug 2020	14 Aug 2020	21 Aug 2020	18 Aug 2020	27 Sep 2020	20 Aug 2020
GWQR1	SE209989.007	LB206946	14 Aug 2020	14 Aug 2020	21 Aug 2020	18 Aug 2020	27 Sep 2020	20 Aug 2020

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1M	SE209989.001	LB206946	14 Aug 2020	14 Aug 2020	21 Aug 2020	18 Aug 2020	27 Sep 2020	20 Aug 2020
BH2M	SE209989.002	LB206946	14 Aug 2020	14 Aug 2020	21 Aug 2020	18 Aug 2020	27 Sep 2020	20 Aug 2020
BH4M	SE209989.003	LB206946	14 Aug 2020	14 Aug 2020	21 Aug 2020	18 Aug 2020	27 Sep 2020	20 Aug 2020
GWQD1	SE209989.004	LB206946	14 Aug 2020	14 Aug 2020	21 Aug 2020	18 Aug 2020	27 Sep 2020	20 Aug 2020
GWQR1	SE209989.007	LB206946	14 Aug 2020	14 Aug 2020	21 Aug 2020	18 Aug 2020	27 Sep 2020	20 Aug 2020

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1M	SE209989.001	%	40 - 130%	68
	BH2M	SE209989.002	%	40 - 130%	56
	BH4M	SE209989.003	%	40 - 130%	62
d14-p-terphenyl (Surrogate)	BH1M	SE209989.001	%	40 - 130%	94
	BH2M	SE209989.002	%	40 - 130%	94
	BH4M	SE209989.003	%	40 - 130%	94
d5-nitrobenzene (Surrogate)	BH1M	SE209989.001	%	40 - 130%	50
	BH2M	SE209989.002	%	40 - 130%	42
	BH4M	SE209989.003	%	40 - 130%	44

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	GWQTS1	SE209989.005	%	60 - 130%	98
	GWQTB1	SE209989.006	%	60 - 130%	71
d4-1,2-dichloroethane (Surrogate)	GWQTS1	SE209989.005	%	60 - 130%	101
	GWQTB1	SE209989.006	%	60 - 130%	94
d8-toluene (Surrogate)	GWQTS1	SE209989.005	%	60 - 130%	90
	GWQTB1	SE209989.006	%	60 - 130%	93

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1M	SE209989.001	%	40 - 130%	101
	BH2M	SE209989.002	%	40 - 130%	103
	BH4M	SE209989.003	%	40 - 130%	104
	GWQD1	SE209989.004	%	40 - 130%	103
	GWQR1	SE209989.007	%	40 - 130%	102
d4-1,2-dichloroethane (Surrogate)	BH1M	SE209989.001	%	40 - 130%	103
	BH2M	SE209989.002	%	40 - 130%	100
	BH4M	SE209989.003	%	40 - 130%	100
	GWQD1	SE209989.004	%	40 - 130%	101
	GWQR1	SE209989.007	%	40 - 130%	100
d8-toluene (Surrogate)	BH1M	SE209989.001	%	40 - 130%	103
	BH2M	SE209989.002	%	40 - 130%	98
	BH4M	SE209989.003	%	40 - 130%	98
	GWQD1	SE209989.004	%	40 - 130%	98
	GWQR1	SE209989.007	%	40 - 130%	98

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1M	SE209989.001	%	40 - 130%	101
	BH2M	SE209989.002	%	40 - 130%	103
	BH4M	SE209989.003	%	40 - 130%	104
	GWQD1	SE209989.004	%	40 - 130%	103
	GWQR1	SE209989.007	%	40 - 130%	102
d4-1,2-dichloroethane (Surrogate)	BH1M	SE209989.001	%	60 - 130%	103
	BH2M	SE209989.002	%	60 - 130%	100
	BH4M	SE209989.003	%	60 - 130%	100
	GWQD1	SE209989.004	%	60 - 130%	101
	GWQR1	SE209989.007	%	60 - 130%	100
d8-toluene (Surrogate)	BH1M	SE209989.001	%	40 - 130%	103
	BH2M	SE209989.002	%	40 - 130%	98
	BH4M	SE209989.003	%	40 - 130%	98
	GWQD1	SE209989.004	%	40 - 130%	98
	GWQR1	SE209989.007	%	40 - 130%	98

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB206793.001	Mercury	mg/L	0.0001	<0.0001

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB206800.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	64
		2-fluorobiphenyl (Surrogate)	%	-	70
		d14-p-terphenyl (Surrogate)	%	-	82

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result
LB206871.001	Total Phenols	mg/L	0.01	<0.01

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB206783.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB206800.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB206842.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	93
		d8-toluene (Surrogate)	%	-	90
		Bromofluorobenzene (Surrogate)	%	-	78
	Totals	Total BTEX	mg/kg	0.6	<0.6

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Sample Number		Parameter	Units	LOR	Result
LB206946.001	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5
		1,2-dichloropropane	µg/L	0.5	<0.5
		cis-1,3-dichloropropene	µg/L	0.5	<0.5
		trans-1,3-dichloropropene	µg/L	0.5	<0.5
		1,2-dibromoethane (EDB)	µg/L	0.5	<0.5
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5
		Chloromethane	µg/L	5	<5
		Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3
		Bromomethane	µg/L	10	<10
		Chloroethane	µg/L	5	<5
		Trichlorofluoromethane	µg/L	1	<1
		Iodomethane	µg/L	5	<5
		1,1-dichloroethene	µg/L	0.5	<0.5
		Dichloromethane (Methylene chloride)	µg/L	5	<5
		Allyl chloride	µg/L	2	<2
		trans-1,2-dichloroethene	µg/L	0.5	<0.5
		1,1-dichloroethane	µg/L	0.5	<0.5
		cis-1,2-dichloroethene	µg/L	0.5	<0.5
		Bromochloromethane	µg/L	0.5	<0.5
		1,2-dichloroethane	µg/L	0.5	<0.5
		1,1,1-trichloroethane	µg/L	0.5	<0.5
		1,1-dichloropropene	µg/L	0.5	<0.5
		Carbon tetrachloride	µg/L	0.5	<0.5
		Dibromomethane	µg/L	0.5	<0.5
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5
		1,1,2-trichloroethane	µg/L	0.5	<0.5
		1,3-dichloropropane	µg/L	0.5	<0.5
		Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5
		1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5
		cis-1,4-dichloro-2-butene	µg/L	1	<1
		1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5
		1,2,3-trichloropropane	µg/L	0.5	<0.5
		trans-1,4-dichloro-2-butene	µg/L	1	<1
		1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5
		Hexachlorobutadiene	µg/L	0.5	<0.5
	Halogenated Aromatics	Chlorobenzene	µg/L	0.5	<0.5
		Bromobenzene	µg/L	0.5	<0.5
		2-chlorotoluene	µg/L	0.5	<0.5
		4-chlorotoluene	µg/L	0.5	<0.5
		1,3-dichlorobenzene	µg/L	0.5	<0.5
		1,4-dichlorobenzene	µg/L	0.3	<0.3
		1,2-dichlorobenzene	µg/L	0.5	<0.5
		1,2,4-trichlorobenzene	µg/L	0.5	<0.5
		1,2,3-trichlorobenzene	µg/L	0.5	<0.5
	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		o-xylene	µg/L	0.5	<0.5
		Styrene (Vinyl benzene)	µg/L	0.5	<0.5
		Isopropylbenzene (Cumene)	µg/L	0.5	<0.5
		n-propylbenzene	µg/L	0.5	<0.5
		1,3,5-trimethylbenzene	µg/L	0.5	<0.5
		tert-butylbenzene	µg/L	0.5	<0.5
		1,2,4-trimethylbenzene	µg/L	0.5	<0.5
		sec-butylbenzene	µg/L	0.5	<0.5
		p-isopropyltoluene	µg/L	0.5	<0.5
		n-butylbenzene	µg/L	0.5	<0.5
	Nitrogenous Compounds	Acrylonitrile	µg/L	0.5	<0.5
	Oxygenated Compounds	Acetone (2-propanone)	µg/L	10	<10
		MtBE (Methyl-tert-butyl ether)	µg/L	2	<2

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB206946.001	Oxygenated Compounds	Vinyl acetate	µg/L	10	<10
		MEK (2-butanone)	µg/L	10	<10
		MIBK (4-methyl-2-pentanone)	µg/L	5	<5
		2-hexanone (MBK)	µg/L	5	<5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Sulphonated	Carbon disulfide	µg/L	2	<2
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	95
		Bromofluorobenzene (Surrogate)	%	-	96
	Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5
		Bromodichloromethane (THM)	µg/L	0.5	<0.5
		Dibromochloromethane (THM)	µg/L	0.5	<0.5
		Bromoform (THM)	µg/L	0.5	<0.5

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB206946.001		TRH C6-C9	µg/L	40	<40
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	95
		Bromofluorobenzene (Surrogate)	%	-	96

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209989.007	LB206793.011	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209989.006	LB206845.011	% Moisture	%w/w	1	<1.0	<1.0	200	0
SE210012.002	LB206845.022	% Moisture	%w/w	1	10.9	10.4	39	4
SE210012.004	LB206845.025	% Moisture	%w/w	1	6.4	5.7	46	11

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209989.007	LB206783.010	Arsenic, As	µg/L	1	<1	<1	200	0
		Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
		Chromium, Cr	µg/L	1	<1	<1	200	0
		Copper, Cu	µg/L	1	1	<1	187	5
		Lead, Pb	µg/L	1	<1	<1	200	0
		Nickel, Ni	µg/L	1	<1	<1	200	0
		Zinc, Zn	µg/L	5	<5	<5	200	0

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209969.001	LB206800.018		TRH C10-C14	µg/L	50	<50	<50	200	0
			TRH C15-C28	µg/L	200	220	260	113	20
			TRH C29-C36	µg/L	200	<200	<200	200	0
			TRH C37-C40	µg/L	200	<200	<200	200	0
			TRH C10-C40	µg/L	320	<320	<320	163	0
		TRH F Bands	TRH >C10-C16	µg/L	60	<60	<60	200	0
			TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	<60	200	0
			TRH >C16-C34 (F3)	µg/L	500	<500	<500	200	0
			TRH >C34-C40 (F4)	µg/L	500	<500	<500	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE210010.002	LB206842.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	9.1	9.1	50	1
			d8-toluene (Surrogate)	mg/kg	-	9.1	9.0	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.0	6.8	50	3
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE210012.004	LB206842.024	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	9.8	9.7	50	2
			d8-toluene (Surrogate)	mg/kg	-	9.8	9.7	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.4	7.4	50	0
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209989.003	LB206946.023	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5	0	200	0
			1,2-dichloropropane	µg/L	0.5	<0.5	0	200	0
			cis-1,3-dichloropropene	µg/L	0.5	<0.5	0.0007447445	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOCs in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209989.003	LB206946.023	Fumigants	trans-1,3-dichloropropene	µg/L	0.5	<0.5	0.0473461120	200	0
			1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	0	200	0
		Halogenated	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	0.0022105899	200	0
		Aliphatics	Chloromethane	µg/L	5	<5	0	200	0
			Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	0.0124177308	200	0
			Bromomethane	µg/L	10	<10	0.0874880019	200	0
			Chloroethane	µg/L	5	<5	0.0300733197	200	0
			Trichlorofluoromethane	µg/L	1	<1	0.0015747388	200	0
			Iodomethane	µg/L	5	<5	0.0618671080	200	0
			1,1-dichloroethene	µg/L	0.5	<0.5	0.0108853100	200	0
			Dichloromethane (Methylene chloride)	µg/L	5	<5	0.8283209636	200	0
			Allyl chloride	µg/L	2	<2	0	200	0
			trans-1,2-dichloroethene	µg/L	0.5	<0.5	0.0214403453	200	0
			1,1-dichloroethane	µg/L	0.5	<0.5	0	200	0
			cis-1,2-dichloroethene	µg/L	0.5	<0.5	0	200	0
			Bromochloromethane	µg/L	0.5	<0.5	0.0358660548	200	0
			1,2-dichloroethane	µg/L	0.5	<0.5	0.0158712014	200	0
			1,1,1-trichloroethane	µg/L	0.5	<0.5	0	200	0
			1,1-dichloropropene	µg/L	0.5	<0.5	0	200	0
			Carbon tetrachloride	µg/L	0.5	<0.5	0	200	0
			Dibromomethane	µg/L	0.5	<0.5	0	200	0
			Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	0.0291327962	200	0
			1,1,2-trichloroethane	µg/L	0.5	<0.5	0.0409314195	200	0
			1,3-dichloropropane	µg/L	0.5	<0.5	0.3268797815	200	0
			Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	0.0061431434	200	0
			1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	0	200	0
			cis-1,4-dichloro-2-butene	µg/L	1	<1	0	200	0
			1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	0	200	0
			1,2,3-trichloropropane	µg/L	0.5	<0.5	0	200	0
			trans-1,4-dichloro-2-butene	µg/L	1	<1	0	200	0
			1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	0	200	0
			Hexachlorobutadiene	µg/L	0.5	<0.5	0.0024342636	200	0
		Halogenated	Chlorobenzene	µg/L	0.5	<0.5	0.0410405291	200	0
		Aromatics	Bromobenzene	µg/L	0.5	<0.5	0.0065913151	200	0
			2-chlorotoluene	µg/L	0.5	<0.5	0.2918609841	200	0
			4-chlorotoluene	µg/L	0.5	<0.5	0	200	0
			1,3-dichlorobenzene	µg/L	0.5	<0.5	0.0058755963	200	0
			1,4-dichlorobenzene	µg/L	0.3	<0.3	0.0054712749	200	0
			1,2-dichlorobenzene	µg/L	0.5	<0.5	0.0398320188	200	0
			1,2,4-trichlorobenzene	µg/L	0.5	<0.5	0	200	0
			1,2,3-trichlorobenzene	µg/L	0.5	<0.5	0.0016061591	200	0
		Monocyclic	Benzene	µg/L	0.5	<0.5	0.3365631121	179	0
		Aromatic	Toluene	µg/L	0.5	1.7	1.5659148345	61	5
			Ethylbenzene	µg/L	0.5	0.5	0.4998261835	129	3
			m/p-xylene	µg/L	1	6	5.6155673474	47	4
			o-xylene	µg/L	0.5	2.2	2.0569172601	54	5
			Styrene (Vinyl benzene)	µg/L	0.5	<0.5	0.0664128307	200	0
			Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	0	200	0
			n-propylbenzene	µg/L	0.5	<0.5	0	200	0
			1,3,5-trimethylbenzene	µg/L	0.5	1.5	1.5944110806	62	4
			tert-butylbenzene	µg/L	0.5	<0.5	0.0105829538	200	0
			1,2,4-trimethylbenzene	µg/L	0.5	3.4	3.4458962650	45	1
			sec-butylbenzene	µg/L	0.5	<0.5	0	200	0
			p-isopropyltoluene	µg/L	0.5	<0.5	0.0387731068	200	0
			n-butylbenzene	µg/L	0.5	<0.5	0.0318523004	200	0
		Nitrogenous	Acrylonitrile	µg/L	0.5	<0.5	0.0629249998	200	0
		Oxygenated	Acetone (2-propanone)	µg/L	10	<10	0	200	0
		Compounds	MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	0.0246903939	200	0
			Vinyl acetate	µg/L	10	<10	0	200	0
			MEK (2-butanone)	µg/L	10	<10	0	200	0
			MIBK (4-methyl-2-pentanone)	µg/L	5	<5	0.3016319873	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOCs in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209989.003	LB206946.023	Oxygenated	2-hexanone (MBK)	µg/L	5	<5	0	200	0
		Polycyclic	Naphthalene	µg/L	0.5	0.8	0.7128944747	96	12
		Sulphonated	Carbon disulfide	µg/L	2	<2	0.0394883101	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.0	9.4084341590	30	6
			d8-toluene (Surrogate)	µg/L	-	9.8	9.5489948744	30	2
			Bromofluorobenzene (Surrogate)	µg/L	-	10.4	9.7077465940	30	7
		Trihalomethan	Chloroform (THM)	µg/L	0.5	7.2	6.7539063433	37	6
		es	Bromodichloromethane (THM)	µg/L	0.5	<0.5	0.0012097233	200	0
			Dibromochloromethane (THM)	µg/L	0.5	<0.5	0	200	0
			Bromoform (THM)	µg/L	0.5	<0.5	0	200	0
SE210059.002	LB206946.020	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5	0	200	0
			1,2-dichloropropane	µg/L	0.5	<0.5	0.0072160505	200	0
			cis-1,3-dichloropropene	µg/L	0.5	<0.5	0	200	0
			trans-1,3-dichloropropene	µg/L	0.5	<0.5	0.0063778331	200	0
			1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	0	200	0
		Halogenated	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	0.0456629701	200	0
		Aliphatics	Chloromethane	µg/L	5	<5	0	200	0
			Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	0.0456285832	200	0
			Bromomethane	µg/L	10	<10	0	200	0
			Chloroethane	µg/L	5	<5	0	200	0
			Trichlorofluoromethane	µg/L	1	<1	0.0461198166	200	0
			Iodomethane	µg/L	5	<5	0.0707566722	200	0
			1,1-dichloroethene	µg/L	0.5	<0.5	0	200	0
			Dichloromethane (Methylene chloride)	µg/L	5	<5	0	200	0
			Allyl chloride	µg/L	2	<2	0	200	0
			trans-1,2-dichloroethene	µg/L	0.5	<0.5	0.0332691996	200	0
			1,1-dichloroethane	µg/L	0.5	<0.5	0	200	0
			cis-1,2-dichloroethene	µg/L	0.5	<0.5	0.0213587155	200	0
			Bromochloromethane	µg/L	0.5	<0.5	0.0102324777	200	0
			1,2-dichloroethane	µg/L	0.5	<0.5	0	200	0
			1,1,1-trichloroethane	µg/L	0.5	<0.5	0	200	0
			1,1-dichloropropene	µg/L	0.5	<0.5	0.0062753649	200	0
			Carbon tetrachloride	µg/L	0.5	<0.5	0.0022198442	200	0
			Dibromomethane	µg/L	0.5	<0.5	0.0055926211	200	0
			Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	0	200	0
			1,1,2-trichloroethane	µg/L	0.5	<0.5	0	200	0
			1,3-dichloropropane	µg/L	0.5	<0.5	0	200	0
			Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	0.0061419442	200	0
			1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	0	200	0
			cis-1,4-dichloro-2-butene	µg/L	1	<1	0.0210918454	200	0
			1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	0	200	0
			1,2,3-trichloropropane	µg/L	0.5	<0.5	0.0122556134	200	0
			trans-1,4-dichloro-2-butene	µg/L	1	<1	0	200	0
			1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	0	200	0
			Hexachlorobutadiene	µg/L	0.5	<0.5	0.0610972628	200	0
		Halogenated	Chlorobenzene	µg/L	0.5	<0.5	0	200	0
		Aromatics	Bromobenzene	µg/L	0.5	<0.5	0.0350624970	200	0
			2-chlorotoluene	µg/L	0.5	<0.5	0	200	0
			4-chlorotoluene	µg/L	0.5	<0.5	0	200	0
			1,3-dichlorobenzene	µg/L	0.5	<0.5	0.0054504873	200	0
			1,4-dichlorobenzene	µg/L	0.3	<0.3	0.0050364319	200	0
			1,2-dichlorobenzene	µg/L	0.5	<0.5	0	200	0
			1,2,4-trichlorobenzene	µg/L	0.5	<0.5	0.0053307009	200	0
			1,2,3-trichlorobenzene	µg/L	0.5	<0.5	0.0018648673	200	0
		Monocyclic	Benzene	µg/L	0.5	<0.5	0.0614259717	200	0
		Aromatic	Toluene	µg/L	0.5	<0.5	0.0540255141	200	0
			Ethylbenzene	µg/L	0.5	<0.5	0.0646768498	200	0
			m/p-xylene	µg/L	1	<1	0.1909753063	200	0
			o-xylene	µg/L	0.5	<0.5	0.0921760319	200	0
			Styrene (Vinyl benzene)	µg/L	0.5	<0.5	0.0400138944	200	0
			Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	0.0072990436	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE210059.002	LB206946.020	Monocyclic	n-propylbenzene	µg/L	0.5	<0.5	0.0020929438	200	0
		Aromatic	1,3,5-trimethylbenzene	µg/L	0.5	<0.5	0.0051065480	200	0
			tert-butylbenzene	µg/L	0.5	<0.5	0	200	0
			1,2,4-trimethylbenzene	µg/L	0.5	<0.5	0.0042150657	200	0
			sec-butylbenzene	µg/L	0.5	<0.5	0.0022628507	200	0
			p-isopropyltoluene	µg/L	0.5	<0.5	0.0092319415	200	0
			n-butylbenzene	µg/L	0.5	<0.5	0	200	0
		Nitrogenous	Acrylonitrile	µg/L	0.5	<0.5	0.0854275938	200	0
		Oxygenated	Acetone (2-propanone)	µg/L	10	<10	0.1793931188	200	0
		Compounds	MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	0.0209799632	200	0
			Vinyl acetate	µg/L	10	<10	0	200	0
			MEK (2-butanone)	µg/L	10	<10	0	200	0
			MIBK (4-methyl-2-pentanone)	µg/L	5	<5	0	200	0
			2-hexanone (MBK)	µg/L	5	<5	0	200	0
		Polycyclic	Naphthalene	µg/L	0.5	<0.5	0.1169422246	200	0
		Sulphonated	Carbon disulfide	µg/L	2	<2	0.0439439390	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.6	10.0247230801	30	5
			d8-toluene (Surrogate)	µg/L	-	10.1	10.0243780586	30	1
			Bromofluorobenzene (Surrogate)	µg/L	-	10.1	9.9569713544	30	2
		Trihalomethan	Chloroform (THM)	µg/L	0.5	<0.5	0	200	0
		es	Bromodichloromethane (THM)	µg/L	0.5	<0.5	0.0043281142	200	0
			Dibromochloromethane (THM)	µg/L	0.5	<0.5	0.0007275286	200	0
			Bromoform (THM)	µg/L	0.5	<0.5	0	200	0

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE209989.003	LB206946.023		TRH C6-C10	µg/L	50	77	98.997557753	87	25
			TRH C6-C9	µg/L	40	70	91.027204980	80	26
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.0	9.4084341590	30	6
			d8-toluene (Surrogate)	µg/L	-	9.8	9.5489948744	30	2
			Bromofluorobenzene (Surrogate)	µg/L	-	10.4	9.7077465940	30	7
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	0.3365631121	179	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	66	39.759158311	94	30
SE210059.002	LB206946.020		TRH C6-C10	µg/L	50	<50	3.0167333955	200	0
			TRH C6-C9	µg/L	40	<40	1.4964179142	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.6	10.0247230801	30	5
			d8-toluene (Surrogate)	µg/L	-	10.1	10.0243780586	30	1
			Bromofluorobenzene (Surrogate)	µg/L	-	10.1	9.9569713544	30	2
		VPH F Bands	Benzene (F0)	µg/L	0.5	<0.5	0.0614259717	200	0
			TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	3.0167333955	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206800.002		Naphthalene	µg/L	0.1	30	40	60 - 140	75
		Acenaphthylene	µg/L	0.1	35	40	60 - 140	88
		Acenaphthene	µg/L	0.1	39	40	60 - 140	99
		Phenanthrene	µg/L	0.1	40	40	60 - 140	99
		Anthracene	µg/L	0.1	38	40	60 - 140	94
		Fluoranthene	µg/L	0.1	40	40	60 - 140	100
		Pyrene	µg/L	0.1	41	40	60 - 140	103
		Benzo(a)pyrene	µg/L	0.1	39	40	60 - 140	98
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.4	0.5	40 - 130	76
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	76
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	84

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206871.002	Total Phenols	mg/L	0.01	0.24	0.25	80 - 120	95

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206783.002		Arsenic, As	µg/L	1	17	20	80 - 120	85
		Cadmium, Cd	µg/L	0.1	19	20	80 - 120	97
		Chromium, Cr	µg/L	1	20	20	80 - 120	101
		Copper, Cu	µg/L	1	21	20	80 - 120	103
		Lead, Pb	µg/L	1	20	20	80 - 120	99
		Nickel, Ni	µg/L	1	20	20	80 - 120	98
		Zinc, Zn	µg/L	5	21	20	80 - 120	107

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206800.002		TRH C10-C14	µg/L	50	1100	1200	60 - 140	89
		TRH C15-C28	µg/L	200	1300	1200	60 - 140	108
		TRH C29-C36	µg/L	200	1200	1200	60 - 140	97
	TRH F Bands	TRH >C10-C16	µg/L	60	1200	1200	60 - 140	97
		TRH >C16-C34 (F3)	µg/L	500	1500	1200	60 - 140	121
		TRH >C34-C40 (F4)	µg/L	500	<500	600	60 - 140	82

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206842.002	Monocyclic	Benzene	mg/kg	0.1	4.1	5	60 - 140	82
	Aromatic	Toluene	mg/kg	0.1	4.0	5	60 - 140	81
		Ethylbenzene	mg/kg	0.1	4.2	5	60 - 140	84
		m/p-xylene	mg/kg	0.2	8.3	10	60 - 140	83
		o-xylene	mg/kg	0.1	4.2	5	60 - 140	84
	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	9.7	10	70 - 130	97
		d8-toluene (Surrogate)	mg/kg	-	9.6	10	70 - 130	96
		Bromofluorobenzene (Surrogate)	mg/kg	-	8.0	10	70 - 130	80

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206946.002	Halogenated	1,1-dichloroethene	µg/L	0.5	51	45.45	60 - 140	111
	Aliphatics	1,2-dichloroethane	µg/L	0.5	53	45.45	60 - 140	116
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	51	45.45	60 - 140	111
	Halogenated	Chlorobenzene	µg/L	0.5	56	45.45	60 - 140	123
	Monocyclic	Benzene	µg/L	0.5	52	45.45	60 - 140	114
	Aromatic	Toluene	µg/L	0.5	49	45.45	60 - 140	109
		Ethylbenzene	µg/L	0.5	50	45.45	60 - 140	110
		m/p-xylene	µg/L	1	100	90.9	60 - 140	110
		o-xylene	µg/L	0.5	50	45.45	60 - 140	110
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.8	10	60 - 140	108
		d8-toluene (Surrogate)	µg/L	-	10.2	10	70 - 130	102
		Bromofluorobenzene (Surrogate)	µg/L	-	9.7	10	70 - 130	97
	Trihalomethan	Chloroform (THM)	µg/L	0.5	57	45.45	60 - 140	125

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Volatile Petroleum Hydrocarbons in Water — **Method: ME-(AU)-[ENV]AN433**

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB206946.002		TRH C6-C10	µg/L	50	870	946.63	60 - 140	91
		TRH C6-C9	µg/L	40	740	818.71	60 - 140	90
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.8	10	60 - 140	108
		d8-toluene (Surrogate)	µg/L	-	10.2	10	70 - 130	102
		Bromofluorobenzene (Surrogate)	µg/L	-	9.7	10	70 - 130	97
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	560	639.67	60 - 140	88

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE209881.001	LB206793.004	Mercury	mg/L	0.0001	0.0080	<0.0001	0.008	100

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE210032.001	LB206871.004	Total Phenols	mg/L	0.01	0.20	<0.05	0.25	78

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE209881.001	LB206783.004	Arsenic, As	µg/L	1	21	1	20	99
		Cadmium, Cd	µg/L	0.1	21	<0.1	20	104
		Chromium, Cr	µg/L	1	21	1	20	100
		Copper, Cu	µg/L	1	21	2	20	95
		Lead, Pb	µg/L	1	20	<1	20	100
		Nickel, Ni	µg/L	1	19	<1	20	93
		Zinc, Zn	µg/L	5	22	<5	20	101

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE209951.002	LB206842.004	Monocyclic	Benzene	mg/kg	0.1	3.9	<0.1	5	78
		Aromatic	Toluene	mg/kg	0.1	4.0	<0.1	5	79
			Ethylbenzene	mg/kg	0.1	4.1	<0.1	5	81
			m/p-xylene	mg/kg	0.2	8.5	0.4	10	81
			o-xylene	mg/kg	0.1	4.3	0.2	5	81
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	9.4	8.7	10	94
			d8-toluene (Surrogate)	mg/kg	-	9.3	8.8	10	93
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.7	9.6	10	77
		Totals	Total Xylenes	mg/kg	0.3	13	0.7	-	-
			Total BTEX	mg/kg	0.6	25	0.7	-	-

VOCs in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE209933.005	LB206946.024	Monocyclic	Benzene	µg/L	0.5	0	45.45	109
		Aromatic	Toluene	µg/L	0.5	0.01828695835	45.45	107
			Ethylbenzene	µg/L	0.5	0.01213159404	45.45	109
			m/p-xylene	µg/L	1	0.05013007570	90.9	108
			o-xylene	µg/L	0.5	0.01133498619	45.45	108
		Polycyclic	Naphthalene	µg/L	0.5	0.03299045158	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.8333046849	-	101
			d8-toluene (Surrogate)	µg/L	-	10.3084691792	-	100
			Bromofluorobenzene (Surrogate)	µg/L	-	10.2165261821	-	97

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE209933.005	LB206946.024		TRH C6-C10	µg/L	50	1.97156962912	946.63	96
			TRH C6-C9	µg/L	40	0.93136483096	818.71	97
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.8333046849	-	101
			d8-toluene (Surrogate)	µg/L	-	10.3084691792	-	100
			Bromofluorobenzene (Surrogate)	µg/L	-	10.2165261821	-	97
		VPH F Bands	Benzene (F0)	µg/L	0.5	0	-	-
			TRH C6-C10 minus BTEX (F1)	µg/L	50	1.97156962912	639.67	97

MATRIX SPIKE DUPLICATES

SE209989 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.