All Groundwater
find a site
- All Groundwater Map
  - North Coast Region
  - Hunter Region
  - **Greater Sydney Region**
  - South Coast Region
  - Northwest Region
  - Central West Region
  - Southwest Region
  - Far West Region
  - Great Artesian Basin
  - Coal Basins

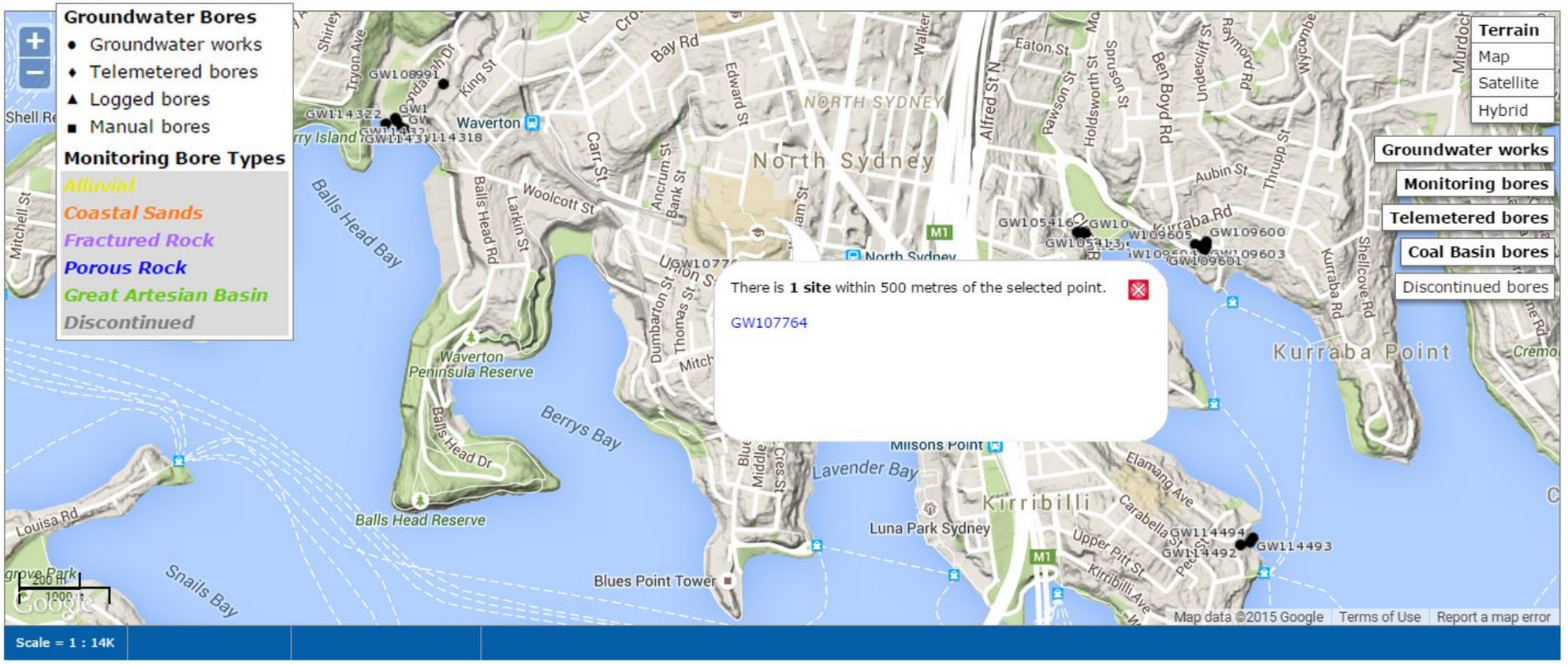
bandwidth ◉ high ○ low
glossary and metadata

All Groundwater > All Groundwater Map

Greater Sydney Region

All data times are Eastern Standard Time

Map



Scale = 1 : 14K

NSW Office of Water
Work Summary

GW107764

Licence: 10BL601165 **Licence Status:** CONVERTED

Authorised Purpose(s): DOMESTIC
Intended Purpose(s):

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

Commenced Date: **Final Depth:**
Completion Date: 22/01/2007 **Drilled Depth:**

Contractor Name:
Driller:
Assistant Driller:

Property: SHORE SCHOOL 18 - 40 WILLIAM ST NORTH SYDNEY 2060 NSW **Standing Water Level:**
GWMA: - **Salinity:**
GW Zone: - **Yield:**

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBE	CUMBE,57	1 229912
Licensed:	CUMBERLAND	WILLOUGHBY	Whole Lot 1//229912

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

Elevation: 0.00 m (A.H.D.) **Northing:** 6254006.0 **Latitude:** 33°50'28.1"S
Elevation Source: Unknown **Easting:** 333832.0 **Longitude:** 151°12'14.7"E

GS Map: - **MGA Zone:** 0 **Coordinate Source:** Unknown

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

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)

Geologists Log
Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments

Remarks

16/04/2010: no form A in file

***** End of GW107764 *****

Section 149 Certificates

30 APR 2015

NORTH SYDNEY COUNCIL

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PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Cert. No.: **61535/02**
Page No.: **1 of 7**

Parcel No: 20103

Date: 27/04/2015
Receipt No.: 1707431
Your REF:

Applicant:
Vittal Boggaram

PO Box 976
NORTH RYDE BC NSW 1670

Owner (as recorded by council):
Sydney Church Of England Grammar School Council
C/- Shore Nominees Limited
PO Box 1221
NORTH SYDNEY NSW 2059

Property Description:
1 Blue Street NORTH SYDNEY 2060
LOT: 3 DP: 508557

The Title information shown on this Certificate has been obtained from the Land and Property Information NSW, therefore Council cannot guarantee accuracy.

The information required to be disclosed in this planning certificate is that prescribed by Schedule 4 of the Environmental Planning and Assessment Regulation 2000. If no response is provided in this planning certificate for an item listed in Schedule 4, that matter has been considered and determined as not applying to the land to which this certificate relates.

AS AT THE DATE OF THE CERTIFICATE THE FOLLOWING MATTERS APPLY TO THE ABOVE MENTIONED LAND.

PLANNING INSTRUMENT:

North Sydney Local Environmental Plan 2013, published on the NSW legislation website on 2 August 2013 and came into force on 13 September 2013, as amended.

Zone: SP2 – Infrastructure "Educational establishment"
PERMITTED WITHOUT CONSENT
Environmental protection works
PERMITTED WITH CONSENT
Roads; The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose
PROHIBITED
Any purpose, other than a purpose listed above, is prohibited in the zone

Exempt Development
Development for the purposes set out in clause 3.1 of *North Sydney Local Environmental Plan 2013* is exempt development, which may be carried out within the zone without the need for development consent.

Complying Development
Development for the purposes set out in clause 3.2 of *North Sydney Local Environmental Plan 2013* is complying development, which may be carried out within the zone without the need for development consent, provided that a complying development certificate is obtained.

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DRAFT PLANNING INSTRUMENTS:

Planning Proposal to amend North Sydney Local Environmental Plan 2013 – 144-154 Pacific Hwy & 18 Berry St, North Sydney

This Planning Proposal seeks to amend *North Sydney Local Environmental Plan 2013* as it relates to land at 144-154 Pacific Highway and 18 Berry Street, North Sydney. In particular, it seeks to amend the non-residential floor space ratio range requirement applying to the site from part 3:1 - 4:1 and part minimum of 0.5:1 to a minimum of 1.4:1 across the entire site with no maximum requirement.

The public exhibition will take place from Thursday 29 January 2015 to Wednesday 25 February 2015.

Planning Proposal to amend North Sydney Local Environmental Plan 2013 – 521 Pacific Highway, Crows Nest

This Planning Proposal seeks to amend *North Sydney Local Environmental Plan 2013* as it relates to land at 521 Pacific Highway, Crows Nest. In particular, it seeks to amend the building height control applying to the site from 20 metres to 40 metres and seeks to introduce a whole of building floor space ratio control of 5.3:1.

The public exhibition will take place from Thursday 12 February 2015 to Thursday 12 March 2015.

Planning Proposal to amend North Sydney Local Environmental Plan 2013 – 200-220 Pacific Highway, Crows Nest

This Planning Proposal seeks to amend *North Sydney Local Environmental Plan 2013* as it relates to land at 200-220 Pacific Highway, Crows Nest. In particular, it seeks to amend the non-residential floor space ratio range for the subject site from 0.5:1 – 2:1 to 0.24:1 - 2:1.

The public exhibition will take place from Thursday 19 February 2015 to Thursday 4 March 2015.

Planning Proposal to amend North Sydney Local Environmental Plan 2013 – Miscellaneous Amendments to B4 Mixed Use Zone

This Planning Proposal seeks to to make the following amendments to North Sydney Local Environmental Plan 2013 (NSLEP 2013):

- permit 'residential flat buildings' with development consent in the *B4 Mixed Use* zone, but only if they are provided as part of mixed use development and achieve active street frontages to address shortcomings with the definition of 'shop top housing';
- remove the maximum non-residential floor space ratio requirement over land subject to clause 4.4A, to improve the flexibility of the existing planning controls, especially in the *B4 Mixed Use* zone; and
- exclude 'serviced apartments' from the calculation of 'non-residential floor space' under subclause 4.4A(8), to prevent the provision of unviable serviced apartments and undermining of the objectives and controls to the provision of non-residential floor space in the *B4 Mixed Use* zone, that seek to protect and promote employment generation.

The public exhibition of the amendments will take place from Thursday 26 March 2015 to Wednesday 22 April 2015.

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DEVELOPMENT CONTROL PLANS:

North Sydney Development Control Plan 2013
North Sydney Development Control Plan 2013 applies to all land to which *North Sydney Local Environmental Plan 2013* applies. The Development Control Plan was adopted by Council on 2 September 2013 and came into effect on 13 September 2013. Amended 20/02/14. Amended 08/01/2015. Amended 26/03/2015.

Draft Amendments North Sydney DCP 2013 (Operation of Section 2 to Part B and parking controls for residential flat buildings in B4 Mixed Use zone)
At its meeting on 16 March 2015, North Sydney Council resolved to adopt a draft amendment to *North Sydney Development Control Plan 2013* for exhibition. In particular, it is proposed to introduce maximum parking rates for 'residential flat buildings' within the *B4 Mixed Use* zone and clarify when Section 2 to Part 3 of the DCP applies. These amendments are proposed in conjunction with an amendment to *North Sydney Local Environmental 2013*, which seeks to permit 'residential flat buildings' in the B4 Mixed Use Zone.

Public exhibition of the draft DCP amendment will take place from Thursday 26 March 2015 to Wednesday 22 April 2015.

SECTION 94 DEVELOPER CONTRIBUTION PLANS:

North Sydney Section 94 Contributions Plan. Comprehensive contributions plan applying to all development in the North Sydney local government area. Effective from 20 June 2013.

HERITAGE CONTROLS:

The subject land IS NOT LOCATED within a CONSERVATION AREA, under clause 5.10 - Heritage Conservation to *North Sydney Local Environmental Plan 2013.*

The whole or part of the subject land IS A HERITAGE ITEM, under clause 5.10 - Heritage Conservation to *North Sydney Local Environmental Plan 2013.* Development consent is required for demolition (including partial demolition) or any change to the property, construction of a building on, or subdivision of, the land. Council may refuse consent to demolish a Heritage Item.

The subject land is NOT IDENTIFIED as containing a HERITAGE ITEM under *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005.*

OTHER CONTROLS:

The subject land is NOT AFFECTED by Section 38 or 39 of the *Coastal Protection Act 1979*.

Council is NOT AWARE of the subject land being subject to an Order made under Part 4D of the *Coastal Protection Act 1979* in relation to temporary coastal protection works undertaken on that land.

Council is NOT AWARE of any public land adjoining the subject land being subject to an Order made under

N O R T H S Y D N E Y C O U N C I L

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Part 4D of the *Coastal Protection Act 1979* in relation to temporary coastal protection works.

Council is NOT AWARE of any notice issued under Clause 55X of the *Coastal Protection Act 1979* advising of the placement of temporary coastal protection works on the subject land.

Council is NOT AWARE of any notice issued under Clause 55X of the *Coastal Protection Act 1979* advising Council of the placement of temporary coastal protection works on land adjacent to the subject land.

The subject land is NOT PROCLAIMED as a Mine Subsidence District within the meaning of Section 15 of the *Mine Subsidence Compensation Act 1961*.

The subject land is NOT AFFECTED by any ROAD WIDENING OR ROAD REALIGNMENT under the *Roads Act 1993*.

The subject land is NOT AFFECTED by any ROAD WIDENING OR ROAD REALIGNMENT under any environmental planning instrument.

The subject land is NOT AFFECTED by any ROAD WIDENING OR ROAD RESERVATION under any Council resolution.

The subject land is NOT IDENTIFIED as BUSHFIRE PRONE LAND on Council's Bushfire Prone Land Map as certified by the NSW Rural Fire Service Commissioner dated 8 April 2009 pursuant to the requirements under the of the *Rural Fires Act 1997* and *Environmental Planning and Assessment Act 1979*.

The subject land is NOT SUBJECT to any reservation for LAND ACQUISITION by a public authority for any purpose under any environmental planning instrument applying to the land as set out in this certificate.

The subject land is NOT AFFECTED by a policy, adopted by the Council or adopted by any other public authority and notified to the Council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the Council, that restricts the development of the land by reason of the likelihood of landslip, bushfire, flooding, tidal inundation, subsidence, acid sulphate soils or any other risk.

THE FOLLOWING STATE ENVIRONMENTAL PLANNING POLICIES AND REGIONAL ENVIRONMENTAL PLANS APPLY:

State Environmental Planning Policies (SEPPs)
SEPP No. 1 – Development Standards
SEPP No. 19 - Bushland in urban areas
SEPP No. 32 - Urban consolidation (redevelopment of urban land)
SEPP No. 33 - Hazardous and offensive development
SEPP No. 50 - Canal estate development
SEPP No. 55 - Remediation of land
SEPP No. 64 - Advertising and signage
SEPP No. 65 - Design Quality of Residential Flat Development
SEPP (Affordable Rental Housing) 2009

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SEPP (Building Sustainability Index: BASIX) 2004
SEPP (Exempt and Complying Development Codes) 2008
SEPP (Housing for Seniors or People with a Disability) 2004 - *formerly SEPP (Seniors Living) 2004*
SEPP (Infrastructure) 2007
SEPP (Major Development) 2005 - *formerly SEPP Major Projects & SEPP State Significant Development*
SEPP (Mining, Petroleum Production and Extractive Industries) 2007
SEPP (Miscellaneous Consent Provisions) 2007 - *formerly SEPP (Temporary Structures) 2007*
SEPP (State and Regional Development) 2011

Regional Environmental Plans (REPs) (Deemed SEPPs)
Sydney REP (Sydney Harbour Catchment) 2005

Note: summaries of the SEPPs and deemed SEPPs are provided on the Department of Planning's website at www.planning.nsw.gov.au

Draft State Environmental Planning Policies (SEPPs)
Draft SEPP No. 66 - Integration of Land Use and Transport
Draft SEPP (Application of Development Standards) 2004
Draft SEPP (Competition) 2010

Note: summaries of the SEPPs and deemed SEPPs are provided on the Department of Planning's website at www.planning.nsw.gov.au

FOR THE PURPOSE OF SECTION 149(2) AND CLAUSE 3 TO SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT REGULATION 2000, THE FOLLOWING INFORMATION IS PROVIDED:

General Housing Code
Complying development types specified within the General Housing Code under Part 3 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* CANNOT BE UNDERTAKEN ON THE SUBJECT LAND, as the subject land is:

- Wholly identified as an item of environmental heritage or heritage item by an environmental planning instrument or on which is located an item that is so identified.

Rural Housing Code
Complying development types specified within the Rural Housing Code under Part 3A of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* CANNOT BE UNDERTAKEN ON THE SUBJECT LAND, as the subject land is:

- Wholly identified as an item of environmental heritage or heritage item by an environmental planning instrument or on which is located an item that is so identified.

Housing Alterations Code
Complying development types specified within the Housing Alterations Code under Part 4 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* CANNOT BE UNDERTAKEN ON THE SUBJECT LAND, as the subject land is:

- Wholly identified as an item of environmental heritage or heritage item by an environmental planning instrument or on which is located an item that is so identified.

General Development Code
Complying development types specified within the General Development Code under Part 4A of *State*

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Environmental Planning Policy (Exempt and Complying Development Codes) 2008 CANNOT BE UNDERTAKEN ON THE SUBJECT LAND, as the subject land is:

- Wholly identified as an item of environmental heritage or heritage item by an environmental planning instrument or on which is located an item that is so identified.

Commercial and Industrial Alterations Code
Complying development types specified within the Commercial and Industrial Alterations Code under Part 5 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* CANNOT BE UNDERTAKEN ON THE SUBJECT LAND, as the subject land is:

- Wholly identified as an item of environmental heritage or heritage item by an environmental planning instrument or on which is located an item that is so identified.

Commercial and Industrial (New Buildings and Additions) Code
Complying development types specified within the Commercial and Industrial (New Buildings and Additions) Code under Part 5A of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* CANNOT BE UNDERTAKEN ON THE SUBJECT LAND, as the subject land is:

- Wholly identified as an item of environmental heritage or heritage item by an environmental planning instrument or on which is located an item that is so identified.

Subdivision Code
Complying development types specified within the Subdivision Code under Part 6 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* CANNOT BE UNDERTAKEN ON THE SUBJECT LAND, as the subject land is:

- Wholly identified as an item of environmental heritage or heritage item by an environmental planning instrument or on which is located an item that is so identified.

Demolition Code
Complying development types specified within the Demolition Code under Part 7 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* CANNOT BE UNDERTAKEN ON THE SUBJECT LAND, as the subject land is:

- Wholly identified as an item of environmental heritage or heritage item by an environmental planning instrument or on which is located an item that is so identified.

Fire Safety Code
Complying development types specified within the Fire Safety Code under Part 8 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* CANNOT BE UNDERTAKEN ON THE SUBJECT LAND, as the subject land is:

- Wholly identified as an item of environmental heritage or heritage item by an environmental planning instrument or on which is located an item that is so identified.

Note. This part of the Planning Certificate only addresses matters raised in Clauses 1.17A(c)-(e), (2), (3) and (4), 1.18 (1)(c3) and 1.19 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.* It is your responsibility to ensure that you comply with any other relevant requirements of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.* Failure to comply with these provisions may mean that a Complying Development Certificate issued under the provisions of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* is invalid.

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FOR THE PURPOSE OF SECTION 59(2) OF THE CONTAMINATED LAND MANAGEMENT ACT 1997, THE FOLLOWING INFORMATION IS PROVIDED:

Council is NOT AWARE of the land (or part of the land) being declared SIGNIFICANTLY CONTAMINATED land, as defined under Section 11 of the *Contaminated Land Management Act, 1997*.

Council is NOT AWARE of the land (or part of the land) being subject to a MANAGEMENT ORDER, as defined under Section 14(1) of the *Contaminated Land Management Act, 1997*.

Council is NOT AWARE of the land (or part of the land) being the subject of an approved VOLUNTARY MANAGEMENT PROPOSAL, as defined under Section 17(1) of the *Contaminated Land Management Act, 1997*.

Council is NOT AWARE of the land (or part of the land) being subject to an ONGOING MAINTENANCE ORDER, as defined under Section 28(2) of the *Contaminated Land Management Act, 1997*.

Council is NOT AWARE of the land (or part of the land) being the subject of a SITE AUDIT STATEMENT, as defined under Part 4 of the *Contaminated Land Management Act, 1997*.

FOR THE PURPOSE OF SECTION 149(5) THE FOLLOWING INFORMATION IS PROVIDED:

MAXIMUM BUILDING HEIGHT:
The whole or part of the subject site is identified under *North Sydney Local Environmental Plan 2013* as having a maximum building height of 12m.

The subject land IS NOT LISTED in the Register of the National Trust of NSW.

The subject land is NOT AFFECTED by the *HERITAGE ACT, 1977*.

A Tree Preservation Order applies throughout the North Sydney Council area. Contact Council for details.

For further information, please contact Council's
DIVISION OF PLANNING & DEVELOPMENT SERVICES

WARWICK WINN
GENERAL MANAGER
per:

Appendix B: Borehole Logs

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 1
1 / 2

EASTING: 333800.679
NORTHING: 6253963.321

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** SPIRAL AUGER **R.L. Surface:** 61.287 m
Date: 9/4/15 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
						61				FILL: Gravelly silty sand, fine to medium grained, fine to medium grained sandstone gravel, with slag, brick and cement fragments, trace of root fibres and clay fines.	M			PLASTIC GEOGRID COVER APPEARS POORLY COMPACTED
					N = 7 5,4,3		1							
▼ COMPLETION OF AUGERING						60			SM	SILTY SAND: fine to medium grained, orange brown and light grey, with medium to coarse grained sandstone gravel.	M	VL - L		RESIDUAL
					N = 4 3,2,2		2				W			
▼						59			-	SANDSTONE: fine to medium grained, light grey and orange brown.	DW	L - M		LOW 'TC' BIT RESISTANCE
										REFER TO CORED BOREHOLE LOG				
						58	3							
						57	4							
						56	5							
						55	6							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

CORED BOREHOLE LOG

Borehole No. 1 **2 / 2**

EASTING: 333800.679
NORTHING: 6253963.321

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Core Size:** NMLC **R.L. Surface:** 61.287 m
Date: 9/4/15 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** D.W./P.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (EL 0.03, VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT SPACING (mm) (500, 300, 100, 50, 30, 10)	DEFECT DETAILS DESCRIPTION Type, inclination, thickness, planarity, roughness, coating. Specific / General
		59			START CORING AT 2.80m					
50% RETURN		58	3		SANDSTONE: fine to medium grained, light grey, with occasional orange brown staining, bedded at 0-5°.	SW	M			Be, 0°, P, R 3x Be, P, R, IS, 3mm SPACING J, 70°, Un, R Be, 5 - 15°, Un, IS, 10mm.t XW INFILL Cr, 5°, 30 mm.t
		57	4		CORE LOSS 0.10m					
0% RETURN		56	5		SANDSTONE: fine to medium grained, orange brown and light grey, bedded at 5-10°	SW	M - H			J, 30°, P, R J, 40°, P, R
					as above, but brown and orange brown, cross bedded at 20°.					Be, 5°, P, R XWS, 5°, 2 mm.t
10% RETURN		55	6		as above, but red brown and light brown.		H			Be, 5°, P, R, IS
		54	7		as above, but light grey, brown and orange brown, bedded at 15°.					Be, 0°, P, R, IS
		53	8		END OF BOREHOLE AT 8.63 m					

JK_LIB_CURRENT - V7.3.GLB Log J & K CORED BOREHOLE - MASTER 27283S NORTH SYDNEY.GPJ <<DrawingFile>> 07/05/2015 15:30 Produced by gINT Professional, Developed by Datgel

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 2
1 / 1

EASTING: 333789.177
NORTHING: 6253942.751

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** SPIRAL AUGER **R.L. Surface:** 58.606 m
Date: 9/4/15 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						58	0			FILL: Clayey silty sand, fine to medium grained, dark brown, with slag, charcoal, fine to coarse grained sandstone and igneous gravel, and cobble sized inclusions.	M			WOOD CHIP COVER
										as above, but with light brown silty sand bands.				
							1			as above, but with dark grey silty clay lenses.				
									SC	CLAYEY SAND: fine to medium grained, orange brown and grey.	M	(L)		RESIDUAL
						57			-	SANDSTONE: fine to medium grained, red brown.	DW	(M)		
							2			END OF BOREHOLE AT 1.70 m				
						56	3							
						55	4							
						54	5							
						53	6							
						52								

JK_LIB_CURRENT - V7.3.GLB Log J & K AUGERHOLE - MASTER 27283S NORTH SYDNEY.GPJ <<DrawingFile>> 07/05/2015 15:29 Produced by gINT Professional, Developed by Datgel

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 3
1 / 1

EASTING: 333800.786
NORTHING: 6253948.656

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** SPIRAL AUGER **R.L. Surface:** 59.821 m
Date: 9/4/15 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty sand, fine to medium grained, brown, with fine to coarse grained sandstone and ironstone gravel, trace of root fibres.	M			GRASS COVER GEOGRID AT 0.05m DEPTH
						59	1			FILL: Sand, medium grained, orange brown, with medium to coarse grained sandstone gravel and sandstone cobbles, trace of silty fines.				
									SM	SILTY SAND: fine to medium grained, light grey.	M	(L)		RESIDUAL
						58	2		-	SANDSTONE: fine to medium grained, orange brown and light grey.	SW	L - M		LOW 'TC' BIT RESISTANCE
										END OF BOREHOLE AT 2.30 m				
						57	3							
						56	4							
						55	5							
						54	6							
						53								

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BOREHOLE LOG

Borehole No. 4
1 / 1

EASTING: 333821.003
NORTHING: 6253961.43

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** HAND AUGER **R.L. Surface:** 63.582 m
Date: 9/4/15 **Datum:** AHD
Plant Type: **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, low plasticity, dark brown, with root fibres and fine to medium grained sand.	MC<PL			GRASS COVER
						63				as above, but with medium to coarse grained sandstone gravel and sandstone cobbles				HAND AUGER REFUSAL ON OBSTRUCTION IN FILL
							1			END OF BOREHOLE AT 0.50 m				
						62	2							
						61	3							
						60	4							
						59	5							
						58	6							
						57								

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BOREHOLE LOG

Borehole No. 5
1 / 2

EASTING: 333846.822
NORTHING: 6253947.739

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** SPIRAL AUGER **R.L. Surface:** 59.116 m
Date: 10/4/15 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING	■					59				CONCRETE: 130mm.t				7mm DIA. REINFORCEMENT, 80mm TOP COVER
									-	FILL: Sandy gravel, medium grained igneous, dark grey, fine to medium grained sand.	M MC>PL	-		
				■	N > 11 7,6,5/ 10mm REFUSAL				CL	FILL: Sandy clay, low plasticity, dark brown and light grey, fine to medium grained sand.	MC~PL	VSt	260 210	RESIDUAL
	■					58	1		-	SANDY CLAY: low plasticity, light grey and red brown, fine to medium grained sand, with medium to coarse grained ironstone gravel.	SW	L - M		LOW 'TC' BIT RESISTANCE
				■						SANDSTONE: fine to medium grained, orange brown and light grey.				
										REFER TO CORED BOREHOLE LOG				
						57	2							
						56	3							
						55	4							
						54	5							
						53	6							

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CORED BOREHOLE LOG

Borehole No. 5 **2 / 2**

EASTING: 333846.822
NORTHING: 6253947.739

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Core Size:** NMLC **R.L. Surface:** 59.116 m
Date: 10/4/15 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** D.W./P.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	DEFECT SPACING (mm) 500 300 100 50 30 10	DEFECT DETAILS DESCRIPTION Type, inclination, thickness, planarity, roughness, coating. Specific / General
		58			START CORING AT 1.60m					
100% RETURN		57	2		SANDSTONE: fine to medium grained, orange brown, bedded at 5-10°.	SW	M			Be, 5°, P, R, IS
					as above, but light grey, with grey laminae.					
		56	3							Be, 10°, P, R
					as above, but orange brown.					
			4		CORE LOSS 0.08m					CS, 0°, 15 mm.t
10% RETURN		55			SANDSTONE: fine to medium grained, orange brown and red brown.	SW	M H			Be, 0°, P, R, IS 2x Be, 0-5°, P, R, IS, 10mm SPACING
					as above, but medium grained, light brown, with brown laminae and quartz inclusions, bedded at 5-10°.					
0% RETURN		54	5							J, 70°, CURVED IS
					as above, but brown, light brown, light grey and red brown.					
		53	6							J, 10°, P, R
		52	7							XWS, 0°, 2 mm.t
					END OF BOREHOLE AT 7.67 m					

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BOREHOLE LOG

Borehole No. 6
1 / 1

EASTING: 333857.452
NORTHING: 6254021.412

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** SPIRAL AUGER **R.L. Surface:** 70.339 m
Date: 10/4/15 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						70	0			FILL: Clayey silty sand, fine to medium grained, dark brown, with root fibres.	M			GRASS COVER
										FILL: Clayey sand, fine to medium grained, orange brown and dark brown, with fine to medium grained ironstone gravel.				
									CL	SANDY CLAY: medium plasticity, light grey, red brown and orange brown, with fine to medium grained ironstone gravel.	MC>PL	(St)		RESIDUAL
						69	1		-	SANDSTONE: fine to medium grained, orange brown, light grey and red brown.	SW	L - M		BANDED LOW TO MODERATE 'TC' BIT RESISTANCE
												M		MODERATE RESISTANCE
							2			END OF BOREHOLE AT 2.00 m				
						68	3							
						67	4							
						66	5							
						65	6							
						64								

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BOREHOLE LOG

Borehole No. 7
1 / 1

EASTING: 333892.259
NORTHING: 6254021.223

Client: SHORE SCHOOL

Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION

Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** SPIRAL AUGER **R.L. Surface:** 71.309 m

Date: 10/4/15 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						71				FILL: Clayey silty sand, fine to medium grained, dark brown, with root fibres.	M			GRASS COVER
										FILL: Sandy clay, low plasticity, dark grey, fine to medium grained sand, with ash and slag.	MC~PL			
							1		CL / SC	SANDY CLAY/CLAYEY SAND: medium plasticity, light brown, fine to medium grained sand.	MC>PL / M	(F / L)		RESIDUAL
						70			-	SANDSTONE: medium grained, orange brown and light grey.	SW	M		MODERATE 'TC' BIT RESISTANCE
												M - H		
							2			END OF BOREHOLE AT 2.00 m				
						69	3							
						68	4							
						67	5							
						66	6							
						65								

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BOREHOLE LOG

Borehole No. 8
1 / 5

EASTING: 333876.768
NORTHING: 6253995.477

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** SPIRAL AUGER **R.L. Surface:** 67.14 m
Date: 13/4/15 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING	■					67			-	ASPHALTIC CONCRETE: 40mm.t FILL: Gravelly silty sand, fine to medium grained, brown, medium to coarse grained igneous gravel.	M			
	■			■	N = 4 3,2,2		1		SC	CLAYEY SAND: fine to medium grained, light grey.	M	-		RESIDUAL
				■	N > 5 1,1,4/ 40mm REFUSAL	66								
				■		65	2		-	SANDSTONE: fine to medium grained, light grey.	SW	M		MODERATE 'TC' BIT RESISTANCE
										REFER TO CORED BOREHOLE LOG				
						64	3							
						63	4							
						62	5							
						61	6							

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CORED BOREHOLE LOG

Borehole No. 8 **2 / 5**

EASTING: 333876.768
NORTHING: 6253995.477

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Core Size:** NMLC **R.L. Surface:** 67.14 m
Date: 13/4/15 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** D.W./P.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, structure, minor components.)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (EL .03, VL .1, L .3, M 1, H 3, VH 10, EH)	DEFECT DETAILS: DEFECT SPACING (mm) (500, 300, 100, 50, 30, 10)	DEFECT DETAILS: DESCRIPTION (Type, inclination, thickness, planarity, roughness, coating.) Specific / General
		65			START CORING AT 2.66m					
100% RETURN		64	3		SANDSTONE: fine to medium grained, orange brown, red brown and light grey, bedded at 5-10°.	SW	M			
		63	4		CORE LOSS 0.05m SANDSTONE: fine to medium grained, light grey, with occasional orange brown staining and grey laminae, bedded at 5-10°.	SW	M - H			Be, 5°, P, R
		62	5		as above, but without orange brown staining	FR	H			Be, 15°, P, R, IS J, 25°, P, R J, 25°, P, R, IS
		61	6							Be, 5°, P, R
		60	7							
		59	8							Be, 5°, P, S

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CORED BOREHOLE LOG

Borehole No. 8
3 / 5

EASTING: 333876.768
NORTHING: 6253995.477

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S | **Core Size:** NMLC | **R.L. Surface:** 67.14 m
Date: 13/4/15 | **Inclination:** VERTICAL | **Datum:** AHD
Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** D.W./P.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, structure, minor components.)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (EL .03, VL .1, L .3, M 1, H 3, VH 10, EH)	DEFECT DETAILS: DEFECT SPACING (mm) (500, 300, 100, 50, 30, 10)	DEFECT DETAILS: DESCRIPTION (Type, inclination, thickness, planarity, roughness, coating.) Specific / General
100% RETURN		58			SANDSTONE: fine to medium grained, light grey, with grey and dark grey laminae, bedded at 5-15°.	FR	M - H			
			10		as above, but bedded at 15°.					J, 20°, P, R J, 15°, P, R
		57								
							M			LOW STRENGTH BAND, 25mm.t
		56	11		SANDSTONE: medium grained, light brown.		H			CS, 0°, 25 mm.t Be, 0°, P, R, IS
			12							
		55			as above, but fine to medium grained, light brown and red brown, light grey and orange brown, bedded at 5-10°.					CS, 5°, 2 mm.t LOW STRENGTH BAND, 40mm.t
			13							Be, 10°, P, R, IS Be, 5°, P, R, IS Be, 5°, P, R, IS
		54								
			14		as above, but medium grained, brown and light grey, bedded at 15°.					
13-4-15		53								J, 80°, Un, R
			15							
		52								Be, 15°, P, R

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CORED BOREHOLE LOG

Borehole No. 8
4 / 5

EASTING: 333876.768
NORTHING: 6253995.477

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S | **Core Size:** NMLC | **R.L. Surface:** 67.14 m
Date: 13/4/15 | **Inclination:** VERTICAL | **Datum:** AHD
Plant Type: JK308 | **Bearing:** N/A | **Logged/Checked By:** D.W./P.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (EL .03, VL .1, L .3, M 1, H 3, VH 10, EH)	DEFECT DETAILS: DEFECT SPACING (mm) (500, 300, 100, 50, 30, 10)	DEFECT DETAILS: DESCRIPTION (Type, inclination, thickness, planarity, roughness, coating.) Specific / General
100% RETURN		51			SANDSTONE: as above	FR	H			CS, 0°, 2 mm.t Be, 5°, P, R, IS
					SANDSTONE: fine to medium grained, orange brown and light grey, bedded at 5-10°.					J, 50°, P, R
		50	17		as above, but red brown and light grey.					Be, 10°, P, R, IS CS, 5°, 3 mm.t
					SANDSTONE: medium to coarse grained, light brown, with light grey bands.					
		49	18							
		48	19							CS, 10°, 1 mm.t
					as above, but medium grained, orange brown and red brown, bedded at 5-15°.					
		47	20							
			21		as above, but light grey.					
		46			SANDSTONE: medium grained, red brown.					CS, 5°, 1 mm.t Be, 5°, P, R, IS Be, 0°, P, R, IS
					as above, but orange brown.					J, 85°, Un, R
17-4-15		45	22							

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CORED BOREHOLE LOG

Borehole No. 8 **5 / 5**

EASTING: 333876.768
NORTHING: 6253995.477

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Core Size:** NMLC **R.L. Surface:** 67.14 m
Date: 13/4/15 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** D.W./P.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (EL .03, VL .1, L .3, M 1, H 3, VH 10, EH)	DEFECT DETAILS: DEFECT SPACING (mm) (500, 300, 100, 50, 30, 10)	DESCRIPTION: Type, inclination, thickness, planarity, roughness, coating. Specific / General
100% RETURN		44			SANDSTONE: medium grained, orange brown, with occasional light grey laminae.	FR	H			J, 45°, Un, R J, 40°, P, R CS, 5°, 4 mm.t
		43	24							Be, 10°, P, R J, 80°, Un, R J, 90°, Un, R
		42	25							Be, 0°, P, R
		41	26		as above, but with occasional brown laminae					
		40	27							Be, 0°, Un, R, IS
		39	28		END OF BOREHOLE AT 28.10 m					MONITORING WELL INSTALLED TO 28.10m DEPTH. ALTERNATE 3m SLOTTED AND 3m CASING FOR ENTIRE LENGTH. BACKFILLED WITH SAND TO 0.1M DEPTH, BENTONITE PLUG AND SEALED WITH GATIC COVER
		38	29							

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BOREHOLE LOG

Borehole No. 9
1 / 2

EASTING: 333747.283
NORTHING: 6253955.57

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** SPIRAL AUGER **R.L. Surface:** 55.75 m
Date: 14/4/15 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING	■									FILL: Silty sand, medium grained, brown.	M			
	■					55			-	SANDSTONE: fine to medium grained, orange brown and light grey, with very low strength bands.	DW	L - M		LOW TO MODERATE RESISTANCE WITH VERY LOW BANDS
				■			1			SANDSTONE: medium grained, red brown.	SW	M - H		MODERATE RESISTANCE
										REFER TO CORED BOREHOLE LOG				
						54	2							
						53	3							
						52	4							
						51	5							
						50	6							
						49								

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CORED BOREHOLE LOG

Borehole No. 9 **2 / 2**

EASTING: 333747.283
NORTHING: 6253955.57

Client: SHORE SCHOOL

Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION

Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Core Size:** NMLC **R.L. Surface:** 55.75 m

Date: 14/4/15 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** D.W./P.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, structure, minor components. START CORING AT 1.14m	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (EL_0.03, VL_0.1, L_0.3, M_1, H_3, VH_10, EH)	DEFECT SPACING (mm) (500, 300, 100, 50, 30, 10)	DEFECT DETAILS DESCRIPTION Type, inclination, thickness, planarity, roughness, coating. Specific / General
50% RETURN		54	2		SANDSTONE: medium grained, red brown, light grey and brown, bedded at 15°.	SW	M - H			Be, 15°, P, R
					as above, but light grey, with dark grey laminae.					Be, 0°, P, R, IS Be, 10°, P, R, IS
		53	3		SANDSTONE: fine to medium grained, light grey, orange brown and red brown, bedded 5-10°, cross bedded at 15°.		H			Be, 5°, P, R, IS Be, 5°, P, R
		52	4		SANDSTONE: fine to medium grained, light grey, with occasional brown and grey laminae.					XWS, 0°, 3 mm.t CS, 5°, 4-10mm.t
		51	5		as above, but light grey and orange brown, bedded at 5°, cross bedded at 20°.		M - H			CS, 5°, 2 mm.t
		50	6		as above, but light grey, with dark grey laminae.	FR	H			
		49	7							
		48			END OF BOREHOLE AT 7.14 m					

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BOREHOLE LOG

Borehole No. 10
1 / 1

EASTING: 333884.194
NORTHING: 6254007.932

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** HAND AUGER **R.L. Surface:** 68.693 m
Date: 14/4/15 **Datum:** AHD
Plant Type: **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■									FILL: Silty sand, fine to medium grained, brown, with root fibres.	M			GRASS COVER
	■								SM	SILTY SAND: medium grained, light grey, with medium to coarse grained sandstone gravel.	M	(L)		RESIDUAL
	■					68	1			END OF BOREHOLE AT 0.45 m				HAND AUGER REFUSAL ON INFERRED SANDSTONE BEDROCK
						67	2							
						66	3							
						65	4							
						64	5							
						63	6							
						62								

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BOREHOLE LOG

Borehole No. 11
1 / 1

EASTING: 333897.16
NORTHING: 6253982.203

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** HAND AUGER **R.L. Surface:** 66.203 m
Date: 14/4/15 **Datum:** AHD
Plant Type: **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■					66				FILL: Silty sand, fine to medium grained, brown, with medium to coarse grained sandstone gravel and metal fragments.	M			GRASS COVER
										END OF BOREHOLE AT 0.60 m				HAND AUGER REFUSAL ON OBSTRUCTION IN FILL
						65	1							
						64	2							
						63	3							
						62	4							
						61	5							
						60	6							

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BOREHOLE LOG

Borehole No. 12
1 / 2

EASTING: 333915.612
NORTHING: 6253961.384

Client: SHORE SCHOOL

Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION

Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Method:** SPIRAL AUGER **R.L. Surface:** 57.843 m

Date: 17/4/15 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** D.W./P.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING	■									BRICK PAVERS: 60mm.t over FILL: Silty sand, 90mm.t				
									SM	SILTY SAND: fine to medium grained, orange brown and light grey, with clay fines and fine to medium grained sandstone gravel.	M	MD		RESIDUAL
				■	N = 31 10,14,17	57	1			as above, but red brown, with M strength medium to coarse grained sandstone gravel.		D		
									-	SANDSTONE: medium grained, red brown.	DW	M		MODERATE 'TC' BIT RESISTANCE
										REFER TO CORED BOREHOLE LOG				
						56	2							
						55	3							
						54	4							
						53	5							
						52	6							
						51								

JK_LIB_CURRENT - V7.3.GLB Log J & K AUGERHOLE - MASTER 27283S NORTH SYDNEY.GPJ <<DrawingFile>> 07/05/2015 15:30 Produced by gINT Professional, Developed by Datgel

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CORED BOREHOLE LOG

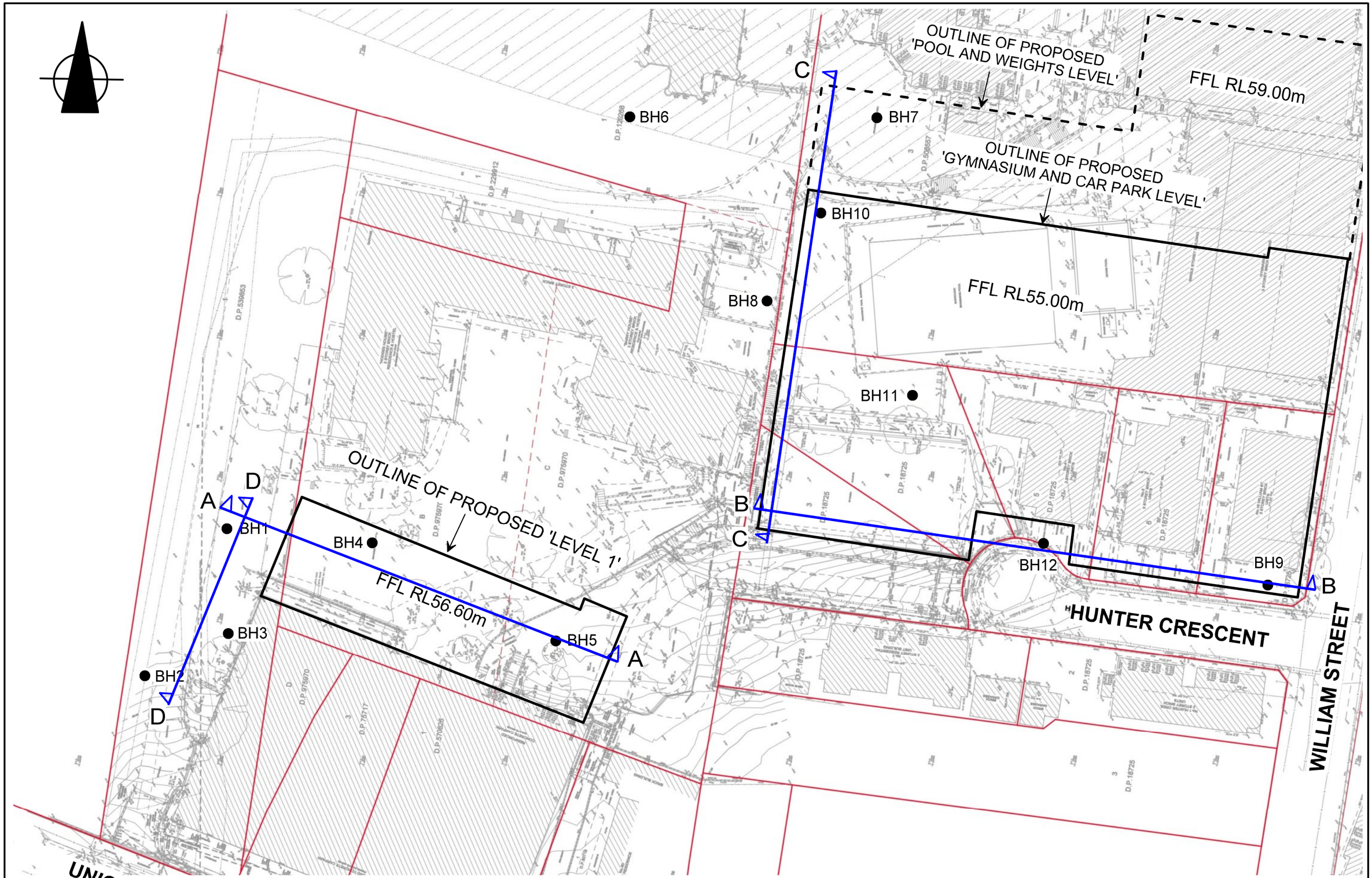
Borehole No. 12 **2 / 2**

EASTING: 333915.612
NORTHING: 6253961.384

Client: SHORE SCHOOL
Project: PROPOSED TRAVERS CENTRE STAGE 2 AND BISHOP GATE CARPARK EXTENSION
Location: SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW

Job No.: 27283S **Core Size:** NMLC **R.L. Surface:** 57.843 m
Date: 17/4/15 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** D.W./P.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS DEFECT SPACING (mm) (500, 300, 100, 50, 30, 10) DESCRIPTION Type, inclination, thickness, planarity, roughness, coating. Specific / General
					START CORING AT 1.17m				
50% RETURN		56	2		SANDSTONE: medium grained, light grey and orange brown, with occasional grey laminae, bedded at 15°.	SW	M - H		CS, 10°, 5 mm.t CS, 10°, 3 mm.t
		55	3		as above, but orange brown and light grey, with dark brown laminae, bedded at 15°.				
		54	4						CS, 15°, 1 mm.t CS, 15°, 1 mm.t CS, 15°, 2 mm.t
		53	5		as above, but light grey, with brown staining, bedded at 5-15°.				Be, 15°, P, R J, 5°, P, R
		52	6						Be, 0°, P, R
		51	7		as above, but orange brown and brown, with brown and light grey laminae.				Be, 5°, P, R Be, 5°, P, R
		50			END OF BOREHOLE AT 7.30 m				



BOREHOLE LOCATION PLAN

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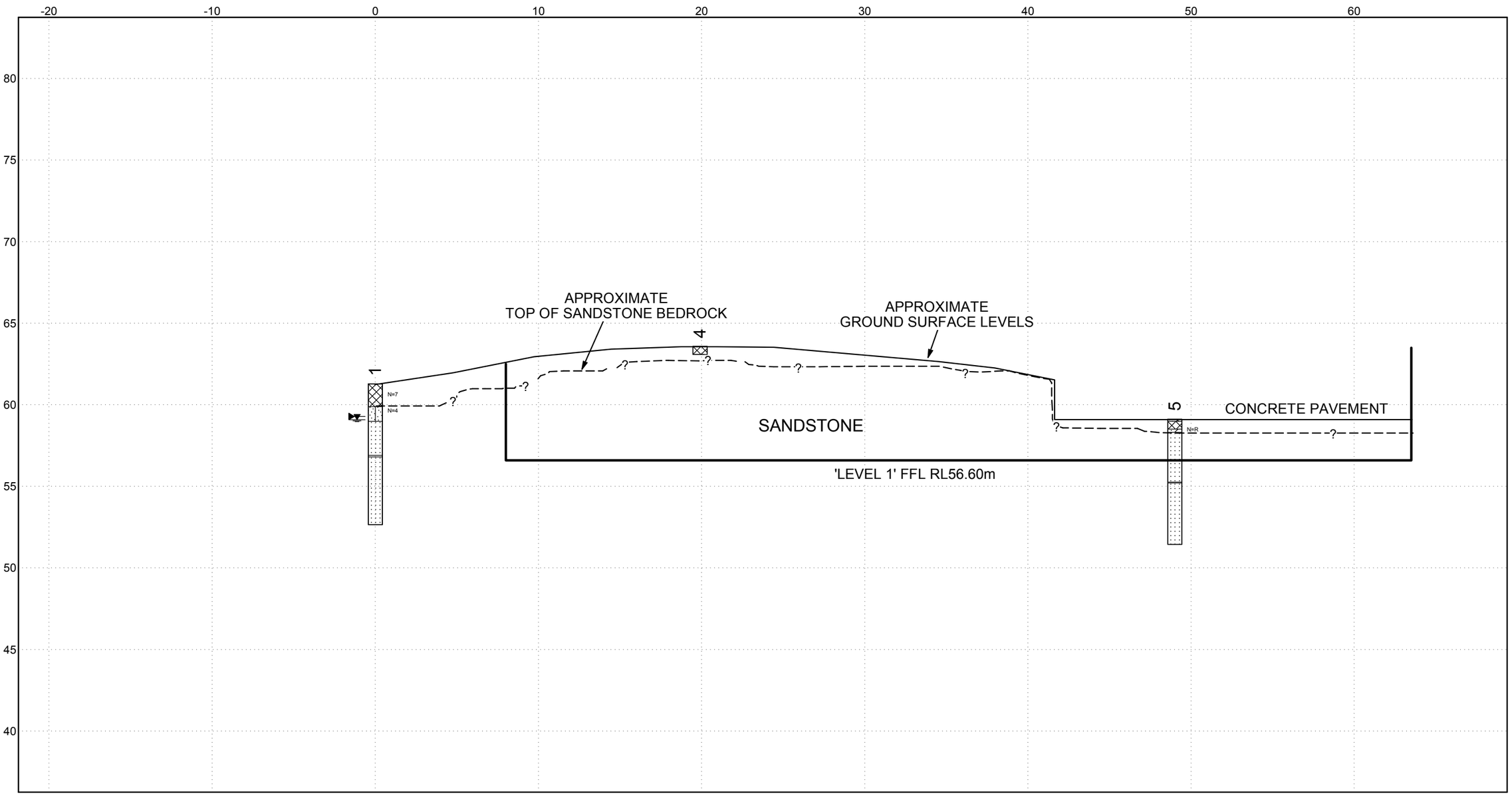
Report No. 27283S Figure No. 1



NOTE: 1. Viewed looking north.
2. Strata boundaries are approximate.

CORE LOSS
CONCRETE
SANDY CLAY
FILL
SILTY SAND
SANDSTONE

GEOLOGICAL SECTION A-A

No.	Amendment Description	Initials	Date

A3 Original | This sheet may be prepared using colour and may be incomplete if copied | Height Datum: AHD

PREPARED BY
JK GEOTECHNICS - GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

DESIGNED: D.W.
REVIEWED: P.S.

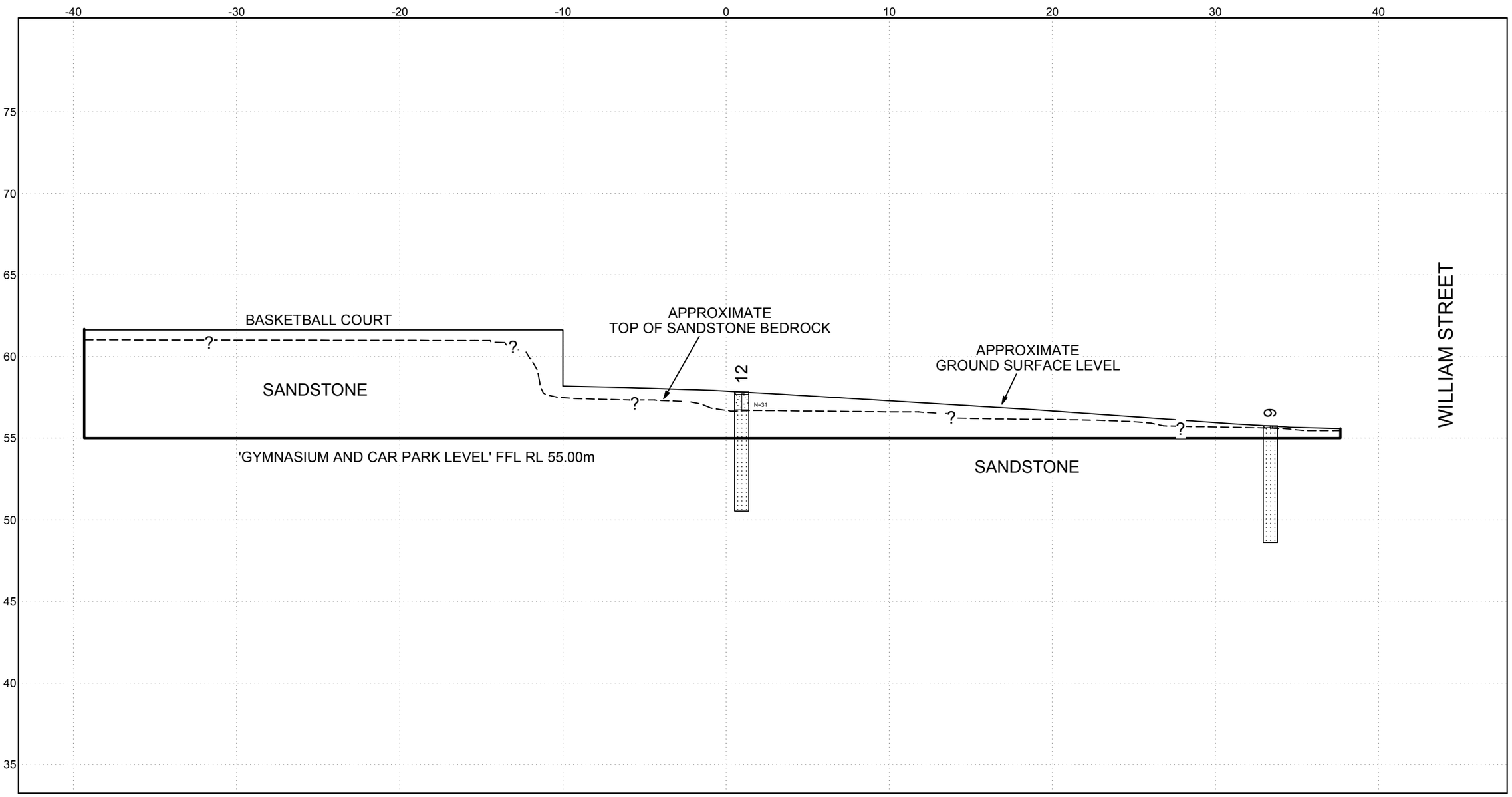
JK Geotechnics

SHORE SCHOOL
PROPOSED TRAVERS CENTRE STAGE 2 AND CARPARK EXTENSION
SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW
GEOLOGICAL SECTION A-A

SCALES
H 1:250
V 1:250

JOB NUMBER
27283S

FIGURE NUMBER
2



NOTE: 1. Viewed looking north.
2. Strata boundaries are approximate.

BRICK
SANDSTONE
SILTY SAND
FILL

GEOLOGICAL SECTION B-B

No.	Amendment Description	Initials	Date

A3 Original | This sheet may be prepared using colour and may be incomplete if copied | Height Datum: AHD

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DESIGNED: D.W.
REVIEWED: P.S.

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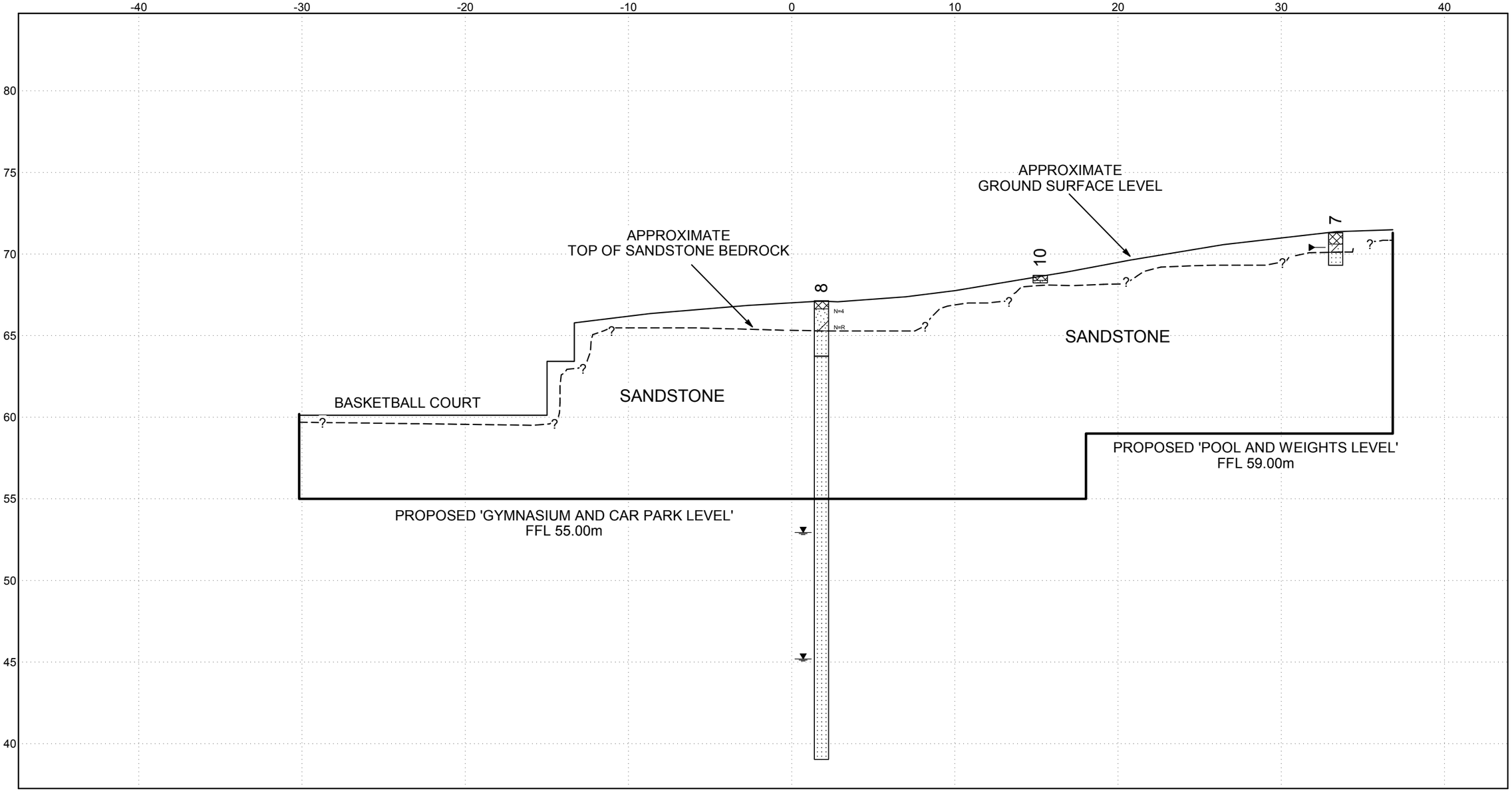
SHORE SCHOOL
PROPOSED TRAVERS CENTRE STAGE 2 AND CARPARK EXTENSION
SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW
GEOLOGICAL SECTION B-B

SCALES
H 1:250
V 1:250

JOB NUMBER
27283S

FIGURE NUMBER
3



NOTE: 1. Viewed looking west
2. Strata boundaries are approximate

ASPHALTIC CONCRETE
SANDY CLAY
SANDSTONE
CLAYEY SAND
SILTY SAND
CORE LOSS
FILL

GEOLOGICAL SECTION C-C

No.	Amendment Description	Initials	Date

A3 Original | This sheet may be prepared using colour and may be incomplete if copied | Height Datum: AHD

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DESIGNED: D.W.
REVIEWED: P.S.

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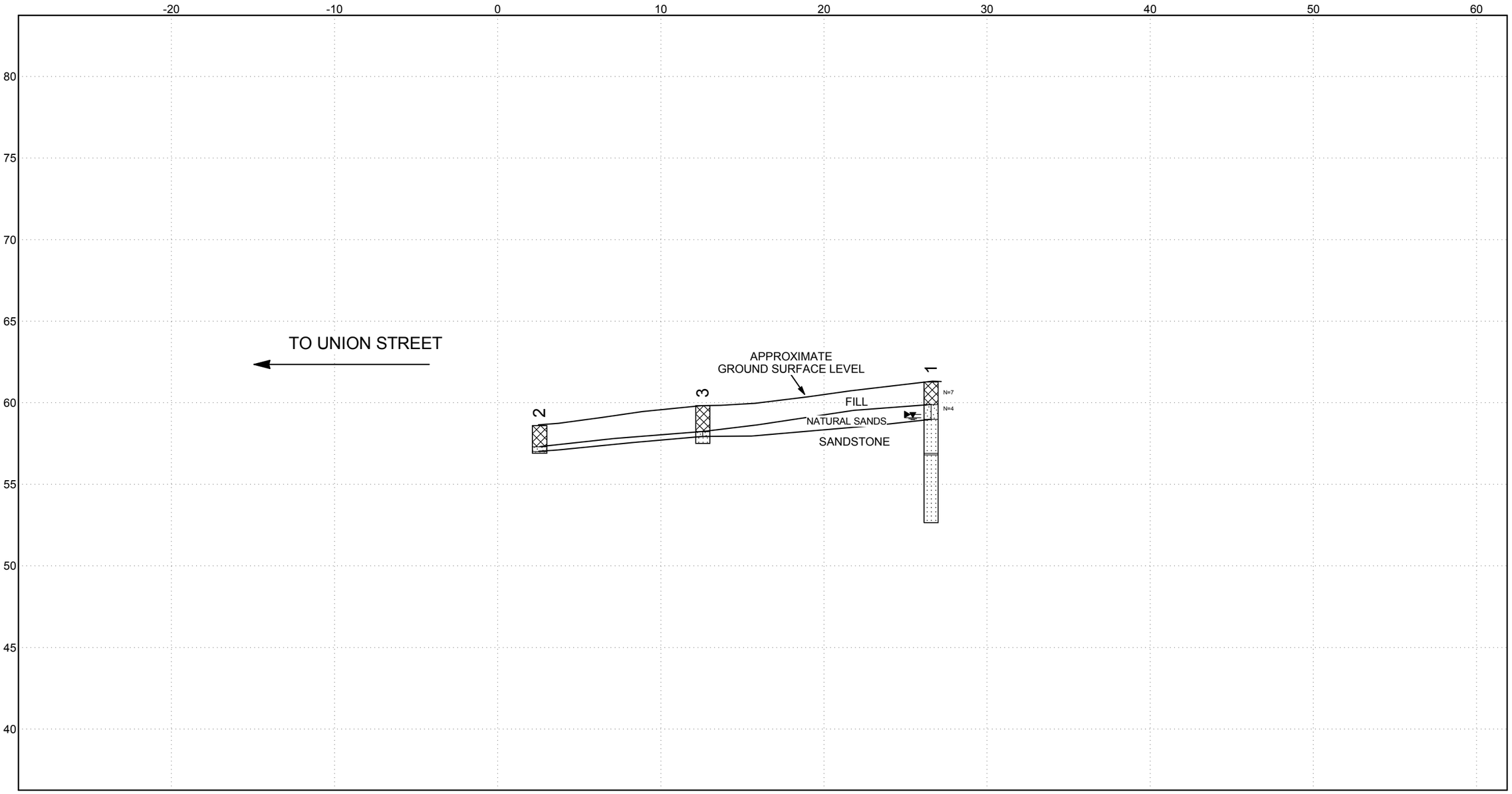
SHORE SCHOOL
PROPOSED TRAVERS CENTRE STAGE 2 AND CARPARK EXTENSION
SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW
GEOLOGICAL SECTION C-C

SCALES
H 1:250
V 1:250

JOB NUMBER
27283S

FIGURE NUMBER
4



NOTE: 1. Viewed looking west.
2. Strata boundaries are approximate.

CLAYEY SAND
FILL
CORE LOSS
SANDSTONE
SILTY SAND

GEOLOGICAL SECTION D-D

No.	Amendment Description	Initials	Date

A3 Original | This sheet may be prepared using colour and may be incomplete if copied | Height Datum: AHD

PREPARED BY
JK GEOTECHNICS - GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

DESIGNED: D.W.
REVIEWED: P.S.

JK Geotechnics

SHORE SCHOOL
PROPOSED TRAVERS CENTRE STAGE 2 AND CARPARK EXTENSION
SHORE SCHOOL, CNR. WILLIAM STREET & HUNTER CRESCENT, NORTH SYDNEY, NSW
GEOLOGICAL SECTION D-D

SCALES
H 1:250
V 1:250

JOB NUMBER
27283S

FIGURE NUMBER
5

EXPLANATORY NOTES – ENVIRONMENTAL LOGS

INTRODUCTION

These notes have been provided to supplement the environmental report with regards to drilling and field logging. Not all notes are necessarily relevant to all reports. Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and manmade processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies involve gathering and assimilating limited facts about these characteristics and properties in order to understand the ground on a particular site under certain conditions. These conditions are directly relevant only to the ground at the place where, and time when, the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, the SAA Site Investigation Code. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached Unified Soil Classification Table qualified by the grading of other particles present (e.g. sandy clay) as set out below (note that unless stated in the report, the soil classification is based on a qualitative field assessment, not laboratory testing):

Soil Classification	Particle Size
Clay	less than 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2mm
Gravel	2 to 60mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose	less than 4
Loose	4 – 10
Medium dense	10 – 30
Dense	30 – 50
Very Dense	greater than 50

Cohesive soils are classified on the basis of strength (consistency) either by use of hand penetrometer, laboratory testing or engineering examination. The strength terms are defined as shown in the following table:

Classification	Unconfined Compressive Strength kPa
Very Soft	less than 25
Soft	25 – 50
Firm	50 – 100
Stiff	100 – 200
Very Stiff	200 – 400
Hard	Greater than 400
Friable	Strength not attainable – soil crumbles

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'Shale' is used to describe thinly bedded to laminated siltstone.

DRILLING OR EXCAVATION METHODS

The following is a brief summary of drilling and excavation methods currently adopted by the Company, and some comments on their use and application. All except test pits and hand auger drilling require the use of a mechanical drilling rig.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descend into the pit. The depth of penetration is limited to approximately 3m for a backhoe and up to 6m for an excavator. Limitations of test pits include problems associated with disturbance and difficulty of reinstatement; and the consequent effects on nearby structures. Care must be taken if construction is to be carried out near test pit locations to either properly re-compact the backfill during construction, or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Premature refusal of the hand augers can occur on a variety of materials such as fill, hard clay, gravel or ironstone, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and in-situ testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock fragments. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (e.g. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, an NMLC triple tube core barrel, which gives a core of about 50mm diameter, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as CORE LOSS. The locations of losses are determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the top end of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" – Test F3.1.

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

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as: N = 13 (4, 6, 7)
- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as: N>30 (15, 30/40mm)

The results of the test can be related empirically to the engineering properties of the soil. Occasionally, the drop hammer is used to drive 50mm diameter thin walled sample tubes (U50) in clays. In such circumstances, the test results are shown on the borehole logs in brackets.

A modification to the SPT test is where the same driving system is used with a solid 60 tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as "Nc" on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

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

The attached explanatory notes define the terms and symbols used in preparation of the logs.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than "straight line"

variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

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

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

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

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (e.g. bricks, concrete, plastic, slag/ash, steel etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably determine the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classifications and rocks strengths indicated on the environmental logs unless noted in the report.

SITE ANOMALIES

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, EIS should be notified immediately.

GRAPHIC LOG SYMBOLS FOR SOIL AND ROCKS

SOIL


FILL


TOPSOIL


CLAY (CL, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CH)


SILTY CLAY (CL, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML)


PEAT AND ORGANIC SOILS

ROCK


CONGLOMERATE


SANDSTONE


SHALE


SILTSTONE, MUDSTONE, CLAYSTONE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

DEFECTS AND INCLUSIONS


CLAY SEAM


SHEARED OR CRUSHED SEAM


BRECCIATED OR SHATTERED SEAM/ZONE


IRONSTONE GRAVEL


ORGANIC MATERIAL

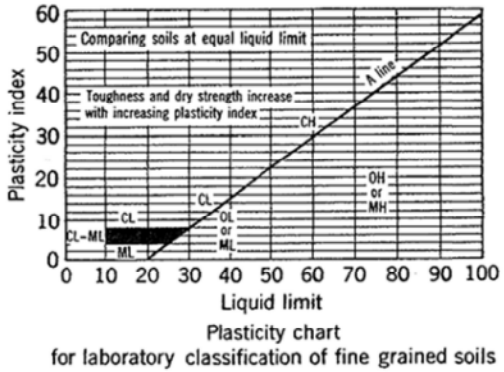
OTHER MATERIALS


CONCRETE


BITUMINOUS CONCRETE, COAL


COLLUVIUM

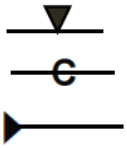
Field Identification Procedures (Excluding particles larger than 75 μm and basing fractions on estimated weights)						Group Symbols [a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria
Coarse-grained soils More than half of material is *larger* than 75 μm sieve size[b] (The 75 μm sieve size is about the smallest particle visible to naked eye)	Gravels More than half of coarse fraction is larger than 4 mm sieve size	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes			*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles 12 mm maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	Use grain size curve in identifying the fractions as given under field identification Determine percentages of gravel and sand from grain size curve Depending on percentage of fines (fraction smaller than 75 μm sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP* More than 12% *GM, GC, SM, SC* 5% to 12% *Borderline* cases requiring use of dual symbols $C_U = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *GW* Atterberg limits below "A" line, or *PI* less than 4 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits above "A" line, with *PI* greater than 7
			Predominantly one size or a range of sizes with some intermediate sizes missing			*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines		
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)			*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)			*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures		
	Sands More than half of coarse fraction is smaller than 4 mm sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes			*SW*	Well graded sands, gravelly sands, little or no fines		$C_U = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *SW* Atterberg limits below "A" line or *PI* less than 5 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits below "A" line with *PI* greater than 7
			Predominantly one size or a range of sizes with some intermediate sizes missing			*SP*	Poorly graded sands, gravelly sands, little or no fines		
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)			*SM*	Silty sands, poorly graded sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)			*SC*	Clayey sands, poorly graded sand-clay mixtures		
Fine-grained soils More than half of material is *smaller* than 75 μm sieve size	Identification Procedures on Fraction Smaller than 380 μm Sieve Size		Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)				
	Silts and clays liquid limit less than 50		None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions Example: *Clayey silt*, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)	
			Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
			Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity		
	Silts and clays liquid limit greater than 50		Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
			High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays		
			Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity		
Highly Organic Soils			Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils		



Plasticity chart
for laboratory classification of fine grained soils

Note: 1 Soils possessing characteristics of two groups are designated by combinations of group symbols (eg. GW-GC, well graded gravel-sand mixture with clay fines).
2 Soils with liquid limits of the order of 35 to 50 may be visually classified as being of medium plasticity.

LOG SYMBOLS

LOG COLUMN	SYMBOL	DEFINITION
Groundwater Record		Standing water level. Time delay following completion of drilling may be shown. Extent of borehole collapse shortly after drilling. Groundwater seepage into borehole or excavation noted during drilling or excavation.
Samples	ES U50 DB DS ASB ASS SAL	Soil sample taken over depth indicated, for environmental analysis. Undisturbed 50mm diameter tube sample taken over depth indicated. Bulk disturbed sample taken over depth indicated. Small disturbed bag sample taken over depth indicated. Soil sample taken over depth indicated, for asbestos screening. Soil sample taken over depth indicated, for acid sulfate soil analysis. Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual show blows per 150mm penetration. 'R' as noted below.
	N_c = 5 7 3 R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60 degree solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25 PID = 100	Vane shear reading in kPa of Undrained Shear Strength. Photoionisation detector reading in ppm (Soil sample heads pace test).
Moisture (Cohesive Soils) (Cohesionless)	MC > PL MC ≈ PL MC < PL D M W	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. DRY – Runs freely through fingers. MOIST – Does not run freely but no free water visible on soil surface. WET – Free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt H ( )	VERY SOFT – Unconfined compressive strength less than 25kPa SOFT – Unconfined compressive strength 25-5 0kPa FIRM – Unconfined compressive strength 50-1 00kPa STIFF – Unconfined compressive strength 100- 200kPa VERY STIFF – Unconfined compressive strength 200- 400kPa HARD – Unconfined compressive strength greater than 400kPa Bracketed symbol indicates estimated consistency based o n tactile examination or other tests.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (ID) Range (%)** / **SPT ' N' Value Range (Blows/300mm)** Very Loose <15 / 0-4 Loose 15-35 / 4-10 Medium Dense 35-65 / 10-30 Dense 65-85 / 30-50 Very Dense >85 / >50 Bracketed symbol indicates estimated density based on ease of drilling or other tests.
Hand Penetrometer Readings	300 250	Numbers indicate individual test results in kPa on representative undisturbed material unless noted otherwise
Remarks	'V' bit 'TC' bit T_{60}	Hardened steel 'V' shaped bit. Tungsten carbide wing bit. Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.

LOG SYMBOLS CONTINUED

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (Is 50) and refers to the strength of the rock substance in the bedding. The test procedure is described by the International Journal of Rock Mechanics, Mining and Geomechanics Abstract Volume 22, No 2, 1985.

TERM	SYMBOL	Is (50) MPa	FIELD GUIDE
Extremely Low:	EL	0.03	Easily remoulded by hand to a material with soil properties.
Very Low:	VL	0.1	May be crumbled in the hand. Sandstone is "sugary" and friable.
Low:	L	0.3	A piece of core 150 mm long x 50mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.
Medium Strength:	M	1	A piece of core 150 mm long x 50mm dia. can be broken by hand with difficulty. Readily scored with knife.
High:	H	3	A piece of core 150 mm long x 50mm dia. core cannot be broken by hand, can be slightly scratched or scored with knife; rock rings under hammer.
Very High:	VH	10	A piece of core 150 mm long x 50mm dia. may be broken with hand-held pick after more than one blow. Cannot be scratched with pen knife; rock rings under hammer.
Extremely High:	EH		A piece of core 150 mm long x 50mm dia. is very difficult to break with h and-held hammer . Rings when struck with a hammer.

ROCK STRENGTH

ABBREVIATION	DESCRIPTION	NOTES
Be	Bedding Plane Parting	Defect orientations measured relative to the normal to (i.e. relative to horizontal for vertical holes)
CS	Clay Seam	
J	Joint	
P	Planar	
Un	Undulating	
S	Smooth	
R	Rough	
IS	Iron stained	
XWS	Extremely Weathered Seam	
Cr	Crushed Seam	
60t	Thickness of defect in millimetres	

Appendix C: Laboratory Report/s & COC Documents

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

CERTIFICATE OF ANALYSIS 126446

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Vittal Boggaram

Sample log in details:

Your Reference:	**E27283KB, North Sydney**
No. of samples:	21 Soils
Date samples received / completed instructions received	13/04/2015 / 13/04/2015

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date:	20/04/15 / 17/04/15
Date of Preliminary Report:	NO

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Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	126446-2	126446-4	126446-8	126446-12	126446-14
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.5-1.0	0-0.2	0-0.2	0.1-0.2	0.13-0.3
Date Sampled		09/04/2015	09/04/2015	09/04/2015	09/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	14/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Date analysed	-	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	93	92	95	89	93

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	126446-16	126446-20
Your Reference	----------	BH6	BH7
Depth	----------	0-0.2	0.3-0.5
Date Sampled		10/04/2015	10/04/2015
Type of sample		SOIL	SOIL
Date extracted	-	14/04/2015	14/04/2015
Date analysed	-	15/04/2015	15/04/2015
TRHC$_6$ - C$_9$	mg/kg	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	91	90

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	126446-2	126446-4	126446-8	126446-12	126446-14
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.5-1.0	0-0.2	0-0.2	0.1-0.2	0.13-0.3
Date Sampled		09/04/2015	09/04/2015	09/04/2015	09/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	14/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Date analysed	-	14/04/2015	14/04/2015	15/04/2015	15/04/2015	15/04/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	110	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	110	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	190	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	88	87	91	94	94

svTRH (C10-C40) in Soil			
Our Reference:	UNITS	126446-16	126446-20
Your Reference	----------	BH6	BH7
Depth	----------	0-0.2	0.3-0.5
Date Sampled		10/04/2015	10/04/2015
Type of sample		SOIL	SOIL
Date extracted	-	14/04/2015	14/04/2015
Date analysed	-	15/04/2015	15/04/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100
Surrogate o-Terphenyl	%	85	81

PAHs in Soil						
Our Reference:	UNITS	126446-2	126446-4	126446-8	126446-12	126446-14
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.5-1.0	0-0.2	0-0.2	0.1-0.2	0.13-0.3
Date Sampled		09/04/2015	09/04/2015	09/04/2015	09/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	14/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Date analysed	-	14/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Naphthalene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.2	0.5	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.2	0.3	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	1.5	4.9	0.1	0.5	0.9
Anthracene	mg/kg	0.4	1.2	<0.1	0.1	0.2
Fluoranthene	mg/kg	1.8	8.3	0.4	1.4	1.5
Pyrene	mg/kg	1.6	7.7	0.4	1.3	1.5
Benzo(a)anthracene	mg/kg	0.8	3.6	0.2	0.6	0.7
Chrysene	mg/kg	0.8	3.4	0.2	0.7	0.6
Benzo(b,j+k)fluoranthene	mg/kg	1	6.2	0.4	2	1
Benzo(a)pyrene	mg/kg	0.86	4.2	0.2	0.94	0.77
Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	2.2	0.2	0.6	0.4
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.5	2.1	0.1	0.6	0.4
Benzo(a)pyrene TEQ calc (zero)	mg/kg	1.1	5.8	<0.5	1.2	1.0
Benzo(a)pyrene TEQ calc(half)	mg/kg	1.2	5.8	<0.5	1.3	1.1
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	1.2	5.8	<0.5	1.3	1.1
Total Positive PAHs	mg/kg	10	45	2.4	8.5	8.3
Surrogate p-Terphenyl-d14	%	96	97	96	96	96

PAHs in Soil			
Our Reference:	UNITS	126446-16	126446-20
Your Reference	----------	BH6	BH7
Depth	----------	0-0.2	0.3-0.5
Date Sampled		10/04/2015	10/04/2015
Type of sample		SOIL	SOIL
Date extracted	-	14/04/2015	14/04/2015
Date analysed	-	14/04/2015	14/04/2015
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.2
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	1.1
Anthracene	mg/kg	<0.1	0.3
Fluoranthene	mg/kg	0.1	3.4
Pyrene	mg/kg	0.1	3.1
Benzo(a)anthracene	mg/kg	<0.1	1.8
Chrysene	mg/kg	<0.1	1.7
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	3.6
Benzo(a)pyrene	mg/kg	0.09	2.3
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	1.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.2
Benzo(g,h,i)perylene	mg/kg	<0.1	1.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	3.2
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	3.2
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	3.2
Total Positive PAHs	mg/kg	0.33	20
Surrogate p-Terphenyl-d14	%	96	94

Organochlorine Pesticides in soil						
Our Reference:	UNITS	126446-2	126446-4	126446-8	126446-14	126446-16
Your Reference	----------	BH1	BH2	BH3	BH5	BH6
Depth	----------	0.5-1.0	0-0.2	0-0.2	0.13-0.3	0-0.2
Date Sampled		09/04/2015	09/04/2015	09/04/2015	10/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	14/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Date analysed	-	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	67	72	76	78	76

Organochlorine Pesticides in soil		
Our Reference:	UNITS	126446-20
Your Reference	----------	BH7
Depth	----------	0.3-0.5
Date Sampled		10/04/2015
Type of sample		SOIL
Date extracted	-	14/04/2015
Date analysed	-	15/04/2015
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCMX	%	75

Organophosphorus Pesticides						
Our Reference:	UNITS	126446-2	126446-4	126446-8	126446-14	126446-16
Your Reference	----------	BH1	BH2	BH3	BH5	BH6
Depth	----------	0.5-1.0	0-0.2	0-0.2	0.13-0.3	0-0.2
Date Sampled		09/04/2015	09/04/2015	09/04/2015	10/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	14/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Date analysed	-	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	67	72	76	78	76

Organophosphorus Pesticides		
Our Reference:	UNITS	126446-20
Your Reference	----------	BH7
Depth	----------	0.3-0.5
Date Sampled		10/04/2015
Type of sample		SOIL
Date extracted	-	14/04/2015
Date analysed	-	15/04/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate TCMX	%	75

PCBs in Soil						
Our Reference:	UNITS	126446-2	126446-4	126446-8	126446-14	126446-16
Your Reference	----------	BH1	BH2	BH3	BH5	BH6
Depth	----------	0.5-1.0	0-0.2	0-0.2	0.13-0.3	0-0.2
Date Sampled		09/04/2015	09/04/2015	09/04/2015	10/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	14/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Date analysed	-	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	67	72	76	78	76

PCBs in Soil		
Our Reference:	UNITS	126446-20
Your Reference	----------	BH7
Depth	----------	0.3-0.5
Date Sampled		10/04/2015
Type of sample		SOIL
Date extracted	-	14/04/2015
Date analysed	-	15/04/2015
Arochlor 1016	mg/kg	<0.1
Arochlor 1221	mg/kg	<0.1
Arochlor 1232	mg/kg	<0.1
Arochlor 1242	mg/kg	<0.1
Arochlor 1248	mg/kg	<0.1
Arochlor 1254	mg/kg	<0.1
Arochlor 1260	mg/kg	<0.1
Surrogate TCLMX	%	75

Acid Extractable metals in soil						
Our Reference:	UNITS	126446-2	126446-4	126446-8	126446-12	126446-14
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.5-1.0	0-0.2	0-0.2	0.1-0.2	0.13-0.3
Date Sampled		09/04/2015	09/04/2015	09/04/2015	09/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date digested	-	14/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Date analysed	-	14/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Arsenic	mg/kg	6	16	<4	5	<4
Cadmium	mg/kg	<0.4	2	<0.4	<0.4	<0.4
Chromium	mg/kg	10	24	7	12	12
Copper	mg/kg	6	120	13	33	56
Lead	mg/kg	41	680	31	110	51
Mercury	mg/kg	<0.1	0.5	<0.1	0.2	0.1
Nickel	mg/kg	1	18	5	4	9
Zinc	mg/kg	24	1,300	44	83	82

Acid Extractable metals in soil			
Our Reference:	UNITS	126446-16	126446-20
Your Reference	----------	BH6	BH7
Depth	----------	0-0.2	0.3-0.5
Date Sampled		10/04/2015	10/04/2015
Type of sample		SOIL	SOIL
Date digested	-	14/04/2015	14/04/2015
Date analysed	-	14/04/2015	14/04/2015
Arsenic	mg/kg	7	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	6	12
Copper	mg/kg	19	19
Lead	mg/kg	35	260
Mercury	mg/kg	<0.1	0.3
Nickel	mg/kg	3	4
Zinc	mg/kg	38	66

Moisture						
Our Reference:	UNITS	126446-2	126446-4	126446-8	126446-12	126446-14
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.5-1.0	0-0.2	0-0.2	0.1-0.2	0.13-0.3
Date Sampled		09/04/2015	09/04/2015	09/04/2015	09/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	14/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Date analysed	-	15/04/2015	15/04/2015	15/04/2015	15/04/2015	15/04/2015
Moisture	%	7.9	19	8.9	22	17

Moisture			
Our Reference:	UNITS	126446-16	126446-20
Your Reference	----------	BH6	BH7
Depth	----------	0-0.2	0.3-0.5
Date Sampled		10/04/2015	10/04/2015
Type of sample		SOIL	SOIL
Date prepared	-	14/04/2015	14/04/2015
Date analysed	-	15/04/2015	15/04/2015
Moisture	%	13	20

Asbestos ID - soils						
Our Reference:	UNITS	126446-2	126446-4	126446-8	126446-14	126446-16
Your Reference	----------	BH1	BH2	BH3	BH5	BH6
Depth	----------	0.5-1.0	0-0.2	0-0.2	0.13-0.3	0-0.2
Date Sampled		09/04/2015	09/04/2015	09/04/2015	10/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	17/04/2015	17/04/2015	17/04/2015	17/04/2015	17/04/2015
Sample mass tested	g	Approx 40g	Approx 40g	Approx 60g	Approx 60g	Approx 40g
Sample Description	-	Brown coarse grain soil & rocks	Brown coarse grain soil & rocks	Brown coarse grain soil & rocks	Brown coarse grain soil & rocks	Brown coarse grain soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils		
Our Reference:	UNITS	126446-20
Your Reference	----------	BH7
Depth	----------	0.3-0.5
Date Sampled		10/04/2015
Type of sample		SOIL
Date analysed	-	17/04/2015
Sample mass tested	g	Approx 45g
Sample Description	-	Brown coarse grain soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/04/2015	126446-2	14/04/2015 || 14/04/2015	LCS-4	14/04/2015
Date analysed	-			15/04/2015	126446-2	15/04/2015 || 15/04/2015	LCS-4	15/04/2015
TRHC6 - C9	mg/kg	25	Org-016	<25	126446-2	<25 || <25	LCS-4	100%
TRHC6 - C10	mg/kg	25	Org-016	<25	126446-2	<25 || <25	LCS-4	100%
Benzene	mg/kg	0.2	Org-016	<0.2	126446-2	<0.2 || <0.2	LCS-4	94%
Toluene	mg/kg	0.5	Org-016	<0.5	126446-2	<0.5 || <0.5	LCS-4	96%
Ethylbenzene	mg/kg	1	Org-016	<1	126446-2	<1 || <1	LCS-4	100%
m+p-xylene	mg/kg	2	Org-016	<2	126446-2	<2 || <2	LCS-4	105%
o-Xylene	mg/kg	1	Org-016	<1	126446-2	<1 || <1	LCS-4	96%
naphthalene	mg/kg	1	Org-014	<1	126446-2	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	97	126446-2	93 || 92 || RPD: 1	LCS-4	99%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/04/2015	126446-2	14/04/2015 || 14/04/2015	LCS-4	14/04/2015
Date analysed	-			14/04/2015	126446-2	14/04/2015 || 14/04/2015	LCS-4	14/04/2015
TRHC10 - C14	mg/kg	50	Org-003	<50	126446-2	<50 || <50	LCS-4	100%
TRHC15 - C28	mg/kg	100	Org-003	<100	126446-2	<100 || <100	LCS-4	108%
TRHC29 - C36	mg/kg	100	Org-003	<100	126446-2	<100 || <100	LCS-4	103%
TRH>C10-C16	mg/kg	50	Org-003	<50	126446-2	<50 || <50	LCS-4	100%
TRH>C16-C34	mg/kg	100	Org-003	<100	126446-2	<100 || <100	LCS-4	108%
TRH>C34-C40	mg/kg	100	Org-003	<100	126446-2	<100 || <100	LCS-4	103%
Surrogate o-Terphenyl	%		Org-003	81	126446-2	88 || 87 || RPD: 1	LCS-4	98%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/04/2015	126446-2	14/04/2015 || 14/04/2015	LCS-4	14/04/2015
Date analysed	-			14/04/2015	126446-2	14/04/2015 || 14/04/2015	LCS-4	14/04/2015
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	<0.1 || <0.1	LCS-4	89%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	0.2 || 0.2 || RPD: 0	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	0.2 || 0.1 || RPD: 67	LCS-4	84%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	1.5 || 1.4 || RPD: 7	LCS-4	84%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	0.4 || 0.3 || RPD: 29	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	1.8 || 2.1 || RPD: 15	LCS-4	82%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	1.6 || 2.0 || RPD: 22	LCS-4	85%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	0.8 || 1 || RPD: 22	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	0.8 || 1 || RPD: 22	LCS-4	81%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	126446-2	1 || 2 || RPD: 67	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	126446-2	0.86 || 1.1 || RPD: 24	LCS-4	103%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	0.5 || 0.6 || RPD: 18	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	<0.1 || 0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	126446-2	0.5 || 0.6 || RPD: 18	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	98	126446-2	96 || 98 || RPD: 2	LCS-4	95%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/04/2015	126446-2	14/04/2015 || 14/04/2015	LCS-4	14/04/2015
Date analysed	-			15/04/2015	126446-2	15/04/2015 || 15/04/2015	LCS-4	15/04/2015
HCB	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	LCS-4	91%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	LCS-4	104%
Heptachlor	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	LCS-4	91%
delta-BHC	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	LCS-4	96%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	LCS-4	99%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	LCS-4	118%
Dieldrin	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	LCS-4	98%
Endrin	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	LCS-4	100%
pp-DDD	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	LCS-4	130%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	LCS-4	100%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	87	126446-2	67 || 75 || RPD: 11	LCS-4	91%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/04/2015	126446-2	14/04/2015 || 14/04/2015	LCS-4	14/04/2015
Date analysed	-			15/04/2015	126446-2	15/04/2015 || 15/04/2015	LCS-4	15/04/2015
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	LCS-4	89%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	LCS-4	82%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	LCS-4	81%
Dimethoate	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	LCS-4	75%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	LCS-4	71%
Malathion	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	LCS-4	74%
Parathion	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	LCS-4	94%
Ronnel	mg/kg	0.1	Org-008	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-008	87	126446-2	67 || 75 || RPD: 11	LCS-4	85%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/04/2015	126446-2	14/04/2015 || 14/04/2015	LCS-4	14/04/2015
Date analysed	-			15/04/2015	126446-2	15/04/2015 || 15/04/2015	LCS-4	15/04/2015
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	126446-2	<0.1 || <0.1	LCS-4	96%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	126446-2	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	87	126446-2	67 || 75 || RPD: 11	LCS-4	85%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			14/04/2015	126446-2	14/04/2015 || 14/04/2015	LCS-4	14/04/2015
Date analysed	-			14/04/2015	126446-2	14/04/2015 || 14/04/2015	LCS-4	14/04/2015
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	126446-2	6 || 4 || RPD: 40	LCS-4	103%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	126446-2	<0.4 || <0.4	LCS-4	101%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	126446-2	10 || 10 || RPD: 0	LCS-4	101%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	126446-2	6 || 5 || RPD: 18	LCS-4	106%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	126446-2	41 || 30 || RPD: 31	LCS-4	92%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	126446-2	<0.1 || <0.1	LCS-4	90%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	126446-2	1 || 1 || RPD: 0	LCS-4	97%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	126446-2	24 || 17 || RPD: 34	LCS-4	94%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	126446-4	14/04/2015
Date analysed	-	[NT]	[NT]	126446-4	15/04/2015
TRHC$_6$ - C$_9$	mg/kg	[NT]	[NT]	126446-4	94%
TRHC$_6$ - C$_{10}$	mg/kg	[NT]	[NT]	126446-4	94%
Benzene	mg/kg	[NT]	[NT]	126446-4	89%
Toluene	mg/kg	[NT]	[NT]	126446-4	91%
Ethylbenzene	mg/kg	[NT]	[NT]	126446-4	94%
m+p-xylene	mg/kg	[NT]	[NT]	126446-4	99%
o-Xylene	mg/kg	[NT]	[NT]	126446-4	90%
naphthalene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	126446-4	91%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	126446-4	14/04/2015
Date analysed	-	[NT]	[NT]	126446-4	15/04/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	[NT]	[NT]	126446-4	94%
TRHC$_{15}$ - C$_{28}$	mg/kg	[NT]	[NT]	126446-4	100%
TRHC$_{29}$ - C$_{36}$	mg/kg	[NT]	[NT]	126446-4	#
TRH>C$_{10}$-C$_{16}$	mg/kg	[NT]	[NT]	126446-4	94%
TRH>C$_{16}$-C$_{34}$	mg/kg	[NT]	[NT]	126446-4	100%
TRH>C$_{34}$-C$_{40}$	mg/kg	[NT]	[NT]	126446-4	#
Surrogate o-Terphenyl	%	[NT]	[NT]	126446-4	94%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	126446-4	14/04/2015
Date analysed	-	[NT]	[NT]	126446-4	15/04/2015
Naphthalene	mg/kg	[NT]	[NT]	126446-4	96%
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	126446-4	99%
Phenanthrene	mg/kg	[NT]	[NT]	126446-4	#
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	126446-4	#
Pyrene	mg/kg	[NT]	[NT]	126446-4	#
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	126446-4	68%
Benzo(b,j+k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	126446-4	95%
Indeno(1,2,3-c,d)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	[NT]	[NT]	126446-4	102%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	126446-4	14/04/2015
Date analysed	-	[NT]	[NT]	126446-4	15/04/2015
HCB	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	[NT]	[NT]	126446-4	82%
gamma-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	[NT]	[NT]	126446-4	84%
Heptachlor	mg/kg	[NT]	[NT]	126446-4	73%
delta-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	[NT]	[NT]	126446-4	80%
Heptachlor Epoxide	mg/kg	[NT]	[NT]	126446-4	79%
gamma-Chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	[NT]	[NT]	126446-4	90%
Dieldrin	mg/kg	[NT]	[NT]	126446-4	76%
Endrin	mg/kg	[NT]	[NT]	126446-4	77%
pp-DDD	mg/kg	[NT]	[NT]	126446-4	93%
Endosulfan II	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	[NT]	[NT]	126446-4	81%
Methoxychlor	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%	[NT]	[NT]	126446-4	73%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	126446-4	14/04/2015
Date analysed	-	[NT]	[NT]	126446-4	15/04/2015
Azinphos-methyl (Guthion)	mg/kg	[NT]	[NT]	126446-4	102%
Bromophos-ethyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	mg/kg	[NT]	[NT]	126446-4	93%
Chlorpyriphos-methyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Diazinon	mg/kg	[NT]	[NT]	[NR]	[NR]
Dichlorvos	mg/kg	[NT]	[NT]	126446-4	83%
Dimethoate	mg/kg	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	[NT]	[NT]	126446-4	86%
Fenitrothion	mg/kg	[NT]	[NT]	126446-4	99%
Malathion	mg/kg	[NT]	[NT]	126446-4	73%
Parathion	mg/kg	[NT]	[NT]	126446-4	99%
Ronnel	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%	[NT]	[NT]	126446-4	72%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	126446-4	14/04/2015
Date analysed	-	[NT]	[NT]	126446-4	15/04/2015
Arochlor 1016	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	[NT]	[NT]	126446-4	99%
Arochlor 1260	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	126446-4	88%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	126446-4	14/04/2015
Date analysed	-	[NT]	[NT]	126446-4	14/04/2015
Arsenic	mg/kg	[NT]	[NT]	126446-4	96%
Cadmium	mg/kg	[NT]	[NT]	126446-4	98%
Chromium	mg/kg	[NT]	[NT]	126446-4	77%
Copper	mg/kg	[NT]	[NT]	126446-4	88%
Lead	mg/kg	[NT]	[NT]	126446-4	#
Mercury	mg/kg	[NT]	[NT]	126446-4	84%
Nickel	mg/kg	[NT]	[NT]	126446-4	78%
Zinc	mg/kg	[NT]	[NT]	126446-4	#

Report Comments:

Total Recoverable Hydrocarbons in soil: # Percent recovery is not possible to report due to interference from analytes (other than those being tested) in the sample/s.

PAH's in soil: # Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

METALS_S: # Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Asbestos ID was analysed by Approved Identifier: Paul Ching
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NA: Test not required
<: Less than

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

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

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

SAMPLE RECEIPT ADVICE

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC NSW 1670

ph: 02 9888 5000
Fax: 02 9888 5001

Attention: Vittal Boggaram

Sample log in details:

Your reference:	**E27283KB, North Sydney**
Envirolab Reference:	**126446**
Date received:	13/04/2015
Date results expected to be reported:	**20/04/15**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	21 Soils
Turnaround time requested:	Standard
Temperature on receipt (°C)	14.4
Cooling Method:	Ice Pack
Sampling Date Provided:	YES

Comments:

If there is sufficient sample after testing, samples will be held for the following time frames from date of receipt of samples:
Water samples - 1 month
Soil and other solid samples - 2 months
Samples collected in canisters - 1 week. Canisters will then be cleaned.
All other samples are not retained after analysis
If you require samples to be retained for longer periods then retention fees will apply as per our pricelist.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	EIS Job Number: E27283KB	ENVIRONMENTAL INVESTIGATION SERVICES
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067	Date Results Required: STANDARD	MACQUARIE PARK, NSW 2113
P: (02) 99106200		P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201	Page: 1 of 2	Attention: Vittal Boggaram
Attention: Aileen		

Location: North Sydney, NSW

Sampler: DW

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos	sPOCAS
9/4/15	1	BH1	0-0.2	G, A	0	Soil F										
	2		0.5-1.0		0.6	Soil F				X						
	3		1.5-2		0	N										
	4	BH2	0-0.2		0	F				X						
	5		0.2-0.5		0	F										
	6		0.6-1		0	F										
	7		1.3-1.5		0	N										
	8	BH3	0-0.2		5.8	F				X						
	9		0.3-0.5		0.7	F										
	10		0.7-1.2		0.3	F										
	11		1.6-1.9		0.3	N										
	12	BH4	0.1-0.2		0.2	F		X								
	13		0.3-0.4		0	F										
10/4/15	14	BH5	0.13-0.3		0.6	F				X						
	15		0.8-1		0.2	N										
	16	BH6	0-0.2		0.1	F				X						
	17		0.3-0.5		0.1	F										
	18		0.7-1		0	N										
	19	BH7	0-0.2		0	F										
	20		0.3-0.5		0	F				X						
	21		0.7-1.0		0.1	N										

ENVIROLAB GROUP

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

Job No: 126446

Date Received: 13/4/15

Time Received: 17:50

Received by: DT

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
Jack Slater	13/4/15		Daniel Ford-EIS	13/4/15

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

CERTIFICATE OF ANALYSIS 126446-A

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Vittal Boggaram

Sample log in details:

Your Reference:	**E27283KB, North Sydney**
No. of samples:	Additional testing on soils
Date samples received / completed instructions received	13/04/2015 / 20/04/15

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date:	27/04/15 / 27/04/15
Date of Preliminary Report:	NO

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

PAHs in Soil			
Our Reference:	UNITS	126446-A-6	126446-A-21
Your Reference	----------	BH2	BH7
Depth	----------	0.6-1	0.7-1.0
Date Sampled		09/04/2015	10/04/2015
Type of sample		SOIL	SOIL
Date extracted	-	21/04/2015	21/04/2015
Date analysed	-	21/04/2015	21/04/2015
Naphthalene	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
Fluoranthene	mg/kg	0.2	<0.1
Pyrene	mg/kg	0.2	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1
Chrysene	mg/kg	0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.2	<0.2
Benzo(a)pyrene	mg/kg	0.1	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Total Positive PAHs	mg/kg	1.3	NIL (+)VE
Surrogate p-Terphenyl-d14	%	100	95

Acid Extractable metals in soil			
Our Reference:	UNITS	126446-A-6	126446-A-21
Your Reference	----------	BH2	BH7
Depth	----------	0.6-1	0.7-1.0
Date Sampled		09/04/2015	10/04/2015
Type of sample		SOIL	SOIL
Date digested	-	21/04/2015	21/04/2015
Date analysed	-	21/04/2015	21/04/2015
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	9	10
Copper	mg/kg	5	<1
Lead	mg/kg	23	6
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	<1	<1
Zinc	mg/kg	120	9

Moisture			
Our Reference:	UNITS	126446-A-6	126446-A-21
Your Reference	----------	BH2	BH7
Depth	----------	0.6-1	0.7-1.0
Date Sampled		09/04/2015	10/04/2015
Type of sample		SOIL	SOIL
Date prepared	-	21/04/2015	21/04/2015
Date analysed	-	22/04/2015	22/04/2015
Moisture	%	13	15

Metals in TCLP USEPA1311						
Our Reference:	UNITS	126446-A-2	126446-A-4	126446-A-6	126446-A-12	126446-A-20
Your Reference	----------	BH1	BH2	BH2	BH4	BH7
Depth	----------	0.5-1.0	0-0.2	0.6-1	0.1-0.2	0.3-0.5
Date Sampled		09/04/2015	09/04/2015	09/04/2015	09/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015
Date analysed	-	[NA]	21/04/2015	21/04/2015	21/04/2015	21/04/2015
pH of soil for fluid# determ.	pH units	7.9	7.5	7.4	6.6	6.2
pH of soil for fluid # determ. (acid)	pH units	1.6	1.5	1.7	1.6	1.7
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.0	5.0	4.9	4.9	5.0
Arsenic in TCLP	mg/L	[NA]	[NA]	<0.05	[NA]	[NA]
Cadmium in TCLP	mg/L	[NA]	[NA]	<0.01	[NA]	[NA]
Chromium in TCLP	mg/L	[NA]	[NA]	<0.01	[NA]	[NA]
Copper in TCLP	mg/L	[NA]	[NA]	<0.01	[NA]	[NA]
Lead in TCLP	mg/L	[NA]	1.3	0.1	0.06	0.07
Mercury in TCLP	mg/L	[NA]	[NA]	<0.0005	[NA]	[NA]
Nickel in TCLP	mg/L	[NA]	[NA]	<0.02	[NA]	[NA]
Zinc in TCLP	mg/L	[NA]	[NA]	1.7	[NA]	[NA]

Metals in TCLP USEPA1311		
Our Reference:	UNITS	126446-A-21
Your Reference	----------	BH7
Depth	----------	0.7-1.0
Date Sampled		10/04/2015
Type of sample		SOIL
Date extracted	-	21/04/2015
Date analysed	-	21/04/2015
pH of soil for fluid# determ.	pH units	7.0
pH of soil for fluid # determ. (acid)	pH units	1.7
Extraction fluid used	-	1
pH of final Leachate	pH units	4.9
Arsenic in TCLP	mg/L	<0.05
Cadmium in TCLP	mg/L	<0.01
Chromium in TCLP	mg/L	<0.01
Copper in TCLP	mg/L	0.01
Lead in TCLP	mg/L	<0.03
Mercury in TCLP	mg/L	<0.0005
Nickel in TCLP	mg/L	<0.02
Zinc in TCLP	mg/L	0.2

PAHs in TCLP (USEPA 1311)						
Our Reference:	UNITS	126446-A-2	126446-A-4	126446-A-6	126446-A-12	126446-A-20
Your Reference	----------	BH1	BH2	BH2	BH4	BH7
Depth	----------	0.5-1.0	0-0.2	0.6-1	0.1-0.2	0.3-0.5
Date Sampled		09/04/2015	09/04/2015	09/04/2015	09/04/2015	10/04/2015
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015
Date analysed	-	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	0.002	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	0.002	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	0.0040	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	111	118	108	98	104

PAHs in TCLP (USEPA 1311)		
Our Reference:	UNITS	126446-A-21
Your Reference	----------	BH7
Depth	----------	0.7-1.0
Date Sampled		10/04/2015
Type of sample		SOIL
Date extracted	-	21/04/2015
Date analysed	-	21/04/2015
Naphthalene in TCLP	mg/L	<0.001
Acenaphthylene in TCLP	mg/L	<0.001
Acenaphthene in TCLP	mg/L	<0.001
Fluorene in TCLP	mg/L	<0.001
Phenanthrene in TCLP	mg/L	<0.001
Anthracene in TCLP	mg/L	<0.001
Fluoranthene in TCLP	mg/L	<0.001
Pyrene in TCLP	mg/L	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001
Chrysene in TCLP	mg/L	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001
Total +ve PAH's	mg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	98

Method ID	Methodology Summary
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			21/04/2015	[NT]	[NT]	LCS-5	21/04/2015
Date analysed	-			21/04/2015	[NT]	[NT]	LCS-5	21/04/2015
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-5	86%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-5	93%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-5	92%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-5	96%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-5	99%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-5	96%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	[NT]	[NT]	LCS-5	104%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	96	[NT]	[NT]	LCS-5	94%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			21/04/2015	[NT]	[NT]	LCS-1	21/04/2015
Date analysed	-			21/04/2015	[NT]	[NT]	LCS-1	21/04/2015
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	LCS-1	108%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	LCS-1	104%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	103%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	104%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	99%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	LCS-1	116%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	99%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	102%
QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			21/04/2015	[NT]	[NT]	LCS-W1	21/04/2015
Date analysed	-			21/04/2015	[NT]	[NT]	LCS-W1	21/04/2015
Arsenic in TCLP	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	108%
Cadmium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	LCS-W1	108%
Chromium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	LCS-W1	104%
Copper in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	LCS-W1	106%
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	100%
Mercury in TCLP	mg/L	0.0005	Metals-021 CV-AAS	<0.0005	[NT]	[NT]	LCS-W1	100%
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	LCS-W1	103%
Zinc in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	LCS-W1	106%

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			21/04/2015	[NT]	[NT]	LCS-W1	21/04/2015
Date analysed	-			21/04/2015	[NT]	[NT]	LCS-W1	21/04/2015
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	75%
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	79%
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	85%
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	89%
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	92%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	76%
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	91%
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	83	[NT]	[NT]	LCS-W1	96%

Report Comments:

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

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

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

Aileen Hie

From: Vittal Boggaram <VBoggaram@jkgroup.net.au>
Sent: Monday, 20 April 2015 9:16 AM
To: Aileen Hie
Cc: Jacinta Hurst
Subject: RE: Additional testing for registration '126446 - E27283KB, North Sydney'

Hi Aileen

Can you please schedule the following additional testing on a standard turnaround. Samples in grey have not been tested in the first round. Ta.

EIS Sample Ref:	Envirolab Sample Ref:	Depth	Additional Testing
BH1	2	0.5-1.0	TCLP PAHs
BH2	4	0-0.2	TCLP PAHs & TCLP Lead
BH2	6	0.6-1	8 Metals, PAHs, TCLP PAHs and TCLP metals
BH4	12	0.1-0.2	TCLP PAHs & TCLP Lead
BH7	20	0.3-0.5	TCLP PAHs & TCLP Lead
BH7	21	0.7-1.0	8 Metals, PAHs, TCLP PAHs and TCLP metals

126446 A
std T/A
due 27/4.

Regards,

Vittal Boggaram
Associate | Environmental Scientist

VBoggaram@jkgroup.net.au
www.jkgroup.net.au

Environmental Investigation Services
CONSULTING ENVIRONMENTAL ENGINEERS AND SCIENTISTS
PO Box 976, North Ryde BC NSW 1670
115 Wicks Rd, Macquarie Park NSW 2113
T: +612 9888 5000 F: +612 9888 5001

-----Original Message-----
From: Geoff Weir [mailto:GWeir@envirolab.com.au]
Sent: Friday, 17 April 2015 6:55 PM
To: Vittal Boggaram
Subject: Results for registration '126446 - E27283KB, North Sydney'

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the Invoice
a copy of the COC
an excel file containing the results

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

CERTIFICATE OF ANALYSIS 126567

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Vittal Boggaram

Sample log in details:

Your Reference:	**E27283KB, North Sydney**
No. of samples:	12 Soils
Date samples received / completed instructions received	15/04/2015 / 15/04/2015

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date:	22/04/15 / 22/04/15
Date of Preliminary Report:	Not Issued

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	126567-1	126567-3	126567-5	126567-7	126567-9
Your Reference	----------	BH8	BH9	BH10	BH11	DUP1
Depth	----------	0.01-0.2	0-0.1	0.1-0.2	0-0.2	-
Date Sampled		13/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Date analysed	-	17/04/2015	17/04/2015	17/04/2015	17/04/2015	17/04/2015
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	90	92	91	90	90

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	126567-10	126567-12
Your Reference	----------	DUP2	TB
Depth	----------	-	-
Date Sampled		14/04/2015	14/04/2015
Type of sample		Soil	Soil
Date extracted	-	16/04/2015	16/04/2015
Date analysed	-	17/04/2015	17/04/2015
TRHC$_6$ - C$_9$	mg/kg	<25	[NA]
TRHC$_6$ - C$_{10}$	mg/kg	<25	[NA]
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	[NA]
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
naphthalene	mg/kg	<1	[NA]
Surrogate aaa-Trifluorotoluene	%	86	92

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	126567-1	126567-3	126567-5	126567-7	126567-9
Your Reference	----------	BH8	BH9	BH10	BH11	DUP1
Depth	----------	0.01-0.2	0-0.1	0.1-0.2	0-0.2	-
Date Sampled		13/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Date analysed	-	17/04/2015	17/04/2015	17/04/2015	17/04/2015	17/04/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	150	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	110	<100	<100	<100	100
TRH>C$_{34}$-C$_{40}$	mg/kg	290	120	<100	<100	<100
Surrogate o-Terphenyl	%	96	97	85	86	85

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	126567-10
Your Reference	----------	DUP2
Depth	----------	-
Date Sampled		14/04/2015
Type of sample		Soil
Date extracted	-	16/04/2015
Date analysed	-	17/04/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100
TRHC$_{29}$ - 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
Surrogate o-Terphenyl	%	96

PAHs in Soil						
Our Reference:	UNITS	126567-1	126567-3	126567-5	126567-7	126567-9
Your Reference	----------	BH8	BH9	BH10	BH11	DUP1
Depth	----------	0.01-0.2	0-0.1	0.1-0.2	0-0.2	-
Date Sampled		13/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Date analysed	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.1	<0.1	<0.1	0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.7	<0.1	<0.1	1.4
Anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	0.3
Fluoranthene	mg/kg	<0.1	2.6	0.2	0.2	5.7
Pyrene	mg/kg	<0.1	2.7	0.2	0.2	5.9
Benzo(a)anthracene	mg/kg	<0.1	1.2	0.1	0.1	2.4
Chrysene	mg/kg	<0.1	1.1	0.1	0.1	2.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	2.3	0.2	0.3	4.4
Benzo(a)pyrene	mg/kg	<0.05	1.5	0.1	0.1	3.0
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.9	<0.1	<0.1	1.9
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	0.2
Benzo(g,h,i)perylene	mg/kg	<0.1	0.8	<0.1	<0.1	1.8
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	2.1	<0.5	<0.5	4.1
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	2.1	<0.5	<0.5	4.1
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	2.1	<0.5	<0.5	4.1
Total Positive PAHs	mg/kg	NIL (+)VE	14	0.98	1.2	29
Surrogate p-Terphenyl-d14	%	104	104	97	104	101

PAHs in Soil		
Our Reference:	UNITS	126567-10
Your Reference	----------	DUP2
Depth	----------	-
Date Sampled		14/04/2015
Type of sample		Soil
Date extracted	-	16/04/2015
Date analysed	-	16/04/2015
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.1
Pyrene	mg/kg	0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	0.06
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total Positive PAHs	mg/kg	0.30
Surrogate p-Terphenyl-d14	%	103

Organochlorine Pesticides in soil						
Our Reference:	UNITS	126567-1	126567-3	126567-5	126567-7	126567-9
Your Reference	----------	BH8	BH9	BH10	BH11	DUP1
Depth	----------	0.01-0.2	0-0.1	0.1-0.2	0-0.2	-
Date Sampled		13/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Date analysed	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	92	80	83	81

Organochlorine Pesticides in soil		
Our Reference:	UNITS	126567-10
Your Reference	----------	DUP2
Depth	----------	-
Date Sampled		14/04/2015
Type of sample		Soil
Date extracted	-	16/04/2015
Date analysed	-	16/04/2015
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCMX	%	97

Organophosphorus Pesticides						
Our Reference:	UNITS	126567-1	126567-3	126567-5	126567-7	126567-9
Your Reference	----------	BH8	BH9	BH10	BH11	DUP1
Depth	----------	0.01-0.2	0-0.1	0.1-0.2	0-0.2	-
Date Sampled		13/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Date analysed	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	92	80	83	81

Organophosphorus Pesticides		
Our Reference:	UNITS	126567-10
Your Reference	----------	DUP2
Depth	----------	-
Date Sampled		14/04/2015
Type of sample		Soil
Date extracted	-	16/04/2015
Date analysed	-	16/04/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate TCMX	%	97

PCBs in Soil						
Our Reference:	UNITS	126567-1	126567-3	126567-5	126567-7	126567-9
Your Reference	----------	BH8	BH9	BH10	BH11	DUP1
Depth	----------	0.01-0.2	0-0.1	0.1-0.2	0-0.2	-
Date Sampled		13/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Date analysed	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	87	92	80	83	81

PCBs in Soil		
Our Reference:	UNITS	126567-10
Your Reference	----------	DUP2
Depth	----------	-
Date Sampled		14/04/2015
Type of sample		Soil
Date extracted	-	16/04/2015
Date analysed	-	16/04/2015
Arochlor 1016	mg/kg	<0.1
Arochlor 1221	mg/kg	<0.1
Arochlor 1232	mg/kg	<0.1
Arochlor 1242	mg/kg	<0.1
Arochlor 1248	mg/kg	<0.1
Arochlor 1254	mg/kg	<0.1
Arochlor 1260	mg/kg	<0.1
Surrogate TCLMX	%	97

Acid Extractable metals in soil						
Our Reference:	UNITS	126567-1	126567-3	126567-5	126567-7	126567-9
Your Reference	----------	BH8	BH9	BH10	BH11	DUP1
Depth	----------	0.01-0.2	0-0.1	0.1-0.2	0-0.2	-
Date Sampled		13/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Date analysed	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Arsenic	mg/kg	<4	<4	7	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	0.4
Chromium	mg/kg	9	11	5	6	11
Copper	mg/kg	79	40	14	22	55
Lead	mg/kg	4	400	25	130	400
Mercury	mg/kg	<0.1	0.4	<0.1	<0.1	0.3
Nickel	mg/kg	48	4	3	3	6
Zinc	mg/kg	37	210	26	62	230

Acid Extractable metals in soil		
Our Reference:	UNITS	126567-10
Your Reference	----------	DUP2
Depth	----------	-
Date Sampled		14/04/2015
Type of sample		Soil
Date digested	-	16/04/2015
Date analysed	-	16/04/2015
Arsenic	mg/kg	9
Cadmium	mg/kg	<0.4
Chromium	mg/kg	6
Copper	mg/kg	17
Lead	mg/kg	25
Mercury	mg/kg	<0.1
Nickel	mg/kg	3
Zinc	mg/kg	17

Moisture						
Our Reference:	UNITS	126567-1	126567-3	126567-5	126567-7	126567-9
Your Reference	----------	BH8	BH9	BH10	BH11	DUP1
Depth	----------	0.01-0.2	0-0.1	0.1-0.2	0-0.2	-
Date Sampled		13/04/2015	14/04/2015	14/04/2015	14/04/2015	14/04/2015
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	16/04/2015	16/04/2015	16/04/2015	16/04/2015	16/04/2015
Date analysed	-	17/04/2015	17/04/2015	17/04/2015	17/04/2015	17/04/2015
Moisture	%	7.3	11	11	12	15

Moisture			
Our Reference:	UNITS	126567-10	126567-12
Your Reference	----------	DUP2	TB
Depth	----------	-	-
Date Sampled		14/04/2015	14/04/2015
Type of sample		Soil	Soil
Date prepared	-	16/04/2015	16/04/2015
Date analysed	-	17/04/2015	17/04/2015
Moisture	%	11	0.2

Asbestos ID - soils					
Our Reference:	UNITS	126567-1	126567-3	126567-5	126567-7
Your Reference	----------	BH8	BH9	BH10	BH11
Depth	----------	0.01-0.2	0-0.1	0.1-0.2	0-0.2
Date Sampled		13/04/2015	14/04/2015	14/04/2015	14/04/2015
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	22/04/2015	22/04/2015	22/04/2015	22/04/2015
Sample mass tested	g	Approx. 80g	Approx. 50g	Approx. 40g	Approx. 80g
Sample Description	-	Brown coarse-grain soil & rocks	Brown coarse-grain soil & rocks	Brown coarse-grain soil & rocks	Brown coarse-grain soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-4	16/04/2015
Date analysed	-			17/04/2015	126567-1	17/04/2015 || 17/04/2015	LCS-4	17/04/2015
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	126567-1	<25 || <25	LCS-4	96%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	126567-1	<25 || <25	LCS-4	96%
Benzene	mg/kg	0.2	Org-016	<0.2	126567-1	<0.2 || <0.2	LCS-4	96%
Toluene	mg/kg	0.5	Org-016	<0.5	126567-1	<0.5 || <0.5	LCS-4	95%
Ethylbenzene	mg/kg	1	Org-016	<1	126567-1	<1 || <1	LCS-4	95%
m+p-xylene	mg/kg	2	Org-016	<2	126567-1	<2 || <2	LCS-4	97%
o-Xylene	mg/kg	1	Org-016	<1	126567-1	<1 || <1	LCS-4	94%
naphthalene	mg/kg	1	Org-014	<1	126567-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	93	126567-1	90 || 86 || RPD: 5	LCS-4	93%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-4	16/04/2015
Date analysed	-			16/04/2015	126567-1	17/04/2015 || 17/04/2015	LCS-4	16/04/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	126567-1	<50 || <50	LCS-4	111%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	126567-1	<100 || <100	LCS-4	121%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	126567-1	150 || 170 || RPD: 12	LCS-4	110%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	126567-1	<50 || <50	LCS-4	111%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	126567-1	110 || 100 || RPD: 10	LCS-4	121%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	126567-1	290 || 330 || RPD: 13	LCS-4	110%
Surrogate o-Terphenyl	%		Org-003	88	126567-1	96 || 92 || RPD: 4	LCS-4	110%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-4	16/04/2015
Date analysed	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-4	16/04/2015
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	LCS-4	95%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	LCS-4	90%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	LCS-4	92%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	LCS-4	90%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	LCS-4	94%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	LCS-4	88%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	126567-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	126567-1	<0.05 || <0.05	LCS-4	110%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	108	126567-1	104 || 107 || RPD: 3	LCS-4	99%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-4	16/04/2015
Date analysed	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-4	16/04/2015
HCB	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	LCS-4	87%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	LCS-4	96%
Heptachlor	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	LCS-4	94%
delta-BHC	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	LCS-4	91%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	LCS-4	96%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	LCS-4	99%
Dieldrin	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	LCS-4	95%
Endrin	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	LCS-4	98%
pp-DDD	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	LCS-4	101%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	LCS-4	94%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	88	126567-1	87 || 89 || RPD: 2	LCS-4	83%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-4	16/04/2015
Date analysed	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-4	16/04/2015
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	LCS-4	68%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	LCS-4	104%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	LCS-4	85%
Dimethoate	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	LCS-4	106%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	LCS-4	91%
Malathion	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	LCS-4	83%
Parathion	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	LCS-4	111%
Ronnel	mg/kg	0.1	Org-008	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-008	88	126567-1	87 || 89 || RPD: 2	LCS-4	85%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-4	16/04/2015
Date analysed	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-4	16/04/2015
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	126567-1	<0.1 || <0.1	LCS-4	100%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	126567-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	88	126567-1	87 || 89 || RPD: 2	LCS-4	90%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date digested	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-3	16/04/2015
Date analysed	-			16/04/2015	126567-1	16/04/2015 || 16/04/2015	LCS-3	16/04/2015
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	126567-1	<4 || <4	LCS-3	102%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	126567-1	<0.4 || <0.4	LCS-3	97%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	126567-1	9 || 9 || RPD: 0	LCS-3	98%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	126567-1	79 || 83 || RPD: 5	LCS-3	101%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	126567-1	4 || 4 || RPD: 0	LCS-3	95%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	126567-1	<0.1 || <0.1	LCS-3	85%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	126567-1	48 || 50 || RPD: 4	LCS-3	96%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	126567-1	37 || 37 || RPD: 0	LCS-3	95%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	126567-3	16/04/2015 || 16/04/2015
Date analysed	-	126567-3	16/04/2015 || 16/04/2015
Naphthalene	mg/kg	126567-3	<0.1 || <0.1
Acenaphthylene	mg/kg	126567-3	0.1 || <0.1
Acenaphthene	mg/kg	126567-3	<0.1 || <0.1
Fluorene	mg/kg	126567-3	<0.1 || <0.1
Phenanthrene	mg/kg	126567-3	0.7 || 0.8 || RPD: 13
Anthracene	mg/kg	126567-3	0.2 || 0.2 || RPD: 0
Fluoranthene	mg/kg	126567-3	2.6 || 2.7 || RPD: 4
Pyrene	mg/kg	126567-3	2.7 || 2.7 || RPD: 0
Benzo(a)anthracene	mg/kg	126567-3	1.2 || 1.1 || RPD: 9
Chrysene	mg/kg	126567-3	1.1 || 1.0 || RPD: 10
Benzo(b,j+k)fluoranthene	mg/kg	126567-3	2.3 || 2.2 || RPD: 4
Benzo(a)pyrene	mg/kg	126567-3	1.5 || 1.5 || RPD: 0
Indeno(1,2,3-c,d)pyrene	mg/kg	126567-3	0.9 || 1 || RPD: 11
Dibenzo(a,h)anthracene	mg/kg	126567-3	0.1 || 0.1 || RPD: 0
Benzo(g,h,i)perylene	mg/kg	126567-3	0.8 || 0.9 || RPD: 12
Surrogate p-Terphenyl-d14	%	126567-3	104 || 96 || RPD: 8

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	126567-9	16/04/2015 || 16/04/2015
Date analysed	-	126567-9	16/04/2015 || 16/04/2015
Naphthalene	mg/kg	126567-9	<0.1 || <0.1
Acenaphthylene	mg/kg	126567-9	0.1 || 0.2 || RPD: 67
Acenaphthene	mg/kg	126567-9	<0.1 || <0.1
Fluorene	mg/kg	126567-9	<0.1 || <0.1
Phenanthrene	mg/kg	126567-9	1.4 || 1.6 || RPD: 13
Anthracene	mg/kg	126567-9	0.3 || 0.5 || RPD: 50
Fluoranthene	mg/kg	126567-9	5.7 || 4.7 || RPD: 19
Pyrene	mg/kg	126567-9	5.9 || 4.7 || RPD: 23
Benzo(a)anthracene	mg/kg	126567-9	2.4 || 2.1 || RPD: 13
Chrysene	mg/kg	126567-9	2.1 || 1.8 || RPD: 15
Benzo(b,j+k)fluoranthene	mg/kg	126567-9	4.4 || 3.7 || RPD: 17
Benzo(a)pyrene	mg/kg	126567-9	3.0 || 2.4 || RPD: 22
Indeno(1,2,3-c,d)pyrene	mg/kg	126567-9	1.9 || 1.5 || RPD: 24
Dibenzo(a,h)anthracene	mg/kg	126567-9	0.2 || 0.2 || RPD: 0
Benzo(g,h,i)perylene	mg/kg	126567-9	1.8 || 1.4 || RPD: 25
Surrogate p-Terphenyl-d14	%	126567-9	101 || 98 || RPD: 3

Report Comments:

Asbestos ID was analysed by Approved Identifier: Paul Ching
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NA: Test not required
<: Less than

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

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

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Investigation Services
Attention	Vittal Boggaram

Sample Login Details	
Your Reference	E27283KB, North Sydney
Envirolab Reference	126567
Date Sample Received	15/04/2015
Date Instructions Received	15/04/2015
Date Results Expected to be Reported	22/04/2015

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	12 Soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	11.2
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

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@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on 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
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

Sample Id	*Acid Extractable metals in soil*	*Asbestos ID - soils*	*Organochlorine Pesticides in soil*	*Organophosphorus Pesticides*	*PAHs in Soil*	*PCBs in Soil*	*svTRH (C10-C40) in Soil*	*vTRH(C6-C10)/BTEXN in Soil*	*On Hold*
BH8-0.01-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH8-0.5-1									✓
BH9-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH9-0.1-0.5									✓
BH10-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH10-0.3-0.4									✓
BH11-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH11-0.5-0.6									✓
DUP1	✓		✓	✓	✓	✓	✓	✓	
DUP2	✓		✓	✓	✓	✓	✓	✓	
DUP3									✓
TB								✓	

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	EIS Job Number: E27283KB	ENVIRONMENTAL INVESTIGATION SERVICES
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067		MACQUARIE PARK, NSW 2113
P: (02) 99106200	Date Results Required: STANDARD	P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201		
Attention: Aileen	Page: 1 of 1	Attention: Vittal Boggaram

Location: North Sydney, NSW

Sampler: DW

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos	sPOCAS		
13/04/15	1	BH8	0.01-0.2	G, A	0.2	F				X								
↓	2	↓	0.5-1	↓	0.4	N												
14/04/15	3	BH9	0-0.1		0	F				X								
	4	↓	0.1-0.5		0	N												
	5	BH10	0.1-0.2		0	F				X								
	6	↓	0.3-0.4		0	N												
	7	BH11	0-0.2		0	F				X								
	8	↓	0.5-0.6	↓	0	F												
	9	DUP1	—	—	0	—			X									
	10	DUP2	—	—	0	—			X									
	11	DUP3	—	—	0	—												
↓	12	TB	—	—	—	Soil								X				

ENVIROLAB

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

Job No: 126567

Date Received: 15/4/15

Time Received: 13:20

Received by: D.F

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
Vittal B-S	15/4/15		Daniel Ford - ELS	15/4/15

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

CERTIFICATE OF ANALYSIS 126567-A

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Vittal Boggaram

Sample log in details:

Your Reference:	**E27283KB, North Sydney**
No. of samples:	Additional testing on soils
Date samples received / completed instructions received	15/04/2015 / 22/04/15

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date:	29/04/15 / 24/04/15
Date of Preliminary Report:	Not Issued

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

PAHs in Soil		
Our Reference:	UNITS	126567-A-4
Your Reference	----------	BH9
Depth	----------	0.1-0.5
Date Sampled		14/04/2015
Type of sample		Soil
Date extracted	-	23/04/2015
Date analysed	-	23/04/2015
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE
Surrogate p-Terphenyl-d14	%	94

Acid Extractable metals in soil		
Our Reference:	UNITS	126567-A-4
Your Reference	----------	BH9
Depth	----------	0.1-0.5
Date Sampled		14/04/2015
Type of sample		Soil
Date digested	-	23/04/2015
Date analysed	-	23/04/2015
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	7
Copper	mg/kg	1
Lead	mg/kg	6
Mercury	mg/kg	<0.1
Nickel	mg/kg	2
Zinc	mg/kg	8

Moisture		
Our Reference:	UNITS	126567-A-4
Your Reference	----------	BH9
Depth	----------	0.1-0.5
Date Sampled		14/04/2015
Type of sample		Soil
Date prepared	-	23/04/2015
Date analysed	-	24/04/2015
Moisture	%	7.8

Metals in TCLP USEPA1311				
Our Reference:	UNITS	126567-A-1	126567-A-3	126567-A-4
Your Reference	----------	BH8	BH9	BH9
Depth	----------	0.01-0.2	0-0.1	0.1-0.5
Date Sampled		13/04/2015	14/04/2015	14/04/2015
Type of sample		Soil	Soil	Soil
Date extracted	-	24/04/2015	24/04/2015	24/04/2015
Date analysed	-	24/04/2015	24/04/2015	24/04/2015
pH of soil for fluid# determ.	pH units	8.9	9.6	8.4
pH of soil for fluid # determ. (acid)	pH units	1.6	1.7	1.6
Extraction fluid used	-	1	1	1
pH of final Leachate	pH units	5.0	5.1	4.9
Arsenic in TCLP	mg/L	[NA]	[NA]	<0.05
Cadmium in TCLP	mg/L	[NA]	[NA]	<0.01
Chromium in TCLP	mg/L	[NA]	[NA]	0.02
Copper in TCLP	mg/L	[NA]	[NA]	0.01
Lead in TCLP	mg/L	[NA]	0.41	<0.03
Mercury in TCLP	mg/L	[NA]	[NA]	<0.0005
Nickel in TCLP	mg/L	0.06	[NA]	<0.02
Zinc in TCLP	mg/L	[NA]	[NA]	0.1

PAHs in TCLP (USEPA 1311)			
Our Reference:	UNITS	126567-A-3	126567-A-4
Your Reference	----------	BH9	BH9
Depth	----------	0-0.1	0.1-0.5
Date Sampled		14/04/2015	14/04/2015
Type of sample		Soil	Soil
Date extracted	-	23/04/2015	23/04/2015
Date analysed	-	23/04/2015	23/04/2015
Naphthalene in TCLP	mg/L	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	111	102

Method ID	Methodology Summary
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			23/04/2015	[NT]	[NT]	LCS-4	23/04/2015
Date analysed	-			23/04/2015	[NT]	[NT]	LCS-4	23/04/2015
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	92%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	86%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	87%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	86%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	89%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	84%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	[NT]	[NT]	LCS-4	103%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	97	[NT]	[NT]	LCS-4	91%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			23/04/2015	[NT]	[NT]	LCS-5	23/04/2015
Date analysed	-			23/04/2015	[NT]	[NT]	LCS-5	23/04/2015
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	LCS-5	107%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	LCS-5	101%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-5	103%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-5	100%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-5	97%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	LCS-5	88%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-5	99%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-5	99%
QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/04/2015	[NT]	[NT]	LCS-W1	24/04/2015
Date analysed	-			24/04/2015	[NT]	[NT]	LCS-W1	24/04/2015
Arsenic in TCLP	mg/L	0.05	Metals-020 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	109%
Cadmium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	LCS-W1	109%
Chromium in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	LCS-W1	102%
Copper in TCLP	mg/L	0.01	Metals-020 ICP-AES	<0.01	[NT]	[NT]	LCS-W1	99%
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	102%
Mercury in TCLP	mg/L	0.0005	Metals-021 CV-AAS	<0.0005	[NT]	[NT]	LCS-W1	100%
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	LCS-W1	104%
Zinc in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	LCS-W1	107%

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			23/04/2015	[NT]	[NT]	LCS-W1	23/04/2015
Date analysed	-			23/04/2015	[NT]	[NT]	LCS-W1	23/04/2015
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	76%
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	70%
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	70%
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	70%
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	71%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	73%
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	86%
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	98	[NT]	[NT]	LCS-W1	97%

Report Comments:

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

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

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

Aileen Hie

From: Vittal Boggaram <VBoggaram@jkgroup.net.au>
Sent: Wednesday, 22 April 2015 3:03 PM
To: Aileen Hie
Cc: Jacinta Hurst
Subject: RE: Additional Testing for registration '126567 - E27283KB, North Sydney'

Hi Aileen,

Can you please schedule the following additional testing for the above job on a standard turnaround.

Sample	Sample	Depth	Additional Testing
BH8	1	0.01-0.2	TCLP Nickel
BH9	3	0-0.1	TCLP PAHs and Lead
BH9	4	0.1-0.5	Heavy Metals, PAHs, TCLP metals and TCLP PAHs

126567A
std TA
due 29/4

Regards,

Vittal Boggaram
Associate | Environmental Scientist

VBoggaram@jkgroup.net.au
www.jkgroup.net.au

Environmental Investigation Services
CONSULTING ENVIRONMENTAL ENGINEERS AND SCIENTISTS
PO Box 976, North Ryde BC NSW 1670
115 Wicks Rd, Macquarie Park NSW 2113
T: +612 9888 5000 F: +612 9888 5001

-----Original Message-----
From: Nancy Zhang [mailto:NZhang@envirolab.com.au]
Sent: Wednesday, 22 April 2015 1:06 PM
To: Vittal Boggaram
Subject: Results for registration '126567 - E27283KB, North Sydney'

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC
an excel file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
Jacinta Hurst on jhurst@envirolabservices.com.au or David Springer on dspringer@envirolabservices.com.au
or

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

CERTIFICATE OF ANALYSIS 126764

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Vittal Boggaram

Sample log in details:

Your Reference:	**E27283KB, North Sydney**
No. of samples:	2 Soils
Date samples received / completed instructions received	21/04/15 / 21/04/15

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date:	28/04/15 / 28/04/15
Date of Preliminary Report:	Not Issued

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference:	UNITS	126764-1
Your Reference	----------	BH12
Depth	----------	0.06-0.15
Date Sampled		17/04/2015
Type of sample		Soil
Date extracted	-	22/04/2015
Date analysed	-	23/04/2015
TRHC$_6$ - C$_9$	mg/kg	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25
vTPHC$_6$ - 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
Surrogate aaa-Trifluorotoluene	%	99

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	126764-1
Your Reference	----------	BH12
Depth	----------	0.06-0.15
Date Sampled		17/04/2015
Type of sample		Soil
Date extracted	-	22/04/2015
Date analysed	-	23/04/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100
TRHC$_{29}$ - 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
Surrogate o-Terphenyl	%	81

PAHs in Soil		
Our Reference:	UNITS	126764-1
Your Reference	----------	BH12
Depth	----------	0.06-0.15
Date Sampled		17/04/2015
Type of sample		Soil
Date extracted	-	22/04/2015
Date analysed	-	22/04/2015
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.5
Pyrene	mg/kg	0.5
Benzo(a)anthracene	mg/kg	0.2
Chrysene	mg/kg	0.2
Benzo(b,j+k)fluoranthene	mg/kg	0.5
Benzo(a)pyrene	mg/kg	0.3
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total Positive PAHs	mg/kg	2.7
Surrogate p-Terphenyl-d14	%	99

Organochlorine Pesticides in soil		
Our Reference:	UNITS	126764-1
Your Reference	----------	BH12
Depth	----------	0.06-0.15
Date Sampled		17/04/2015
Type of sample		Soil
Date extracted	-	22/04/2015
Date analysed	-	24/04/2015
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCMX	%	94

Organophosphorus Pesticides		
Our Reference:	UNITS	126764-1
Your Reference	----------	BH12
Depth	----------	0.06-0.15
Date Sampled		17/04/2015
Type of sample		Soil
Date extracted	-	22/04/2015
Date analysed	-	24/04/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate TCMX	%	97

PCBs in Soil		
Our Reference:	UNITS	126764-1
Your Reference	----------	BH12
Depth	----------	0.06-0.15
Date Sampled		17/04/2015
Type of sample		Soil
Date extracted	-	22/04/2015
Date analysed	-	24/04/2015
Arochlor 1016	mg/kg	<0.1
Arochlor 1221	mg/kg	<0.1
Arochlor 1232	mg/kg	<0.1
Arochlor 1242	mg/kg	<0.1
Arochlor 1248	mg/kg	<0.1
Arochlor 1254	mg/kg	<0.1
Arochlor 1260	mg/kg	<0.1
Surrogate TCLMX	%	97

Acid Extractable metals in soil		
Our Reference:	UNITS	126764-1
Your Reference	----------	BH12
Depth	----------	0.06-0.15
Date Sampled		17/04/2015
Type of sample		Soil
Date digested	-	22/04/2015
Date analysed	-	22/04/2015
Arsenic	mg/kg	<4
Cadmium	mg/kg	0.4
Chromium	mg/kg	10
Copper	mg/kg	27
Lead	mg/kg	110
Mercury	mg/kg	<0.1
Nickel	mg/kg	6
Zinc	mg/kg	110

Moisture		
Our Reference:	UNITS	126764-1
Your Reference	----------	BH12
Depth	----------	0.06-0.15
Date Sampled		17/04/2015
Type of sample		Soil
Date prepared	-	22/04/2015
Date analysed	-	23/04/2015
Moisture	%	5.1

Asbestos ID - soils		
Our Reference:	UNITS	126764-1
Your Reference	----------	BH12
Depth	----------	0.06-0.15
Date Sampled		17/04/2015
Type of sample		Soil
Date analysed	-	24/04/2015
Sample mass tested	g	Approx. 55g
Sample Description	-	Brown, sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/04/2015	[NT]	[NT]	LCS-9	22/04/2015
Date analysed	-			23/04/2015	[NT]	[NT]	LCS-9	23/04/2015
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-9	106%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-9	106%
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	LCS-9	103%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-9	103%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-9	102%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-9	110%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-9	101%
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	101	[NT]	[NT]	LCS-9	103%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/04/2015	[NT]	[NT]	LCS-9	22/04/2015
Date analysed	-			23/04/2015	[NT]	[NT]	LCS-9	23/04/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-9	100%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-9	103%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-9	91%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-9	100%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-9	103%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-9	91%
Surrogate o-Terphenyl	%		Org-003	81	[NT]	[NT]	LCS-9	103%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/04/2015	[NT]	[NT]	LCS-9	22/04/2015
Date analysed	-			22/04/2015	[NT]	[NT]	LCS-9	22/04/2015
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-9	98%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-9	99%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-9	106%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-9	106%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-9	110%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-9	97%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	[NT]	[NT]	LCS-9	111%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	101	[NT]	[NT]	LCS-9	94%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/04/2015	[NT]	[NT]	LCS-9	22/04/2015
Date analysed	-			24/04/2015	[NT]	[NT]	LCS-9	24/04/2015
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	104%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	95%
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	95%
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	103%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	103%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	105%
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	101%
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	104%
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	123%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-9	107%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	94	[NT]	[NT]	LCS-9	91%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/04/2015	[NT]	[NT]	LCS-9	22/04/2015
Date analysed	-			24/04/2015	[NT]	[NT]	LCS-9	24/04/2015
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	101%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	113%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	99%
Dimethoate	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	100%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	99%
Malathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	94%
Parathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-9	112%
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-008	94	[NT]	[NT]	LCS-9	96%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/04/2015	[NT]	[NT]	LCS-9	22/04/2015
Date analysed	-			24/04/2015	[NT]	[NT]	LCS-9	24/04/2015
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-9	117%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	94	[NT]	[NT]	LCS-9	91%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			22/04/2015	[NT]	[NT]	LCS-3	22/04/2015
Date analysed	-			22/04/2015	[NT]	[NT]	LCS-3	22/04/2015
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	LCS-3	105%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	LCS-3	99%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-3	101%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-3	100%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-3	96%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	LCS-3	92%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-3	96%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-3	97%

Report Comments:

Asbestos ID was analysed by Approved Identifier: Lulu Guo
Asbestos ID was authorised by Approved Signatory: Lulu Guo

INS: Insufficient sample for this test
NA: Test not required
<: Less than

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

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

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Investigation Services
Attention	Vittal Boggaram

Sample Login Details	
Your Reference	E27283KB, North Sydney
Envirolab Reference	126764
Date Sample Received	21/04/2015
Date Instructions Received	21/04/2015
Date Results Expected to be Reported	28/04/2015

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	2 Soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	16.2
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

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@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on 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
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

Sample Id	*Acid Extractable metals in soil*	*Asbestos ID - soils*	*Organochlorine Pesticides in soil*	*Organophosphorus Pesticides*	*PAHs in Soil*	*PCBs in Soil*	*svTRH (C10-C40) in Soil*	*vTRH(C6-C10)/BTEXN in Soil*	*On Hold*
BH12-0.06-0.15	✓	✓	✓	✓	✓	✓	✓	✓	
BH12-0.15-0.3									✓

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	EIS Job Number: E27283KB	ENVIRONMENTAL INVESTIGATION SERVICES
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067	Date Results Required: STANDARD	MACQUARIE PARK, NSW 2113
P: (02) 99106200		P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201		Attention: Vittal Boggaram
Attention: Aileen	Page: 1 of 1	

Location: North Sydney, NSW

Sampler: DW

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos	sPOCAS
17/4/15	1	BH 12	0.06-0.15	G, A	0.2	Fill				X						
↓	2	↓	0.15-0.3	↓	1.2	Sand										

ENVIROLAB group

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

Job No: 126764

Date Received: 21/4/15

Time Received: 10:00

Received by: DF

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
	20/4/15	1:30pm		21/4/15

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

CERTIFICATE OF ANALYSIS 126764-A

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Vittal Boggaram

Sample log in details:

Your Reference:	**E27283KB, North Sydney**
No. of samples:	Additional Testing on 1 Soil
Date samples received / completed instructions received	21/04/15 / 28/04/15

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date:	5/05/15 / 30/04/15
Date of Preliminary Report:	Not Issued

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

Metals in TCLP USEPA1311		
Our Reference:	UNITS	126764-A-1
Your Reference	----------	BH12
Depth	----------	0.06-0.15
Date Sampled		17/04/2015
Type of sample		Soil
Date extracted	-	29/04/2015
Date analysed	-	29/04/2015
pH of soil for fluid# determ.	pH units	8.9
pH of soil for fluid # determ. (acid)	pH units	1.6
Extraction fluid used	-	1
pH of final Leachate	pH units	4.9
Lead in TCLP	mg/L	0.05

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/04/2015	[NT]	[NT]	LCS-W1	29/04/2015
Date analysed	-			29/04/2015	[NT]	[NT]	LCS-W1	29/04/2015
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	94%

Report Comments:

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

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

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

Aileen Hie

From: Vittal Boggaram <VBoggaram@jkgroup.net.au>
Sent: Tuesday, 28 April 2015 2:45 PM
To: Aileen Hie
Subject: RE: Additional Testing for registration '126764 - E27283KB, North Sydney'

Hi Aileen,

Can you please schedule the following additional testing on a standard turnaround. Thanks.

EIS Sample Ref	Depth	Date Sampled	Additional Testing Required
BH12	0.06-0.15	17/04/2015	TCLP Lead

Regards,

Envirolab Ref- 126764A
Due: 5/5/15
std + 1A.

Vittal Boggaram
Associate | Environmental Scientist

VBoggaram@jkgroup.net.au
www.jkgroup.net.au

Environmental Investigation Services
CONSULTING ENVIRONMENTAL ENGINEERS AND SCIENTISTS
PO Box 976, North Ryde BC NSW 1670
115 Wicks Rd, Macquarie Park NSW 2113
T: +612 9888 5000 F: +612 9888 5001

-----Original Message-----
From: Nancy Zhang [mailto:NZhang@envirolab.com.au]
Sent: Tuesday, 28 April 2015 12:02 PM
To: Vittal Boggaram
Subject: Results for registration '126764 - E27283KB, North Sydney'

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC
an excel file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
Jacinta Hurst on jhurst@envirolabservices.com.au or David Springer on dspringer@envirolabservices.com.au
or
Tania Notaras on tnotaras@envirolabservices.com.au

Regards

Appendix D: Report Explanatory Notes

STANDARD SAMPLING PROCEDURE

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by EIS.

The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

Soil Sampling

- Prepare a borehole/test pit log or made a note of the sample description for stockpiles.
- Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill rig/excavator such that the machine can operate in a safe manner.
- Ensure all sampling equipment has been decontaminated prior to use.
- Remove any surface debris from the immediate area of the sampling location.
- Collect samples and place in glass jar with a Teflon seal. This should be undertaken as quickly as possible to prevent the loss of any volatiles. If possible, fill the glass jars completely.
- Collect samples for asbestos analysis and place in a zip-lock plastic bag.
- Label the sampling containers with the EIS job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
- Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled zip-lock plastic bags. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.
- Record the lithology of the sample and sample depth on the borehole/test pit log generally in accordance with AS1726-1993[23].
- Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with the standards outlined in the report.
- Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.
- Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

Decontamination Procedures for Soil Sampling Equipment

- All sampling equipment should be decontaminated between every sampling location. This excludes single use PVC tubing used for push tubes etc. Equipment and materials required for the decontamination include:
  - Phosphate free detergent (Decon 90);
  - Potable water;
  - Stiff brushes; and
  - Plastic sheets.

[23] Standards Australia, (1993), *Geotechnical Site Investigations.* (AS1726-1993)

- Ensure the decontamination materials are clean prior to proceeding with the decontamination.
- Fill both buckets with clean potable water and add phosphate free detergent to one bucket.
- In the bucket containing the detergent, scrub the sampling equipment until all the material attached to the equipment has been removed.
- Rinse sampling equipment in the bucket containing potable water.
- Place cleaned equipment on clean plastic sheets.

If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes, then the equipment should not be used until it has been thoroughly cleaned.

Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

- After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
- Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling, the condition of each well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
- Take the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.
- Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or other low flow) techniques.
- Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
    - Micropore filtration system or Stericup single-use filters (for heavy metals samples);
    - Filter paper for Micropore filtration system; Bucket with volume increments;
    - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles;
    - Bucket with volume increments;
    - Flow cell;
    - pH/EC/Eh/T meters;
    - Plastic drums used for transportation of purged water;
    - Esky and ice;
    - Nitrile gloves;
    - Distilled water (for cleaning);
    - Electronic dip meter;

- Low flow pump pack and associated tubing; and
- Groundwater sampling forms.

- If single-use stericup filtration is not used, clean the Micropore filtration system thoroughly with distilled water prior to use and between each sample. Filter paper should be changed between samples. 0.45um filter paper should be placed below the glass fibre filter paper in the filtration system.
- Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.
- Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.
- Groundwater samples are obtained from the monitoring wells using low flow/micro-purge sampling equipment to reduce the disturbance of the water column and loss of volatiles.
- During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%.
- All measurements are recorded on specific data sheets.
- Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.
- All samples are preserved in accordance with water sampling requirements detailed in the NEPM 2013 and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice as outlined in the report text.
- Record the sample on the appropriate log in accordance with AS1726:1993. At the end of each water sampling complete a chain of custody form.

Decontamination Procedures for Groundwater Sampling Equipment

- All equipment associated with the groundwater sampling procedure (other than single-use items) should be decontaminated between every sampling location.
- The following equipment and materials are required for the decontamination procedure:
  - Phosphate free detergent;
  - Potable water;
  - Distilled water; and
  - Plastic Sheets or bulk bags (plastic bags).
- Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.
- Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.
- Flush pump head with distilled water.
- Change water and detergent solution after each sampling location.
- Rinse sampling equipment in the bucket containing distilled water.
- Place cleaned equipment on clean plastic sheets.
- If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned

QA/QC DEFINITIONS

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994[24]) methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (H. Keith 1991[25]).

Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection limit (MDL) for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations.

"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit" Keith 1991.

Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD). Acceptable targets for precision in this report will be less than 50% RPD for concentrations greater than ten times the PQL, less than 75% RPD for concentrations between five and ten times the PQL and less than 100% RPD for concentrations that are less than five times the PQL.

Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured. The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes.

The proximity of an averaged result to the true value, where all random errors have been statistically removed. Accuracy is measured by percent recovery. Acceptable limits for accuracy generally lie between 70% to 130% recoveries. Certain laboratory methods may allow for values that lie outside these limits.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

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[24] US EPA, (1994), *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[25] Keith., H, (1991), *Environmental Sampling and Analysis, A Practical Guide.*

Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms; Sample receipt form;
- All sample results reported; All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

Comparability

Comparability is the evaluation of the similarity of conditions (eg. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

Blanks

The purpose of laboratory and field blanks is to check for artifacts and interferences that may arise during sampling and analysis.

Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

Appendix E: Calculation Sheets

UCL Statistics for Data Sets with Non-Detects using ProUCL 5.0

User Selected Options

Date/Time of Computation	22/05/2015 11:19
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	4	Mean	145.3
Maximum	680	Median	51
SD	196.5	Std. Error of Mean	54.51
Coefficient of Variation	1.352	Skewness	2.066
Normal GOF Test			
Shapiro Wilk Test Statistic	0.711	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.3	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	242.5	95% Adjusted-CLT UCL (Chen-1995)	268.3
		95% Modified-t UCL (Johnson-1978)	247.7
Gamma GOF Test			
A-D Test Statistic	0.488	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.77	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.183	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.246	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics

k hat (MLE)	0.754	k star (bias corrected MLE)	0.631
Theta hat (MLE)	192.8	Theta star (bias corrected MLE)	230.3
nu hat (MLE)	19.59	nu star (bias corrected)	16.41
MLE Mean (bias corrected)	145.3	MLE Sd (bias corrected)	182.9
		Approximate Chi Square Value (0.05)	8.25
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	7.439

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	289	**95% Adjusted Gamma UCL (use when n<50)**	**320.5**

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.148	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.246	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			

Lognormal Statistics

Minimum of Logged Data	1.386	Mean of logged Data	4.185
Maximum of Logged Data	6.522	SD of logged Data	1.388

Assuming Lognormal Distribution

95% H-UCL	717.9	90% Chebyshev (MVUE) UCL	346.8
95% Chebyshev (MVUE) UCL	434.9	97.5% Chebyshev (MVUE) UCL	557.3
99% Chebyshev (MVUE) UCL	797.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	235	95% Jackknife UCL	242.5
95% Standard Bootstrap UCL	228.8	95% Bootstrap-t UCL	365.6
95% Hall's Bootstrap UCL	546.8	95% Percentile Bootstrap UCL	239.7
95% BCA Bootstrap UCL	263.4		
90% Chebyshev(Mean, Sd) UCL	308.8	95% Chebyshev(Mean, Sd) UCL	382.9
97.5% Chebyshev(Mean, Sd) UCL	485.7	99% Chebyshev(Mean, Sd) UCL	687.6

Suggested UCL to Use	
95% Adjusted Gamma UCL	**320.5**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

B(a)P TEQ

General Statistics

Total Number of Observations			13	Number of Distinct Observations			7
Number of Detects			6	Number of Non-Detects			7
Number of Distinct Detects			6	Number of Distinct Non-Detects			1
Minimum Detect			1.1	Minimum Non-Detect			0.5
Maximum Detect			5.8	Maximum Non-Detect			0.5
Variance Detects			3.535	Percent Non-Detects			53.85%
Mean Detects			2.833	SD Detects			1.88
Median Detects			2.35	CV Detects			0.664
Skewness Detects			0.768	Kurtosis Detects			-0.772
Mean of Logged Detects			0.849	SD of Logged Detects			0.685

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic			0.886	Shapiro Wilk GOF Test		
5% Shapiro Wilk Critical Value			0.788	Detected Data appear Normal at 5% Significance Level		
Lilliefors Test Statistic			0.261	Lilliefors GOF Test		
5% Lilliefors Critical Value			0.362	Detected Data appear Normal at 5% Significance Level		
Detected Data appear Normal at 5% Significance Level						

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean				1.577	Standard Error of Mean		0.5
SD				1.647	95% KM (BCA) UCL		2.469
95% KM (t) UCL				2.469	95% KM (Percentile Bootstrap) UCL		2.354
95% KM (z) UCL				2.4	95% KM Bootstrap t UCL		2.834
90% KM Chebyshev UCL				3.078	95% KM Chebyshev UCL		3.758
97.5% KM Chebyshev UCL				4.702	99% KM Chebyshev UCL		6.556

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic			0.389	Anderson-Darling GOF Test		
5% A-D Critical Value			0.702	Detected data appear Gamma Distributed at 5% Significance Level		
K-S Test Statistic			0.271	Kolmogrov-Smirnoff GOF		
5% K-S Critical Value			0.335	Detected data appear Gamma Distributed at 5% Significance Level		
Detected data appear Gamma Distributed at 5% Significance Level						

Gamma Statistics on Detected Data Only

k hat (MLE)				2.756	k star (bias corrected MLE)		1.489
Theta hat (MLE)				1.028	Theta star (bias corrected MLE)		1.903
nu hat (MLE)				33.07	nu star (bias corrected)		17.87
MLE Mean (bias corrected)				2.833	MLE Sd (bias corrected)		2.322

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)				0.917	nu hat (KM)		23.84
Approximate Chi Square Value (23.84, α)				13.72	Adjusted Chi Square Value (23.84, β)		12.64
95% Gamma Approximate KM-UCL (use when n>=50)				2.739	95% Gamma Adjusted KM-UCL (use when n<50)		2.973

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
GROS may not be used when kstar of detected data is small such as < 0.1							
For such situations, GROS method tends to yield inflated values of UCLs and BTVs							
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
Minimum				0.01	Mean		1.313
Maximum				5.8	Median		0.01
SD				1.902	CV		1.449
k hat (MLE)				0.293	k star (bias corrected MLE)		0.277
Theta hat (MLE)				4.478	Theta star (bias corrected MLE)		4.743
nu hat (MLE)				7.625	nu star (bias corrected)		7.198
MLE Mean (bias corrected)				1.313	MLE Sd (bias corrected)		2.495
					Adjusted Level of Significance (β)		0.0301
Approximate Chi Square Value (7.20, α)				2.28	Adjusted Chi Square Value (7.20, β)		1.906
95% Gamma Approximate UCL (use when n>=50)				4.145	95% Gamma Adjusted UCL (use when n<50)		4.958

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic			0.905	Shapiro Wilk GOF Test		
5% Shapiro Wilk Critical Value			0.788	Detected Data appear Lognormal at 5% Significance Level		
Lilliefors Test Statistic			0.241	Lilliefors GOF Test		
5% Lilliefors Critical Value			0.362	Detected Data appear Lognormal at 5% Significance Level		
Detected Data appear Lognormal at 5% Significance Level						

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale				1.484	Mean in Log Scale		-0.317
SD in Original Scale				1.784	SD in Log Scale		1.313
95% t UCL (assumes normality of ROS data)				2.366	95% Percentile Bootstrap UCL		2.283
95% BCA Bootstrap UCL				2.583	95% Bootstrap t UCL		3.039
95% H-UCL (Log ROS)				6.302			

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)				0.0187	95% H-UCL (KM -Log)		2.931
KM SD (logged)				0.879	95% Critical H Value (KM-Log)		2.644
KM Standard Error of Mean (logged)				0.267			

DL/2 Statistics

DL/2 Normal					DL/2 Log-Transformed		
Mean in Original Scale				1.442	Mean in Log Scale		-0.355
SD in Original Scale				1.808	SD in Log Scale		1.241
95% t UCL (Assumes normality)				2.336	95% H-Stat UCL		4.918
DL/2 is not a recommended method, provided for comparisons and historical reasons							

Nonparametric Distribution Free UCL Statistics
Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use							
95% KM (t) UCL			**2.469**	**95% KM (Percentile Bootstrap) UCL**			**2.354**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.