

18 – Geotech Report

18



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Our Ref: PSM3331-007R

5 September 2017

GHD Pty Ltd
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SYDNEY NSW 2000

ATTENTION: MICHAEL ABBOTT

Dear Michael

**RE: WAITARA PUBLIC SCHOOL
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION**

We are pleased to submit our geotechnical report for the proposed re-development of Waitara Public School, NSW.

Please do not hesitate to contact the undersigned if you have any queries.

For and on behalf of
PELLS SULLIVAN MEYNINK

BERNARD SHEN

Distribution: pdf copy emailed to: michael.abbott@ghd.com.au
Original held by PSM

GHD Pty Ltd

**WAITARA PUBLIC SCHOOL
MYRA STREET, WAITARA
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION**

PSM3331-007R SEPTEMBER 2017

CONTENTS

1	INTRODUCTION	1
2	BACKGROUND	1
3	GEOTECHNICAL INVESTIGATION	1
3.1	Fieldwork	1
3.2	Augured Boreholes	2
3.3	Salinity and Aggressivity Testing	2
3.4	Contamination Assessment	4
4	SITE CONDITIONS	4
4.1	Geological Setting	4
4.2	Surface Conditions	4
4.3	Subsurface Conditions	4
4.4	Groundwater	6
4.5	Soil Chemistry	6
5	ASSESSMENT	6
5.1	Acid Sulfate Soils	6
5.2	Salinity	6
5.3	Corrosivity	7
6	DISCUSSION AND RECOMMENDATIONS	8
6.1	Excavation Conditions	8
6.2	Site Classification	8
6.3	Temporary and Permanent Batters	8
6.4	Retaining Walls	9
6.5	Foundations	10

FIGURES

- 1 Locality plan

APPENDICES

- A Borehole Engineering Logs
B Soil Laboratory Test Results
C Selected Site Photos
D JBS&G Contamination Report

1 INTRODUCTION

This report presents the results of the geotechnical and contamination investigation undertaken by Pells Sullivan Meynink (PSM) at Waitara Public School for the new teaching spaces.

The work has been undertaken in accordance with the GHS Services Agreement (Ref. GHD Works Subcontract dated June 2017).

PSM were provided with the following prior to the investigation works:

- GHD Request For Tender Document No. 20126108 "Schools-Geotech_Contamination_RFT"
- GHD Woodhead Development Application Architectural Drawings dated 24 July 2017

2 BACKGROUND

Based on the information provided, we understand the proposed development comprises the following:

- Removal of 15 existing demountable buildings and 5 MDR home bases
- Demolition of the existing hall, canteen and 3 existing buildings
- Construction of a 4-storey main building
- Provision of 37 new teaching spaces within the main building

3 GEOTECHNICAL INVESTIGATION

3.1 Fieldwork

The fieldwork for the geotechnical investigation was undertaken on 14 August 2017 under the fulltime supervision of a PSM geotechnical engineer, who undertook the following tasks:

- Setting out investigation locations
- Preparation of engineering logs
- Collection of samples for environmental testing.

The investigation locations were recorded with a hand-held GPS unit with a horizontal accuracy of approximately ± 5 m.

Prior to testing, on-site service location "scans" were undertaken by a service locator in the presence of a PSM geotechnical engineer to ensure the test locations were free from buried utilities.

3.2 Augured Boreholes

A total of eight (8) augured boreholes were drilled using a 1.2 tonne tracked drill rig. Figure 1 presents the investigation locations. The boreholes were drilled with a tungsten carbide (TC) drill bit, with practical refusal occurring in bedrock between 2.6 m and 4 m depth.

The completed boreholes were reinstated using either cold-mix asphalt, concrete or excavated spoil (lightly compacted), depending upon the existing surface type at the location they were drilled.

Tabulated borehole logs are presented in Appendix A.

3.3 Salinity and Aggressivity Testing

Eight (8) disturbed soil samples recovered on site were sent to a NATA accredited environmental laboratory for the following testing:

- Cation Exchange Capacity (CEC) of sodium, calcium, magnesium and potassium
- Exchange sodium percentage
- Salinity (EC 1:5, one part soil to five parts water)
- Soil pH
- Chlorides
- Sulphates

A summary of the soil salinity and aggressivity test results is presented in Table 1. The laboratory report is provided in Appendix B.

TABLE 1
SOIL LABORATORY TEST RESULTS

SAMPLE ID/DEPTH	SOIL PH	ELECTRICAL CONDUCTIVITY [µS/cm]	MOISTURE CONTENT [%]	SOLUBLE SULPHATE BY ICPAES [mg/kg]	CHLORIDE BY DISCRETE ANALYSER [mg/kg]	EXCHANGEABLE CATIONS [meq/100g]					ESP [%]
						Ca	Mg	K	Na	CEC	
BH01 1.5 m	5.3	30	13.4	150	20	0.5	0.8	0.1	<0.1	1.7	<0.1
BH02 1.5 m	5.1	44	12.1	410	20	0.3	0.8	0.2	0.3	1.6	17.3
BH03 1.2 m	4.6	14.2	13.8	490	200	<0.1	0.6	0.2	0.8	1.7	47.6
BH04 1.0 m	5	35	12.1	390	<10	<0.1	0.6	0.2	0.2	1.0	22.1
BH05 1.2 m	4.6	190	15.5	400	310	0.6	1.3	0.2	0.9	3.0	30.0
BH06 1.2 m	4.7	17.2	12.7	340	190	<0.1	1.0	0.2	1.2	2.5	49.9
BH07 1.5 m	5	61	15.8	340	30	0.2	1.0	0.2	0.4	1.8	19.7
BH08 1.2 m	5.2	28	13.2	400	<10	0.9	1.4	0.2	0.2	2.6	6.0

3.4 Contamination Assessment

A contamination assessment was undertaken by environmental consultants JBS&G and the report prepared by JBS&G is appended to Appendix D.

As part of the contamination assessment, JBS&G completed a desktop study and sampling during the drilling works for contamination testing.

4 SITE CONDITIONS

4.1 Geological Setting

The 1:100,000 Sydney Geological map (1991) indicates the site is underlain by the Wianamatta Group formation (Ashfield Shale - Rwa) comprising black to dark-grey shale and laminate.

4.2 Surface Conditions

The site comprises an existing public school with concrete pathways, sealed bitumen surfaces and some grassed and landscaped areas. A number of free-standing buildings and demountables occupy the school area.

Selected site photos are included in Appendix C.

4.3 Subsurface Conditions

The subsurface conditions encountered within the boreholes are summarised in Table 2.

The encountered subsurface conditions were consistent with the published information in the geological map.

TABLE 2
SUMMARY OF INFERRED SUBSURFACE CONDITIONS ENCOUNTERED IN
PSM BOREHOLES

INFERRED UNIT	ENCOUNTERED DEPTH TO TOP OF INFERRED UNIT (m)	DESCRIPTION
WEARING COURSE	0.0	Existing asphalt/concrete – typically up to 0.1 m thick
TOPSOIL	0.0	TOPSOIL; Sandy CLAY; dark brown, low to medium plasticity, fine grained sand, firm consistency, dry, rootlets down to depth of 0.1 m.

INFERRED UNIT	ENCOUNTERED DEPTH TO TOP OF INFERRED UNIT (m)	DESCRIPTION
NATURAL SOIL	0.0 to 0.1 m	CLAY; grey, brown and orange, low to medium plasticity, firm to hard consistency, dry to moist, a trace of organics.
BEDROCK	0.7 to 2.5	SHALE; brown and grey, extremely weathered to highly weathered, extremely low to very low strength

TABLE 3
DEPTH BELOW GROUND SURFACE OF TOP OF INFERRED GEOTECHNICAL
UNITS ENCOUNTERED IN BOREHOLES

BOREHOLE	DEPTH BELOW GROUND SURFACE OF TOP OF INFERRED GEOTECHNICAL UNITS (m)				
	WEARING COURSE	TOPSOIL	NATURAL SOIL	BEDROCK	END OF HOLE
BH01	0	N.E.	0.1	2.0	4.0
BH02	N.E	0	0.1	0.7	3.6
BH03	N.E	0	0.1	1.5	3.8 ^R
BH04	0	N.E	0.05	1.8	3.5 ^R
BH05	N.E	N.E	0	2.1	2.9 ^R
BH06	N.E	0	0.1	2.4	2.9 ^R
BH07	0	N.E	0.02	2.5	3.0 ^R
BH08	0	N.E	0.08	2.0	2.6 ^R

Note: N.E. = Not Encountered
R = TC bit practical refusal

4.4 Groundwater

No groundwater was observed at any of the investigation locations.

4.5 Soil Chemistry

The salinity and aggressivity test results summarised in Table 1 indicate the following:

- pH of the soil samples analysed to be in the range of 4.6 to 5.3, with an average of 4.9.
- Concentrations of chlorides in samples analysed to be in the range of less than 10 mg/kg to 310 mg/kg.
- Concentrations of sulphates in samples analysed to be in the range of 150 mg/kg to 490 mg/kg.
- Cation Exchange Capacity (CEC) in samples analysed to be in the range 1.0 meq/100g to 3.0 meq/100g.
- The 1:5 soil to water extraction and subsequent electrical conductivity (EC1:5) of the soil samples analysed to be in the range of 28 $\mu\text{S}/\text{cm}$ to 190 $\mu\text{S}/\text{cm}$.

5 ASSESSMENT

5.1 Acid Sulfate Soils

The Department of Land and Water Conservation has mapped the occurrence of Acid Sulfate Soils along the NSW coast. The Hornsby/Mona Vale 1:25,000 map (1997) illustrates no known occurrences of acid sulfate soils within Waitara or the neighbouring suburbs.

5.2 Salinity

Site Investigations for Urban Salinity (DLWC 2002) classify soil salinity based on electrical conductivity (EC_e) as per Richards (1954). The method of conversion from $\text{EC}_{1:5}$ to EC_e (electrical conductivity of saturated extract) is based on DLWC (2002) and given by $\text{EC}_e = \text{EC}_{1:5} \times M$, where M is the multiplication factor based on "Soil Texture Group".

The "Soil Texture Group" of the samples tested has been assessed with a corresponding multiplication factor M. The salinity classification for the soil samples that were tested is presented in Table 4.

TABLE 4
SALINITY CLASSIFICATION

SAMPLE ID	EC _{1:5} (dS/m)	SOIL TYPE	M	EC _e (dS/m)	SALINITY CLASS
BH01	0.030	Clay loam	9	0.27	Non-saline
BH02	0.044	Sandy loam	14	0.62	Non-saline
BH03	0.142	Clay loam	9	1.28	Non-saline
BH04	0.035	Light clay	8.5	0.30	Non-saline
BH05	0.190	Light clay	8.5	1.62	Non-saline
BH06	0.172	Light clay	8.5	1.46	Non-saline
BH07	0.061	Light clay	8.5	0.52	Non-saline
BH08	0.028	Clay loam	9	0.25	Non-saline

It is assessed that the soils on site are classified as "Non-saline".

Table 4.8.2 of Australian Standard AS3600-2009 "Concrete Structures" provides an exposure classification for concrete structures in saline soils based on soil electrical conductivity (EC_e). We assess the exposure classification for this site is "A2".

5.3 Corrosivity

Table 4.8.1 of AS3600-2009 "Concrete Structures" provides criteria for exposure classification for concrete in sulphate soils based on sulphates in soil and groundwater, and pH of soil. On the basis of the sulphate and pH testing completed we assess the exposure classification for concrete in sulphate soils to be "A2".

Similarly Table 6.4.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for concrete piles in soil, and here the exposure classification for concrete piles in soil is "Mild".

Table 6.5.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for steel piles based on resistivity, soil and groundwater pH, and chlorides in soil and groundwater. On the basis of the resistivity, pH and chloride testing completed we assess the exposure classification for steel piles in the soil to be "Non-aggressive".

6 DISCUSSION AND RECOMMENDATIONS

6.1 Excavation Conditions

The works will involve excavation in TOPSOIL, NATURAL SOIL and weathered BEDROCK units and excavation should be achievable with conventional excavation equipment. We note that an experienced contractor should make their own assessment of the appropriate excavation equipment.

6.2 Site Classification

Based on the field observations and the inferred geotechnical units from the boreholes, we have classified the site in accordance with Australian Standard AS 2870 – 2011 *Residential slabs and footings – Construction*. We recommend that structures which are within the scope of AS 2870 (2011) be designed for a site classification of Class "H1".

6.3 Temporary and Permanent Batters

The batter slope angles shown in Table 5 are recommended for the design of batters up to 2 m height and subject to the following recommendations:

- The batters shall be protected from erosion.
- Permanent batters (if required) shall be drained.
- Temporary batters shall not be left unsupported for more than a month without further advice, and inspection by a geotechnical engineer should be undertaken following significant rain events.
- No buildings, loads or services should be located within 1 batter height of the crest.

If the conditions above cannot be met, further advice should be sought.

TABLE 5
BATTER SLOPE ANGLES

UNIT	TEMPORARY	PERMANENT (If required)
NATURAL SOIL	1H : 1V	2H : 1V
BEDROCK	1H : 1V	2H : 1V

Proper and suitable safe work method statements and OHS documents need to be developed for works to be undertaken in the vicinity of the crest and toe of batters, including temporary batters for the BEDROCK unit.

Steeper batters may be possible subject to further advice, probably including inspection during construction.

6.4 Retaining Walls

Cuts in the NATURAL SOIL and BEDROCK units steeper than the recommended permanent batter slopes in Section 6.3 will need to be supported by some form of retaining structure or soil nails etc.

The selection of an appropriate retention system is a matter of design. The designer should consider the following factors in making its selection:

- Technical factors:
 - Performance
 - Ground conditions (this is addressed below with the design parameters)
 - Surcharge loading and
 - Proximity of structures, buildings and roads, etc.
- Non- technical factors
 - Cost (to build and to maintain)
 - Other constraints such as real estate, neighbouring site / boundary, aesthetics, legislation, etc.

The design of these structures should be based on the following geotechnical properties:

- Effective soil strength parameters in Table 6, and
- A lateral pressure of 10 kPa for vertical cuts in the BEDROCK units. This is to allow for blocks and rock wedges formed due to adverse defects that may exist within the unit.

Note that design of retention systems may be based on either K_a or K_0 earth pressures. Design using active earth pressures provides the minimum lateral earth pressure that must be supported to avoid failure and requires a wall that can rotate or translate to allow the pressures to reduce to these values (vertical and lateral movements up to 2% of height may occur, typical movements will be much less).

Where the design is based on K_0 pressures, construction should be carefully controlled to avoid unwanted effects. It should be noted that designing for K_0 pressures do not, of themselves, ensure that movement does not occur. Movements are controlled by the construction method, especially sequence.

Both surface and sub-surface drainage needs to be designed and constructed properly to prevent pore water pressures from building up behind the retaining walls or appropriate water pressures must be included in the design.

TABLE 6
ENGINEERING PARAMETERS OF INFERRED GEOTECHNICAL UNITS

INFERRED UNIT	BULK UNIT WEIGHT (kN/m ³)	SOIL EFFECTIVE STRENGTH PARAMETERS		ULTIMATE BEARING PRESSURE UNDER VERTICAL CENTRIC LOADING (kPa)	ALLOWABLE BEARING PRESSURE UNDER VERTICAL CENTRIC LOADING (kPa)	ELASTIC PARAMETERS	
		c' (kPa)	φ' (deg)			YOUNG'S MODULUS (MPa)	POISSON'S RATIO
NATURAL SOIL	18	2	28	400*	150*	10	0.3
BEDROCK	22	N.A.	N.A.	3000	700	50	0.25

Note: * Minimum horizontal dimension of 1 m and embedment depth of at least 0.5 m
N.A. = Not Available

The above advice should be sufficient for design to proceed to completion. If further geotechnical design parameters are required, the designer should contact PSM for more advice.

6.5 Foundations

Pad footings could be founded on or within the NATURAL SOIL and BEDROCK units. The design parameters in Table 6 can be adopted.

Footing deflection within the above units can be assessed using the moduli provided in Table 6. When assessing the settlement of the shallow footings, the designer needs to consider the additional ground settlement due to the total building load on both shallow and deeper units. The differential settlement due to the building load shall also be assessed.

Settlement on the BEDROCK unit can be taken as 1% of the minimum plan footing dimension when the load is equal to allowable bearing pressure presented in Table 6.

We note that an allowable bearing pressure (ABP) is not a soil property. It depends on many factors such as the size of the footings, the embedment depth, the load direction and eccentricity, the stiffness of the footing, the adopted factor of safety (FOS), as well as the soil properties. As footings get bigger or deeper the capacity increases rapidly, as the load gains eccentricity or becomes inclined, the capacity reduces rapidly.

Higher ABPs in the NATURAL SOIL unit may be available but these depend on the size, depth, loads, etc and would be subject to specific advice. Settlement and lateral movement of footings should be assessed based on a foundation material with a long term Young's modulus in Table 6.

Should there be any queries, do not hesitate to contact the undersigned.

For and on behalf of
PELLS SULLIVAN MEYNINK



WILLIAM PIPER
Senior Geotechnical Engineer



BERNARD SHEN
Principal



Notes:

1. Aerial photograph obtained from Google Earth, imagery date 16/10/2015

● Borehole location



GHD Pty Ltd

Waitara Public School

GEO TECHNICAL & ENVIRONMENTAL

INVESTIGATION

LOCALITY PLAN

PSM3331-007R

Figure 1

APPENDIX A

BOREHOLE ENGINEERING LOGS

TABLE 1
SUMMARY OF SUBSURFACE CONDITIONS

BOREHOLE	DEPTH	MATERIAL ENCOUNTERED	SPT
BH01	0 – 0.1 m	ASPHALT	
	0.1 – 2.0 m	CLAY; grey, low to medium plasticity, firm consistency, dry.	
	1.4 m	Becoming medium plasticity, stiff to very stiff consistency	At 1 m, 8, 11, 13 N = 24
	2.0 – 4.0 m	SHALE; dark brown and grey, extremely weathered, extremely low to very low strength.	At 2 m, 13, 32, 31 N = 63
	3.0 m	Becoming dark grey, highly weathered.	At 3 m, 19, 38, 42 N = 80
	4.0 m	Practical refusal at 4.0 m.	At 4 m, 18, 26, 30 N = 56
BH02	0 – 0.1 m	TOPSOIL; Sandy CLAY; dark brown, low plasticity, fine to medium grained sand, firm consistency, dry, rootlets down to 0.1 m.	
	0.1 – 0.7 m	CLAY; orange, low to medium plasticity, stiff consistency, moist.	
	0.7 – 3.6 m	SHALE; brown and grey, extremely to highly weathered, extremely low strength.	At 1 m, 9, 18, 22 N = 40
	2.6 m	Becoming very low strength.	At 2 m, 11, 23, 26* *Refusal at 100 mm
	3.6 m	Practical refusal at 3.6 m.	

BOREHOLE	DEPTH	MATERIAL ENCOUNTERED	SPT
BH03	0 – 0.1 m	TOPSOIL; Sandy CLAY; dark brown, low plasticity, fine to medium grained sand, firm consistency, dry, rootlets down to 0.1 m	At 1 m, 5, 11, 16 N = 27 At 2 m, 16, 30, 26* *Refusal at 90 mm
	0.1 – 1.5 m	CLAY; grey and orange, low to medium plasticity, stiff to very stiff consistency, dry.	
	1.5 – 3.8 m	SHALE; brown and grey, extremely weathered, extremely low strength to very low strength	
	2.5 m	Becoming very low strength, extremely to highly weathered.	
	3.8 m	Practical refusal at 3.8 m.	
BH04	0 – 0.05 m	ASPHALT	At 1 m, 7, 11, 15 N = 28 At 2 m, 10, 32* *Refusal at 150 mm
	0.05 – 1.8 m	CLAY; brown and orange, low to medium plasticity, stiff to very stiff consistency, dry.	
	1.5 m	Becoming very stiff to hard consistency.	
	1.8 – 3.5 m	SHALE; grey, extremely weathered, extremely low strength.	
	3.0 m	Becoming highly weathered, very low strength	
BH05	3.5 m	Practical refusal at 3.5 m.	
	0 – 2.1 m	CLAY with a trace of organics; brown and red, medium plasticity, stiff consistency, moist.	At 1 m, 9, 11, 11 N = 22 At 2 m, 15, 28* *Refusal at 100 mm
	0.8 m	Becoming light grey and red, stiff to very stiff consistency.	
	2.1 – 2.9 m	SHALE; grey, highly weathered, extremely low to very low strength.	
	2.9 m	Practical refusal at 2.9 m.	

BOREHOLE	DEPTH	MATERIAL ENCOUNTERED	SPT
BH06	0 – 0.1 m	TOPSOIL; Sandy CLAY; dark brown, low plasticity, fine to medium grained sand, firm consistency, dry, rootlets down to 0.1 m.	At 1 m, 8, 11, 13 N = 24
	0.1 – 2.4 m	CLAY with a trace of organics; dark grey, low to medium plasticity, stiff to very stiff consistency, moist.	
	0.4 m	Becoming light grey, dry to moist.	
	1.5 m	Becoming very stiff to hard consistency.	At 2 m, 20, 27* *Refusal at 110 mm
	2.4 – 2.9 m	SHALE; grey, extremely weathered, extremely low strength.	
	2.9 m	Practical refusal at 2.9 m.	
BH07	0 – 0.02 m	ASPHALT.	At 1 m, 7, 11, 12 N = 23
	0.02 – 2.5 m	CLAY; grey, medium plasticity, stiff to very stiff consistency, dry, rootlets down to 0.2 m.	
	1.0 m	Becoming grey and red, moist.	
	1.8 m	Becoming very stiff to hard consistency.	At 2 m, 9, 16, 28 N = 44
	2.5 – 3.0 m	SHALE; brown and grey, extremely weathered, extremely low strength.	
	3.0 m	Practical refusal at 3.0 m.	

BOREHOLE	DEPTH	MATERIAL ENCOUNTERED	SPT
BH08	0 – 0.08 m	CONCRETE.	At 1 m, 10, 17, 19 N = 38 At 2 m, 19, 20* *Refusal at 90 mm
	0.08 – 2.0 m	CLAY; brown, low plasticity, firm to stiff consistency, dry to moist.	
	0.8 m	Becoming light grey, brown and red, very stiff to hard consistency.	
	2.0 – 2.6 m	SHALE; brown, extremely weathered, extremely low strength.	
	2.4 m	Becoming very low strength	
	2.6 m	Practical refusal at 2.6 m.	

APPENDIX B

SOIL LABORATORY RESULTS

CERTIFICATE OF ANALYSIS

Work Order	: ES-17-20147	Page	: 1 of 4
Client	: PELLIS SULLIVAN MEYENIK TIA PSM Admin PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: WILL PIPER	Contact	: Customer Services ES
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Telephone	: +61 02 9812 5000	Telephone	: +61 2-8784 8555
Project	: PSM333 1-3 SCHOOLS	Date Samples Received	: 14-Aug-2017 19:00
Order number	: --	Date Analysis Commenced	: 15-Aug-2017
C-O-C number	: --	Issue Date	: 22-Aug-2017 17:12
Sampler	: SS		
Site	: --		
Quote number	: SYBQ/441/15		
No. of samples received	: 8		
No. of samples analysed	: 8		



Accreditation No. 025
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dan Dao		Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW



Page : 2 of 4
Work Order : ESI1720147
Client : PELLIS SULLIVAN MEYNIK T/A PSM Admin PTY LTD
Project : PSM333-1-3 SCHOOLS

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported result is higher than the LOR, this may be due to primary sample extrusion/dilatation and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

A = This result is computed from individual analyte detections at or above the level of reporting

a = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Raymond & Lyons (2011) suggests Exchange Acidity by IM KCl - Method 15-G1 (ED008) is a more suitable method for the determination of exchange acidity (H⁺ + Al³⁺).



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Client sample ID									
Compound	CAS Number	Client sampling date / time		Unit	W01	W02	W03	W04	W05	Result	Result
		LOR									
		Result									
EA002 : pH (Soils)											
pH value	--	0.1	pH Unit		5.3	5.1	4.6	5.0		4.6	4.6
EA010: Conductivity											
Electrical Conductivity @ 25°C	--	1	µS/cm		30	44	142	35		190	
EA055: Moisture Content (Dried @ 105-110°C)											
Moisture Content	--	1.0	%		13.4	12.1	13.6	12.1		15.5	
ED007: Exchangeable Cations											
Exchangeable Calcium	--	0.1	meq/100g		--	0.3	<0.1	<0.1		0.6	
Exchangeable Magnesium	--	0.1	meq/100g		--	0.6	0.6	0.6		1.3	
Exchangeable Potassium	--	0.1	meq/100g		--	0.2	0.2	0.2		0.2	
Exchangeable Sodium	--	0.1	meq/100g		--	0.3	0.8	0.2		0.9	
Cation Exchange Capacity	--	0.1	meq/100g		--	1.6	1.7	1.0		3.0	
Exchangeable Sodium Percent	--	0.1	%		--	17.3	47.6	22.1		30.0	
Calcium/Magnesium Ratio	--	0.1	-		--	0.4	<0.1	<0.1		0.5	
Magnesium/Potassium Ratio	--	0.1	-		--	3.7	2.8	2.9		6.5	
ED008: Exchangeable Cations											
Exchangeable Calcium	--	0.1	meq/100g		0.5	--	--	--		--	
Exchangeable Magnesium	--	0.1	meq/100g		0.6	--	--	--		--	
Exchangeable Potassium	--	0.1	meq/100g		0.1	--	--	--		--	
Exchangeable Sodium	--	0.1	meq/100g		<0.1	--	--	--		--	
Cation Exchange Capacity	--	0.1	meq/100g		1.7	--	--	--		--	
Exchangeable Sodium Percent	--	0.1	%		<0.1	--	--	--		--	
Calcium/Magnesium Ratio	--	0.1	-		0.6	--	--	--		--	
Magnesium/Potassium Ratio	--	0.1	-		5.9	--	--	--		--	
ED046: Sulfate SO4 2-											
Sulfate as SO4 2-	1403-79-8	100	mg/kg		130	410	410	300		400	
ED0450: Chloride by Discrete Analyser											
Chloride	16937-00-6	10	mg/kg		20	20	200	<10		310	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Client sample ID					
		Client sampling date / time					
Compound	CAS Number	LOR	Unit	W06	W07	W08	W09
				14-Aug-2017 17:32	14-Aug-2017 17:32	14-Aug-2017 17:32	
				ES 1720147-006	ES 1720147-007	ES 1720147-008	
				Result	Result	Result	
EA002 : pH (Solis)							
pH value	--	0.1	pH Unit	4.7	5.0	5.2	--
EA010: Conductivity							
Electrical Conductivity @ 25°C	--	1	µS/cm	172	61	28	--
EA055: Moisture Content (Dried @ 105-110°C)							
Moisture Content	--	1.0	%	12.7	15.8	13.2	--
ED007: Exchangeable Cations							
Exchangeable Calcium	--	0.1	meq/100g	<0.1	0.2	0.9	--
Exchangeable Magnesium	--	0.1	meq/100g	1.0	1.0	1.4	--
Exchangeable Potassium	--	0.1	meq/100g	0.2	0.2	0.2	--
Exchangeable Sodium	--	0.1	meq/100g	1.2	0.4	0.2	--
Cation Exchange Capacity	--	0.1	meq/100g	2.5	1.8	2.6	--
Exchangeable Sodium Percent	--	0.1	%	40.9	19.7	6.0	--
Calcium/Magnesium Ratio	--	0.1	-	<0.1	0.2	0.6	--
Magnesium/Potassium Ratio	--	0.1	-	4.8	5.1	5.6	--
ED040: Sulfur as SO4 2-							
Sulfur as SO4 2-	14008-79-6	100	mg/kg	340	340	400	--
ED0450: Chloride by Discrete Analyser							
Chloride	16887-00-6	10	mg/kg	190	30	<10	--

APPENDIX C

SELECTED SITE PHOTOS



Photo 1 - 1.2 Tonne Tracked Drill Rig



Photo 2 - General Site Conditions (On existing pathway)



Pells Sullivan Meynink

**GHD Pty Ltd
Waitara Public School
GEOTECHNICAL & ENVIRONMENTAL
INVESTIGATION
SELECTED SITE PHOTOS (1 OF 2)**

PSM3331-007R

ATTACHMENT C1



Photo 3 - Typical material encountered at BH07 (CLAY)



Photo 4 - Typical CLAY material encountered



Pells Sullivan Meynink

**GHD Pty Ltd
Waitara Public School
GEOTECHNICAL & ENVIRONMENTAL
INVESTIGATION
SELECTED SITE PHOTOS (2 OF 2)**

PSM3331-007R

ATTACHMENT C2

APPENDIX D

JBS&G CONTAMINATION REPORT



Pells Sullivan Meynink

Environmental Site Assessment

Waitara Public School
48-58 Myra Street
Wahroonga, NSW

31 August 2017
53033/110766 (Rev A)
JBS&G

Pells Sullivan Meynink

Environmental Site Assessment

Waitara Public School
48-58 Myra Street
Wahroonga, NSW

31 August 2017
53033/110766 (Rev A)

JBS&G

Table of Contents

Executive Summary	6
1. Introduction	7
1.1 Background	7
1.2 Objective	7
1.3 Scope of Works	7
2. Site Conditions and Surrounding Environment	8
2.1 Site Identification	8
2.2 Site Description	8
2.3 Surrounding Land-use	8
2.4 Topography	8
2.5 Geology and Soil	8
2.6 Acid Sulfate Soils	9
2.7 Hydrology	9
2.8 Hydrogeology	9
2.9 Meteorology	9
3. Site History	10
3.1 Aerial Photograph	10
3.2 Historical Land Titles	10
3.3 EPA Records	11
3.4 Council Records	11
3.5 Heritage Register	12
3.6 Dangerous Goods Records	12
3.7 Previous Environmental Reports	12
3.7.1 Asbestos Register – Waitara Public School (3334)	12
3.8 Integrity Assessment	12
4. Conceptual Site Model (CSM)	13
4.1 AECs & COPCs	13
4.2 Potentially Impacted Media	13
4.3 Potential Receptors	13
4.4 Potential Exposure Pathways	14
4.5 Potential for Migration	14
4.6 Preferential Pathways	14
5. Sampling and Analysis Plan	15
5.1 Data Quality Objectives	15
5.1.1 State the Problem	15
5.1.2 Identify the Decision	15

5.1.3	Identify Inputs to the Decision	15
5.1.4	Define the Study Boundaries	15
5.1.5	Develop a Decision Rule.....	15
5.1.6	Specify Limits of Decision Error.....	16
5.1.7	Optimise the Design for Obtaining Data	18
5.2	Investigation Methodology	18
5.2.1	Soil Sampling Methodology	18
5.2.2	Soil Sampling Decontamination.....	19
5.2.3	Soil Field PID Screening.....	19
5.2.4	Soil Duplicate Preparation	19
5.3	Laboratory Analysis	19
6.	Assessment Criteria	21
6.1	Regulatory Guidelines	21
6.2	Soil Assessment Criteria	21
7.	Quality Assurance/Quality Control.....	23
7.1	QA/QC Results	23
7.2	QA/QC Discussion.....	24
7.2.1	Precision.....	24
7.2.2	Accuracy	24
7.2.3	Representativeness.....	25
7.2.4	Comparability.....	25
7.2.5	Completeness.....	25
7.2.6	Sensitivity	25
7.3	QA/QC Conclusion	26
8.	Soil Results	27
8.1	Soil Field Observations	27
8.2	Soil Analytical Results	27
8.2.1	Metals	27
8.2.2	PAHs	27
8.2.3	Asbestos	27
8.2.4	TRH.....	27
8.2.5	BTEX	27
8.2.6	OCPs	27
8.2.7	PCBs.....	28
8.2.8	Soil Properties for Site Specific EILs	28
8.3	Preliminary Waste Classification	28
9.	Site Characterisation.....	29

9.1	Are there any unacceptable risks to likely future receptors from impacted soil?	29
9.2	Are there any issues relating to the local area background soil concentrations?	29
9.3	Are there any impacts from chemical mixtures?	29
9.4	Are there any aesthetic concerns?	29
9.5	Is there any evidence of, or potential for, migration of contaminants from the site?	29
9.6	Is a site management strategy required?	30
10.	Conclusions	31
11.	Limitations	32

List of Tables

Table 2.1: Summary Site Details	8
Table 4.1: AECs & COPCs	13
Table 5.1: Summary of Decision Rules	16
Table 5.2: Summary of Quality Assurance / Quality Control Program	17
Table 5.3: Sampling and Analytical Program	20
Table 6.1: Derived EIL urban residential/public open space land use	22
Table 7.1: QA/QC Results Summary	23

List of Figures

Figure 1	Site Location
Figure 2	Site Layout
Figure 3	Sample Locations

Appendices

Appendix A	Summary Tables
Appendix B	Photographic Log
Appendix C	Borelogs
Appendix D	Historical Aerial Photographs
Appendix E	Land Titles
Appendix F	EPA Records
Appendix G	Section 149 (2) and (5) Certificate
Appendix H	Heritage Records
Appendix I	Calibration & Decontamination Records
Appendix J	QA/QC Results

Appendix K Laboratory Documentation

Appendix L Proposed Development Plans

Executive Summary

JBS&G Australia Pty Ltd (JBS&G) was engaged by Pells Sullivan Meynink (PSM, the client), to conduct an environmental site assessment (ESA) with limited intrusive investigations of Waitara Public School located at 48-58 Myra Street, Wahroonga (the site). The site is legally identified as Lot A DP309739, Lots 11, 12 & 13 DP17375 and Lot 1 DP333142 and has a total site area of approximately 2 hectares (2 ha). The site location and site layout are presented on **Figure 1** and **Figure 2** respectively.

At the time of the investigation, the site was used as a school. It is understood that classrooms are to be constructed within the investigation areas.

The objective of the investigation was to characterise potential contamination within the investigation areas that may pose an unacceptable risk to construction workers during construction or to school users.

The scope of work comprised a desktop review, soil sampling at eight locations, laboratory analysis of samples for contaminants of potential concern (COPC) and preparation of an ESA report. The soil sampling locations were preselected prior to undertaking the ESA in conjunction with geotechnical investigations by the client.

Based on the findings of this assessment and subject to the limitations in **Section 11**, the following conclusions are provided:

- The site is understood to have been used for education use (school) since 1924. Prior to this, the site was used for residential purposes.
- Fill material was encountered at all eight sample locations and generally comprised heterogeneous, damp, soft to very soft brown silty clay or sandy silty clay, with some trace gravel, organic material, glass and plastic inclusions. Fill material was observed at depths ranging from 0.05 m bgs to 0.25 m bgs. Natural high plasticity, homogeneous, damp and stiff orange brown silty clay overlying grey and red mottled silty clay were identified beneath the fill material. Natural clay soils were in turn underlain by dark grey weathered shale.
- Concentrations of COPCs in representative soils were less than the adopted NEPC (2013) site assessment criteria.
- Based on the soil and leachate analytical data, the fill material would preliminary be classified as General Solid Waste in accordance with EPA guidelines.
- No chemical mixtures, aesthetic issues or significant offsite migration risks were identified.
- On this basis, it is considered that there were no contamination risks identified that would need to be managed during construction works. Given the limited extent of investigations, implementation of an appropriate unexpected finds protocol implemented during future development works would enable management of any unidentified contamination if encountered.

1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Pells Sullivan Meynink Pty Ltd (PSM, the client) to conduct an environmental site assessment (ESA) with limited intrusive investigations of Waitara Public School located at 48-58 Myra Street, Wahroonga (the site). The site is legally identified as Lot A DP309739, Lot 11, 12 & 13 DP17375 and Lot 1 DP333142 and has a total site area of approximately 2.0 hectares (2.0 ha). The site location and site layout are presented on **Figure 1** and **Figure 2** respectively.

The site is currently used as a school and it is understood that the investigation was undertaken to assess the contamination status for the development of classroom buildings. The investigation was limited to the locations of the proposed classrooms as provided by the client.

The investigation has been developed in general accordance with NEPC (2013)¹, guidelines made or approved by the NSW Environment Protection Authority (EPA) and relevant Australian Standards.

1.2 Objective

The objectives are to investigate the potential for contamination within the investigation areas that may pose an unacceptable risk to construction workers during construction and or to school users. Where potential risks are identified, recommendations are to be made for further investigation or management.

1.3 Scope of Works

The scope of work for the assessment comprised:

- Desktop review of readily available relevant background and historical information including:
 - Site conditions and environmental setting;
 - s.149 certificate(s) obtained from council;
 - current and historical land title records;
 - historical aerial photographs;
 - heritage records held by the Department of Planning;
 - records of environmental incidents or former environmental licenses as held by the EPA;
- A detailed site inspection in the vicinity of the investigation areas;
- Soil sampling at eight locations;
- Laboratory analysis of representative soil samples; and
- Preparation of this Environmental Site Assessment (ESA) report in general accordance with relevant EPA guidelines.

¹ National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1), National Environment Protection Council, 2013 (NEPC 2013).

2. Site Conditions and Surrounding Environment

2.1 Site Identification

The location of the site shown on **Figure 1**. The layout of the site and approximate site boundary are shown on **Figure 2**. The site details are summarised in **Table 2.1**.

Table 2.1: Summary Site Details

Site Address	48-58 Myra Street, Wahroonga, NSW
Lot / DP	Lot A DP309739, Lot 11, 12 & 13 DP17375 and Lot 1 DP333142
Local Government Authority	Hornsby Shire Council
Site Area	Approximately 2.0 ha
Approximate Geographical Coordinates (MGA 56)	Easting: 324988 Northing: 6268616
Zoning	R2 – Low Density Residential (Hornsby Local Environmental Plan 2013)
Previous Land-use	School/Education and Residential
Current Land-use	School/Education

2.2 Site Description

A detailed site inspection was undertaken on 14 August 2017 by one of JBS&G's trained and experienced field scientists. A photographic log is presented in **Appendix B**.

The site was bound by Edgeworth David Avenue to the north, Myra Street to the east and by residential properties to the south and west. The site was secured by a 2 m high metal fence. The site was generally flat with a slight south-western slope along the southern and western edges.

Most of the site comprised sealed surfaces. Buildings, concrete paths and asphalt surfaces were present across the majority of the site, while artificial turf playing fields were located in the western portion of the site. Small strips of grassed areas were observed following the boundary fence lines, and exposed soil was noted in garden beds surrounding trees.

No odours, surface soil staining, soil discolouration or asbestos containing material (ACM) was observed on accessible ground surfaces at the time of inspection. No evidence of above/underground storage tanks was observed at the site.

2.3 Surrounding Land-use

The surrounding land-uses of the site are detailed below.

North – Edgeworth David Avenue, then residential.

East – Residential.

South – Residential.

West – Myra Street, then residential.

2.4 Topography

The site is generally flat with a slight gradient to the south east. The site topography appeared to be consistent with the surrounding land indicating that significant earthworks are unlikely to have occurred at the site.

The site has an approximate elevation of 185 m Australian Height Datum (AHD) based on Google Earth.

2.5 Geology and Soil

According to the Sydney 1:100 000 Geological Sheet 9130 (1983), the site is underlain by a Triassic Period geological formation, Ashfield Shale of the Wianamatta group, comprising of black to dark-grey shale and laminite.

Review of eSPADE² indicated that the site soils comprise Glenorie soils, shallow to moderately deep (<100cm) red podzolic soils on crests, moderately deep red and brown podzolic soils on upper slopes and deep yellow podzolic soils and gleyed podzolic soils along drainage lines.

Investigations encountered fill material across the site to a maximum depth of up to 0.25 metres below ground surface (mbgs). Observations of the fill materials are presented in the bore logs included in **Appendix C**.

2.6 Acid Sulfate Soils

A review of the Office of Environment and Heritage (OEH) – Acid Sulfate Soils Risk Map³ indicated that the site is located within an area of “no known occurrence”. Acid sulfate soils (ASS) are unlikely to occur in areas having this classification. This is consistent with the topographical and geological setting of the site.

2.7 Hydrology

The site is partially unsealed and infiltration consistent with the fill material type and underlying natural soils / geology is anticipated across the site. Surface drainage was observed at the site in the sealed areas which would drain any surface water to the local stormwater system.

The nearest flowing water receptor comprises Hornsby Creek approximately 1 km to the north east of the site. This creek flows in a northerly direction before reaching its confluence with Cowan Creek/Hawkesbury River.

2.8 Hydrogeology

One registered groundwater bore (GW107088) was present within 1.5 km of the site on the NSW Office of Water Groundwater Database⁴.

Bore GW107088 was drilled to a total depth of 162 metres below ground surface (mbgs). The standing water level (SWL) was reported at 78.5 mbgs. The geological log for the bore reported clay between the surface and 11 mbgl which was overlying sandstone from 11mbgl to 162mbgl. No other relevant information for the bore was available.

It is anticipated that on a regional scale groundwater would move toward the north-west, generally towards Hornsby Creek then Cowan Creek/Hawkesbury River. The depth of groundwater beneath the site is unknown, however it is considered likely that the depth to groundwater would be greater than 10mbgs.

2.9 Meteorology

Based on data from Pennant Hills (Yarrara Road) weather station⁵ approximately 3.3 kilometres from the site, the mean monthly maximum temperature ranges from 15.8 degrees Celsius to 27.6 degrees Celsius and the mean monthly average rainfall ranges from 56.1 mm to 124.0 mm.

² <http://www.environment.nsw.gov.au/eSpade2Webapp>. Department of Environment and Heritage, NSW Government. Accessed 17/08/2017

³ OEH – Acid Sulfate Soils Risk Map <http://data.environment.nsw.gov.au/dataset/acid-sulfate-soils-risk0196c> (accessed 18 August 2017)

⁴ <http://allwaterdata.water.nsw.gov.au/water.stm>. Accessed 18 August 2017.

⁵ <http://www.bom.gov.au/climate/data/index.shtml>. Accessed 18 August 2017.

3. Site History

3.1 Aerial Photograph

Historical aerial photographs are provided in **Appendix D** and discussed below.

1943 – The site appeared to be used for education/school purposes. The site contained three large buildings in the northern, central and eastern portions of the site. Smaller buildings (possibly sheds or small classrooms) were in the central portion of the site. What appear to be zig-zag-shaped trenches were visible in the northern portions of the site. Vegetation could be observed in the southern portion of the site and along the site boundaries. Edgeworth David Avenue and Myra Street had been constructed to the north and west of the site respectively. The surrounding land appeared to be used for residential purposes with the property to the south consisting of bushland.

1951 – The site generally remained unchanged except the previously identified trenches had been filled and vegetation in the south eastern portion of the site had been cleared. The surrounding land use remained generally unchanged except for the bushland to the south west which had been cleared for residential development.

1961 – Additional buildings (likely classrooms) had been constructed in the north western, northern and south eastern portions of the site. No other significant changes were observed to site. The surrounding land remained for residential use with the bushland to the south completely cleared and residential dwellings constructed.

1970 – The site has remained essentially unchanged except for the construction of buildings (likely to be classrooms) along the western boundary and north eastern portion of the site. The surrounding land remained essentially unchanged from the previous 1961 aerial photograph.

1982 – The site appeared generally unchanged from the previous 1970 aerial photograph. The site is sealed with asphalt in the north western and central portions of the site. Due to the quality of the previous aerial photographs, it is unknown if these areas were previously sealed. No changed to the surrounding land use was observed.

1991 – Three of the classroom buildings in the central portion of the site had been demolished and the area remained sealed. An additional large building (classroom) had been constructed in the western portion of the site. No other changes to the site were noted. The surrounding land use remained unchanged from the previous 1982 aerial photograph.

2003 – Three additional interconnected buildings (classrooms) and a structure that appeared to be a demountable building had been constructed in the central portion of the site approximately where the three former buildings existed. No other changes from the previous 1991 aerial photograph were observed. No changed were observed to the surrounding land.

2009 – No significant changes were observed at the site or surrounding land from the previous 2003 aerial photograph.

2017 – A demountable building had been constructed in the central portion of the site. Two demountable had been constructed in the south western portion of the site. Four demountable had been constructed in the south eastern portion of the site. No other changes to the site were noted. The surrounding land remained used for a residential use.

3.2 Historical Land Titles

Historical land title records are summarised in below and full records provided in **Appendix E**.

The registered proprietors for the site were as follows:

- 1894 to 1924 – Caroline Hordern (married woman).

- 1924 to date – His most gracious King George the Fifth now Minister of Education.

3.3 EPA Records

A search of the NSW EPA's public register maintained under the Protection of the Environment Operations Act 1997 (POEO Act) was undertaken for the subject site and surrounding properties. The results of the search are present in **Appendix F**. The search identified that there were no current or former prevention, clean-up or prohibition notices for the site and immediate surrounds.

A search of the EPA's public contamination land register (**Appendix F**) was also undertaken. The search identified that there have been no notices issued under the Contaminated Land Management Act 1997 (CLM Act) for the site.

The site has not been notified to the EPA as containing significant contamination.

3.4 Council Records

A full copy of the Section 149 (2) and (5) planning certificate for Lot A DP309739 is provided in **Appendix G**. A summary of the information with respect to contamination is as follows:

- The site is zoned R2 Low Density Residential under the Hornsby Local Environmental Plan 2013.
- Draft *State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017* applies to the site.
- The land is located in a conservation area.
- There is an item of environmental heritage located on the land.
- Acid sulfate soils are not considered likely at the site that would restrict the development of the land.
- Council's electronic property records did not identify the land to be contaminated, being contaminated, having been remediated or being remediated.
- The land is not affected by flood related development controls.
- The land has not been identified as bush fire prone land.
- The council is not aware of the land as significantly contaminated within the meaning of the *Contaminated Land Management Act 1997*.
- The council is not aware of the land as subject of a management order within the meaning of the *Contaminated Land Management Act 1997*.
- The council is not aware of the land as subject of an approved voluntary management proposal within the meaning of the *Contaminated Land Management Act 1997*.
- The council is not aware of the land as subject to an ongoing maintenance order within the meaning of the *Contaminated Land Management Act 1997*.
- The council is not aware of the land as subject of a site audit statement within the meaning of the *Contaminated Land Management Act 1997*.
- The site is not listed on the loose-fill asbestos insulation public register. The council considered there was potential for loose-fill asbestos insulation to be found on properties not listed on the Asbestos Public Register.

3.5 Heritage Register

Results of searches on the NSW⁶ and Australian⁷ heritage registers are provided in **Appendix H**. No records relevant to the site were located on the heritage registers.

3.6 Dangerous Goods Records

A search of the Storage of Hazardous Chemicals database by SafeWork NSW was not undertaken due to time constraints. Given historical use of the site, it is considered unlikely that records and licences for use/storage of dangerous goods (including fuel storage) would be associated with the current site.

3.7 Previous Environmental Reports

3.7.1 Asbestos Register – Waitara Public School (3334)

A review of the Asbestos Register for Waitara Public School identified that presence of asbestos containing materials within the buildings at the site. No information relating to asbestos containing materials in soils were reported within the Asbestos Register.

3.8 Integrity Assessment

The information obtained from the historical sources reviewed has been found to be in general agreement and of a suitable quality. It is therefore considered that the information provided in this historical assessment has an acceptable level of accuracy.

⁶ <http://www.environment.nsw.gov.au/heritageapp/heritageSearch.aspx>. Accessed 13 April 2017.

⁷ <http://www.environment.gov.au/cgi-bin/ahdb/search.pl>. Accessed 13 April 2017.

4. Conceptual Site Model (CSM)

NEPC (2013) identifies a conceptual site model (CSM) as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The development of a CSM is an essential part of all site assessments.

NEPC (2013) identified the essential elements of a CSM as including:

- Known and potential sources of contamination and contaminants of concern including the mechanism(s) of contamination;
- Potentially affected media (soil, sediment and ambient air);
- Potential receptors; and
- Potential and complete exposure pathways.

The CSM below represents a model of potential contamination that may be present at the site based on the desktop review. The potential contamination issues identified are not necessarily present at the site. The CSM usually informs the design of the intrusive sampling program. The results of the intrusive investigation allow conclusions to be drawn regarding the actual site contamination conditions identified as discussed in **Sections 9 and 10**.

4.1 AECs & COPCs

The identified areas of environmental concern (AECs) and associated contaminants of potential concern (COPCs) for the site are presented in **Table 4.1**.

Table 4.1: AECs & COPCs

AECs	COPCs
Fill of unknown origin across the site	Heavy metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX) and asbestos.

4.2 Potentially Impacted Media

Fill material is considered to be a potentially impacted media based upon:

- Unidentified sources of fill material historically imported to or originating from the site to form existing site levels.

Natural soils beneath the fill materials are not expected to be impacted considering the historical use of the site. There is potential that natural soils could be impacted based on possible leaching of contaminants from the fill materials, however considering the low probability of mobile contaminants within the fill, it is expected that any impact would be limited.

Given the anticipated deep levels of groundwater anticipated to occur beneath the site and the relatively low probability of mobile contaminants in fill material and/or natural soils, it is considered that there is a low probability that groundwater will have been significantly impacted as a result of site conditions.

4.3 Potential Receptors

Potential human and ecological receptors on or near the site include:

- Site occupants (including children) / workers and visitors;
- Construction / maintenance workers, including subsurface excavation/maintenance works; and

- Flora and fauna on the site.

4.4 Potential Exposure Pathways

Based on the COPCs identified in soil, the potential exposure pathways for the site include:

- Oral and dermal pathways from impacted soils.
- Inhalation of airborne contaminants (including airborne asbestos fibres).
- Inhalation of vapours/gases migrating from impacted soils.
- Contaminant uptake via vegetation (flora) or bioaccumulation within fauna.

4.5 Potential for Migration

Contaminants generally migrate from site via a combination of windblown dusts, rainwater infiltration, groundwater migration and surface water runoff. The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics);
- The extent of the contaminants (isolated or widespread);
- The location of the contaminants (surface soils or at depth); and
- The site topography, geology, hydrology and hydrogeology.

The potential contaminants of concern identified as part of the site history review and site inspection are in solid (e.g. asbestos, metals), liquid (e.g. TRH/BTEX) or vapour/gaseous (e.g. methane) form. In the event of significant soil and/or groundwater contamination, there is the potential for soil vapour impacts, including off-site migration.

The area of investigation was predominantly sealed with asphalt, concrete, grass or synthetic grass/artificial turf. Due to the majority of the site being sealed, it is considered that the potential migration of dust and soil via windblown migration is considered to be low.

There is the potential for contaminants to migrate down and impact groundwater at the unsealed locations of the site, and to migrate offsite via groundwater. However, this is limited via the clayey nature of the surface fill and low permeability of the underlying clay and shale and inferred depth of groundwater.

Migration of soil via surface water runoff is considered to be limited due to the general sealed nature of the site. In addition, it is expected that the presence of grass in the unsealed areas would limit the migration of any soil via surface water runoff.

4.6 Preferential Pathways

For the purpose of this assessment, preferential pathways have been identified as natural and/or man-made pathways that result in the preferential migration of COPC as either liquids or gasses.

Man-made preferential pathways are present on the site, generally associated with fill materials present beneath the current ground surface, and at near surface depths over the remainder of the site. Fill materials are anticipated to have a higher permeability than the underlying natural soil and/or bedrock.

5. Sampling and Analysis Plan

5.1 Data Quality Objectives

Data quality objectives (DQOs) were developed for the contamination assessment, as discussed in the following sections.

5.1.1 State the Problem

Additional classroom buildings are to be constructed at the site and an ESA is required to characterise potential contamination at the site to enable appropriate management if required during future development activities.

5.1.2 Identify the Decision

The following specific decisions are required to be made as part of these investigations:

- Are there any unacceptable risks to likely future receptors from impacted soil?
- Are there any issues relating to local area background soil concentrations that exceed the appropriate soil criteria?
- Are there any impacts of chemical mixtures?
- Are there any significant aesthetic concerns from impacted soils present at the site?
- Is there any evidence of, or potential for, migration of contaminants from the site?
- Is a site management strategy required?

5.1.3 Identify Inputs to the Decision

Inputs required to address the decisions will be:

- Potential AECs and COPCs as identified by site history review and detailed site inspection;
- Soil environmental data collected by soil sampling and analysis;
- Soil criteria based on the primary school (low density residential) land use;
- Confirmation that data generated by field measurements and sample analysis are of a sufficient quality to allow reliable comparison to assessment criteria as undertaken by assessment of quality assurance / quality control (QA/QC) as per the data quality indicators established in **Section 5.1.6**.

5.1.4 Define the Study Boundaries

The lateral extent of the study comprised the proposed development area, as presented on **Figure 2** and provided plan in **Appendix L**.

The vertical extent of the study comprised assessment of soils to bedrock which was identified between 0.4 and 1.9 mbgs. The investigation comprised only of soil sampling, with no groundwater monitoring wells or soil vapour ports installed or sampled.

The current study does not include assessment of temporal changes in identified COPCs which was beyond the scope of this investigation. Therefore, results were reflective of conditions at the time of the field assessment.

5.1.5 Develop a Decision Rule

The decision rules adopted to answer the decisions identified in **Section 5.1.2** are summarised in **Table 5.1** below.

Table 5.1: Summary of Decision Rules

Decision Required to be Made	Decision Rule
Are there any unacceptable risks to likely future receptors from impacted soil?	Soil analytical data was compared against appropriate criteria. Statistical analyses of the data in accordance with relevant guidance documents were undertaken, if appropriate, to facilitate the decisions. The following statistical criteria were adopted with respect to soils: Either: the reported concentrations were all below the site criteria; Or: the 95% upper confidence limit (UCL) of the average concentration for each analyte was below the adopted site criterion; no single analyte concentration exceeded 250% of the adopted site criterion; and the standard deviation of the results was less than 50% of the site criterion. If the statistical criteria stated above were satisfied, the decision was No. If the statistical criteria were not satisfied, the decision was Yes.
Are there any issues relating to the local area background soil concentrations that exceed appropriate soil criteria?	Analytical data in natural soil samples were compared to the background levels for urban areas of NSW as described in NEPC 2013. Where concentrations were less than the background levels, the answer to the decision was No. Otherwise the answer to the decision was Yes.
Are there any impacts from chemical mixtures?	Are there more than one group of contaminants present which increase the risk of harm? If there was, the decision was Yes. Otherwise, the decision was No.
Are there any significant aesthetic concerns from impacted soils present at the site?	Were significant odour or other aesthetic issues identified during the soil assessment? If yes, the decision was Yes. Otherwise, the decision was No. It is noted that staining/discolouration was not considered to be an aesthetic issue based on DEC 2006 guidance for commercial/industrial land use.
Is there any evidence of, or potential for, migration of contaminants from the site?	Based on the assessment results including soil and groundwater analytical data, was there any evidence of, or potential for, migration of contaminants from the site? If there was potential for unacceptable contaminant concentrations to migrate, the decision was Yes. Otherwise, the decision was No.
Is a site management strategy required?	Was the answer to any of the decisions Yes? If yes, a site management strategy was required. If no, a site management strategy was not required.

5.1.6 Specify Limits of Decision Error

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Data generated during this project must be appropriate to allow decisions to be made with confidence.

Specific limits with respect to the limits of decision error adopted for this project have been implemented in accordance with the appropriate guidance from NEPC (2013) and appropriate indicators of data quality (DQIs used to assess quality assurance / quality control) and standard JBS&G procedures for field sampling and handling.

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined Data Quality Indicators (DQIs).

The pre-determined DQIs established for the project are discussed below in relation to precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS parameters), and are shown in **Table 5.2**.

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD) of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** – expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** - expresses the appropriateness of the chosen field and laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted site assessment criteria.

Table 5.2: Summary of Quality Assurance / Quality Control Program

Data Quality Indicator	Frequency	Data Quality Criteria
Precision		
Blind duplicates (intra laboratory)	1 / 20 samples	<50% RPD ¹
Blind triplicates (inter laboratory)	1 / 20 samples	<50% RPD ¹
Laboratory duplicates	1 / 20 samples	<50% RPD ¹
Accuracy		
Surrogate spikes	All organic samples	70-130%
Laboratory control samples	1 per lab batch	70-130%
Matrix spikes	1 per lab batch	70-130%
Representativeness		
Sampling appropriate for media and analytes	-	-
Samples extracted and analysed within holding times.	-	organics (14 days), inorganics (6 months)
Trip spike	1 per sampling batch	70-130% recovery
Trip blank	1 per sampling batch	<LOR
Rinsate	1 per sampling batch with reusable sampling equipment	<LOR

Data Quality Indicator	Frequency	Data Quality Criteria
Laboratory Blanks	1 per analytical method	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All samples	All samples
Standard analytical methods used for all analyses	All samples	All samples
Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples
Limits of reporting appropriate and consistent	All samples	All samples
Completeness		
Sample description and COCs completed and appropriate	All samples	All samples
Appropriate documentation	All samples	All samples
Satisfactory frequency and result for QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		
Field and analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	All samples	LOR < adopted site criteria (where possible)

1 Relative percent difference (RPD)

If any of the DQIs are not met, further assessment will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data. Corrective actions may include requesting further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of the data.

A qualitative assessment of compliance with standard procedures and appropriate sample collection methods will be completed during the DQI compliance assessment.

5.1.7 Optimise the Design for Obtaining Data

For a site of approximately 20,000 m² EPA (1995)⁸ recommends a stratified approach to sampling. However, based on the requirement to co-locate contamination samples within geo-technical boreholes and the scope of works provided, a total of eight (8) sample locations were undertaken. The borehole locations were generally within the vicinity of the geotechnical investigation locations provided by the client. No locations were drilled on Lot 11 DP17375. The soil sample locations are presented on **Figure 3**.

5.2 Investigation Methodology

5.2.1 Soil Sampling Methodology

Soil samples were collected during the site investigation works using a solid flight auger. Sample locations were extended until bedrock was reached.

Samples were obtained directly from the auger wearing fresh disposable nitrile gloves for each sample. Disturbance of the soil sample was minimised where possible during sample collection and placement with laboratory supplied sample containers to reduce the potential for release of volatile organic contaminants.

Visual inspection of drilling spoil was undertaken at each location for the presence of discolouration, ACM or other indications of potentially contaminated materials. Where identified, the observations were recorded on field logs, which are presented in **Appendix C**.

⁸ Contaminated Sites: Sampling Design Guidelines, NSW EPA, 1995 (EPA 1995).

During site works, sufficient sample material was collected to allow for field testing and laboratory analyses. Additional samples were collected from any soil horizons which exhibited staining, odours, seepage, discolouration, or other physical evidence of potential contamination.

Soil samples destined for laboratory analysis were immediately transferred to laboratory supplied sample jars and sealed with a Teflon-lined screw closure or placed into asbestos sample bags. The sample containers were then placed in a pre-cooled insulated box for sample preservation prior to and during shipment to the testing laboratory. Preservation of the primary soil and QA/QC samples obtained during this investigation was completed in accordance with recognised protocols (NEPC 2013).

The samples were transported under standard JBS&G chain-of-custody protocols to the National Association of Testing Authority (NATA) registered laboratory, Eurofins | mgt Pty Ltd (Eurofins).

Not all samples collected were analysed. Selected samples were analysed in accordance with the analytical schedule (Section 5.3). However, all samples remain at the primary laboratory for a period of two months. This allows for future analysis to be completed in the event that further information is required to characterise site conditions, provided that proposed analytes remain within analytical holding times.

5.2.2 Soil Sampling Decontamination

Prior to the commencement of sampling activities, non-disposable sampling equipment, including sampling trowel/knife were all cleaned with a high-pressure water/detergent spray and brush, rinsed with water and then air dried. The equipment was then inspected to ensure that no soil, oil, debris or other contaminants were apparent on the equipment prior to the commencement of works. Sampling equipment was subsequently decontaminated using the above process between each sampling location. New gloves were used for each sampling event.

5.2.3 Soil Field PID Screening

Samples collected during the JBS&G sampling event were screened on site using a photo-ionisation detector (PID) to assess the potential presence of VOCs including petroleum hydrocarbons. Samples obtained for PID screening were placed in a sealed plastic bag for a period of approximately five minutes to equilibrate, prior to a PID being attached to the bag. Readings were then monitored for a period of approximately one minute or until values stabilise and the stabilised/highest reading were recorded on the borehole logs. PID screening results were recorded on the bore logs included as **Appendix C**. PID calibration records are included in **Appendix I**.

5.2.4 Soil Duplicate Preparation

Field soil duplicate samples were obtained during sampling using the above sampling methods. The collected samples were then divided laterally into two samples and placed in clean glass jars or sample bags as appropriate. Each sample was then labelled with a primary or duplicate sample identification before being placed in the same chilled esky for transport to the laboratory.

5.3 Laboratory Analysis

JBS&G contracted a NATA certified laboratory (Eurofins | mgt) for the required analysis to which the primary and duplicate samples were submitted. Laboratory analysis of samples was conducted as summarised in **Table 5.3**. Duplicate samples were collected at rate of at least 1 per 20 primary samples.

Table 5.3: Sampling and Analytical Program

Sample Media	No. Sample Locations	Analyses (exc. QA/QC)
Soil	8	Heavy metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn) – 8 samples PAH – 8 samples OCPs/PCBs – 8 samples TRH/BTEX – 8 samples Asbestos – 8 samples (500 mL) CEC, Ph, % clay, TOC – 8 samples TCLP (metals/PAHs) – 8 samples

6. Assessment Criteria

6.1 Regulatory Guidelines

Development of site assessment criteria and the associated scope of investigation was undertaken with consideration to aspects of the following guidelines, as relevant:

- *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)*, National Environment Protection Council (NEPC 2013);
- *Contaminated Sites: Sampling Design Guidelines*, NSW EPA, 1995 (EPA 1995);
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*, NSW OEH, 2011 (OEH 2011);
- *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme*, 2nd Edition, NSW EPA, 2006 (DEC 2006); and
- *CRCCARE Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater*, 2011, Friebe and Nadebaum (CRCCARE 2011).

6.2 Soil Assessment Criteria

As per the decision process for assessment of urban development site (DEC 2006), a set of health and ecological assessment thresholds derived from NEPC (2013) or other EPA approved guidelines was used for evaluation of site contamination data collected for this assessment. The site is zoned R2 Low Density Residential and used as a primary school. On this basis, low density residential with gardens and accessible soil land use criteria were adopted as the site assessment criteria. These land use criteria also apply to primary schools. The site assessment criteria are presented on **Table A** and summarised as follows:

- Health based investigation levels (HILs) for residential land use with garden/accessible soils (HIL A);
- Health screening levels (HSLs) for vapour intrusion for low density land use, clay (HSL A);
- HSLs for direct contact for intrusive maintenance worker;
- Management limits for TRH fractions for residential, parkland and public open space, fine soils;
- HSLs for asbestos in soil for residential land use with garden/accessible soils (HSL A);
- Ecological investigation levels (EILs) for urban residential/public open space land use, site specific; and
- Ecological screening levels (ESLs) for urban residential/public open space land use, fine soils.

The results of the asbestos analysis were assessed in general accordance with NEPC (2013) including DOH (2009) guidance.

To derive EILs for the selected inorganics COPCs, consistent with NEPC (2013), the pH, cation exchange capacity (CEC) and percent clay content for surface soils at the site were analysed. The selected pH value, CEC and percent clay was based on the median concentration of the eight samples analysed. Based on the information, the following criteria for copper, nickel, chromium and zinc in **Table 6.1** were derived from the proposed residential land use scenarios using the EIL spreadsheet provided in the NEPC 2013. Additionally, NEPC 2013 provided generic EILs for lead, arsenic, DDT and naphthalene.

Where no criteria are present for a contaminant, the laboratory limit of reporting (LOR) has been used as an initial screening criteria.

Table 6.1: Derived EIL urban residential/public open space land use

pH	CEC (meq/100g)	Clay Content (%)	Cu (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Cr (mg/kg)
6	15	26	190	170	400	400

7. Quality Assurance/Quality Control

7.1 QA/QC Results

The QA/QC results are summarised in **Table 7.1** and discussed in **Section 7.2** below. Relevant QA/QC data is presented in **Appendix J**.

Table 7.1: QA/QC Results Summary

Data Quality Indicator	Results	DQI Met?
Precision		
Blind duplicates (intra laboratory) (soil)	Sampling rate greater than 1 in 20. RPDs = 0-51%	Partial ¹
Blind triplicates (inter laboratory) (soil)	Sampling rate greater than 1 in 20. RPDs = 0-50%	No ¹
Laboratory duplicates	Sampling rate greater than 1 in 20. RPDs = 0-50%	Yes
Accuracy		
Surrogate spikes	58-134% Surrogate spikes were completed for all organic samples	Partial ¹
Laboratory control samples	>70-130% Laboratory control samples completed for each batch	Yes
Matrix spikes	>70-139% One matrix spike was completed for each batch	Yes
Representativeness		
Sampling appropriate for media and analytes	All sampling was conducted in accordance with JBS&G procedures	Yes
Samples extracted and analysed within holding times.	All samples were extracted and analysed within holding times	Yes
Trip spike	77-128% One per sampling event when sampling for volatile or semi-volatile COPC	Yes
Trip blank	<LOR One per sampling event when sampling for volatile or semi-volatile COPC	Yes
Rinsate blank	No rinsate blank was collected.	No ¹
Laboratory Blanks	<LOR One per laboratory method	Yes
Comparability		
Standard operating procedures for sample collection & handling	Field staff used same standard operating procedures throughout works	Yes
Standard analytical methods used for all analyses	Standard analytical methods were used	Yes
Consistent field conditions, sampling staff and laboratory analysis	Sampling was conducted using standard operating procedures in the same conditions throughout the works. The laboratory remained consistent throughout the investigation.	Yes
Limits of reporting appropriate and consistent	Limits of reporting were consistent and appropriate	Yes
Completeness		

Sample description and COCs completed and appropriate	All borehole logs and COCs were completed appropriately.	Yes
Appropriate documentation	Field documentation was appropriately completed.	Yes
Satisfactory frequency and result for QC samples	All frequency and results for QC were satisfactory	Yes
Data from critical samples is considered valid	Data from critical samples is considered valid.	Yes
Sensitivity		
Field and analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	Appropriate laboratory analysis methods and detection limits were considered to have been achieved to the extent practicable during the field and laboratory phases of this investigation.	Yes

Notes: 1 See discussion of DOJ exceedances

7.2 QA/QC Discussion

7.2.1 Precision

Soil Blind Duplicates (Intra laboratory)

Duplicate sample analysis was completed at the required frequency. The reported RPDs were generally within the acceptable limits for all COPCs with the exception of chromium (51%) and zinc (51%). The reported RPDs are marginally outside the acceptable range and are considered not to influence the investigation findings due to the low concentrations of the two analytes within the sample.

Soil Blind Triplicates (Inter laboratory)

No triplicate samples were analysed as part of the investigation.

Laboratory Duplicates

Laboratory duplicate analysis was completed at the required frequency and the laboratory duplicate RPDs were reported within the acceptable limits for all COPCs.

7.2.2 Accuracy

Surrogate Spikes

The surrogate spikes samples have been reported for analysis of all organic constituents for soils and water. A total of 13 surrogate spike samples reported were >30% variation ranging from 58% to 69% and 132% to 135%. Given that most organic COPCs were reported below the LOR and all volatile COPCs were reported below the site assessment criteria, this is not considered to influence the outcome of the investigation. Furthermore, field screening (PID) and observations (odour, staining and sheen) did not indicate the presence of any volatile contaminants. Additionally, the recovery percentages were generally within the NATA accredited lab method acceptance range for surrogate spike recoveries, which are 50-150%.

Laboratory Control Samples

Laboratory control samples have been reported for analysis of all constituents for the analytical batches. All laboratory control samples were within the 70 to 130% acceptance range.

Matrix Spikes

Matrix spikes have been reported for analysis of all constituents for the analytical batches. All laboratory control samples were within the 70 to 130% acceptance range.

7.2.3 Representativeness

Sampling appropriate for media and analytes

All soil sampling works completed during the investigation were conducted in accordance with JBS&G standard operating procedures. Solid flight augers with 300 mm diameter were advanced for the purposes of visual inspection of fill conditions and the collection of 500mL asbestos soil samples, which is considered appropriate for the assessment of asbestos.

All samples were collected wearing a new pair of disposable nitrile gloves. Where possible, disturbance of the sample was minimised during placement into the laboratory supplied sample container and during shipment.

Given the absence of specific information in relation to the potential for volatile contaminant sources, this sampling method was considered appropriate to achieve investigation objectives.

Samples extracted and analysed within holding times

All analyses have been undertaken within holding times.

Trip spikes

A single trip spike was submitted with the soil samples collected during the assessment. Trip spike recoveries were within the JBS&G acceptable limit of 70-130%, with a reported range of 77% to 128%.

Trip blanks

A single trip blank was submitted with the soil sampling event. There were no reported concentrations of BTEX compounds or naphthalene above the laboratory LOR.

Rinsate Blanks

No rinsate blanks were submitted with the samples collected during the assessment, however, based on the concentration of COPCs within soil samples either at background levels (heavy metals) or below LOR, the lack of rinsate blank is not considered to affect the outcome of the assessment.

Laboratory Blanks

Reported concentrations of all analytes were <LOR in laboratory blank samples.

7.2.4 Comparability

Experienced JBS&G personnel undertook all sampling in accordance with standard JBS&G sampling methods.

All field works and sampling were undertaken by one experienced JBS&G field scientist.

The laboratory LORs are consistent and are considered appropriate.

7.2.5 Completeness

Samples were generally transported under full chain of custody (COC) documentation. The COC documentation was generally completed correctly and the selected analyses were correctly conducted.

All field documentation was completed appropriately and were correct.

The frequency of analysis and result for all QC samples are appropriate.

7.2.6 Sensitivity

The adopted analytical methods generally provided suitable LORs with respect to the adopted site assessment criteria.

7.3 QA/QC Conclusion

The field sampling and handling procedures produced QA/QC results which indicate that the soil data are of an acceptable quality and suitable for use in site characterisation.

The NATA certified laboratory results sheets indicate that the project laboratory was generally achieving levels of performance within its recommended control limits during the period when the samples from this program were analysed.

The non-conformances described in **Section 7.2** are considered to be minor in nature and acceptable given the consistency of the data and results significantly below the adopted site assessment criteria.

On the basis of the results of the field and laboratory QA/QC program, the soil data are of an acceptable quality upon which to draw conclusions regarding the environmental condition of the site.

8. Soil Results

8.1 Soil Field Observations

A total of eight sample locations were advanced. Soil sample locations are presented on **Figure 3** and bore logs are provided in **Appendix C**.

Grass/unsealed ground was encountered at the surface at four sampling locations. Three sampling location were undertaken beneath asphalt. One soil sampling location was undertaken beneath concrete.

Fill material was encountered at all sample locations and generally comprised brown silty clay or sandy silty clay, heterogeneous, damp, soft to very soft with some trace gravel, organic material, glass and plastic inclusions. Fill material was observed at depths ranging from 0.05 m bgs to 0.25 m bgs.

Natural soils underlying the fill material generally comprised orange brown silty clay overlying grey silty clay containing red mottles, high plasticity, homogeneous, damp and stiff, underlain by dark grey weathered shale. Natural clays were encountered at all locations. No groundwater seepage was observed during augering.

No odours, staining or asbestos containing material (ACM) were observed within the fill material or natural soils at the site.

PID results during field screen for volatile contaminants were 0 ppm, consistent with the lack of observed odours and staining.

8.2 Soil Analytical Results

Summarised soil analytical results are presented in **Table A** and discussed in the following sections. Laboratory documentation is provided in **Appendix K**.

8.2.1 Metals

The concentrations of the heavy metals in the soil samples selected for analysis were all less than the site assessment criteria.

8.2.2 PAHs

The concentrations of PAHs in the soil samples selected for analyses were all less than the site assessment criteria and below the LOR.

8.2.3 Asbestos

The concentration of all forms of asbestos in the soil samples selected for analyses were all less than the site assessment criteria and below the LOR.

8.2.4 TRH

The concentration of TRH in the soil samples selected for analyses were all less than the site assessment criteria and generally below the LOR.

8.2.5 BTEX

The concentration of BTEX in the soil samples selected for analyses were all less than the site assessment criteria and below the LOR.

8.2.6 OCPs

The concentration of OCPs in the soil samples selected for analyses were all less than the site assessment criteria and generally below the LOR.

8.2.7 PCBs

The concentration of PCBs in the soil samples selected for analyses were all less than the site assessment criteria and below the LOR.

8.2.8 Soil Properties for Site Specific EILs

The reported % clay ranged from 6.3% (BH2) to 40% (BH1 & BH7). The cation exchange capacity ranged from 2.2 meq/100g (BH07) to 27 meq/100g (BH1). pH ranged from 5.0 pH (BH07) to 7.2 pH (BH1). Total organic carbon ranged from 0.4% (BH08) to 9.2% (BH03).

8.3 Preliminary Waste Classification

Toxicity characteristic leaching procedure (TCLP) was undertaken on the soil samples at the site to assess the likely leaching of heavy metal and PAH contaminants within the soils. The results of the TCLP analysis identified that leaching of heavy metals and PAHs within the soil was low as all concentrations were reported below the laboratory limit of reporting (LOR) with the exception of zinc in one sample which was marginally above the laboratory LOR.

The concentrations reported within the soil were below the leachable concentrations and specific contaminant concentration 1 (SSC1) for general solid waste. Based on the results of the soil and TCLP data, the fill material at the site has been preliminary classified as General Solid Waste.

9. Site Characterisation

The following sections provide a summary discussion of the decision outcomes for this assessment.

9.1 Are there any unacceptable risks to likely future receptors from impacted soil?

Boreholes completed at the site in conjunction with the geo-technical investigation works were broadly spread across the site. The boreholes were limited to areas understood to be redeveloped and the locations of the boreholes were pre-selected at geotechnical investigation locations completed by the client. When considering the fill material encountered during the investigation works were generally consistent across the site comprising silty clay or sandy silty clay with a lack of other anthropogenic inclusions (except for traces of plastic), odours, staining and ACM observed, the predetermined sampling locations are considered to be representative of site conditions. Furthermore, the concentrations of COPCs within fill materials analysed at the proposed development locations were reported within background levels (heavy metals) or below the LOR (organic COPCs) in all samples selected for analyses.

Concentrations of COPCs in all soil samples analysed were reported below the site assessment criteria. Based on the soil analytical data, there are no unacceptable risks to future receptors at the proposed development locations sampled.

9.2 Are there any issues relating to the local area background soil concentrations?

Given the nature of the investigation, the soil sampling was targeted towards fill materials, which were considered to represent the greatest potential risk. Heavy metals were reported within background ranges as per Olszowy et al. (1995). In addition, all other COPCs were reported below the LOR. On this basis, there are not considered to be any issues relating to local area background soil concentrations. The physical observations of natural soil/rock conditions is considered sufficient to confirm the absence of conditions of concern for natural materials at the site.

9.3 Are there any impacts from chemical mixtures?

There were no soil conditions identified with significant concentrations of more than one contaminant of concern and therefore no potential chemical mixtures were identified during the investigation that may pose an unacceptable contamination risk at the site with respect to future site users.

9.4 Are there any aesthetic concerns?

Based on the lack of observed odours or staining within site soils, the lack of anthropogenic inclusions and that no ACM was observed within surface soils (or at depth), no unacceptable aesthetic concerns have been identified during this assessment.

9.5 Is there any evidence of, or potential for, migration of contaminants from the site?

The potential for migration of contaminants from the site is considered to be low based upon the absence of identified soil contamination.

No evidence of volatile compounds were identified during the analytical program. As such, it is considered that migration of contamination via migration is negligible.

No groundwater investigation was undertaken at the site. Groundwater was not intercepted during the investigation, and is anticipated to be at depth in bedrock. Considering the concentrations identified within the fill material and the surrounding land uses, it is considered that the risk to groundwater is low and no groundwater assessment would be required.

9.6 Is a site management strategy required?

Based on the scope of works completed, including a desktop review and limited intrusive investigations, and the limitations presented in **Section 11**, there are considered not to be any contamination conditions at the site that represent an unacceptable risk with respect to the proposed development works. On this basis, a contamination management strategy is not required for the site.

An appropriate unexpected find protocol implemented during development works would enable management of any unidentified contamination if encountered.

10. Conclusions

Based on the findings of this assessment and subject to the limitations in **Section 11**, the following conclusions are provided:

- The site is understood to have been used for education use (school) since 1924. Prior to this, the site was used for residential purposes.
- Fill material was encountered at all eight sample locations and generally comprised heterogeneous, damp, soft to very soft brown silty clay or sandy silty clay, with some trace gravel, organic material, glass and plastic inclusions. Fill material was observed at depths ranging from 0.05 m bgs to 0.25 m bgs. Natural high plasticity, homogeneous, damp and stiff orange brown silty clay overlying grey and red mottled silty clay were identified beneath the fill material. Natural clay soils were in turn underlain by dark grey weathered shale.
- Concentrations of COPCs in representative soils were less than the adopted NEPC (2013) site assessment criteria.
- Based on the soil and leachate analytical data, the fill material would preliminary be classified as General Solid Waste in accordance with EPA guidelines.
- No chemical mixtures, aesthetic issues or significant offsite migration risks were identified.
- On this basis, it is considered that there were no contamination risks identified that would need to be managed during construction works. Given the limited extent of investigations, implementation of an appropriate unexpected finds protocol implemented during future development works would enable management of any unidentified contamination if encountered.

11. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Figures

Legend:

 Approximate Site Boundary



Job No: 201003

Client: Pella Sullivan Mayrlink

Version: R01 Rev A

Date: 31-Aug-2017

Drawn By: B/C

Checked By: 88

Scale: 1:6,000

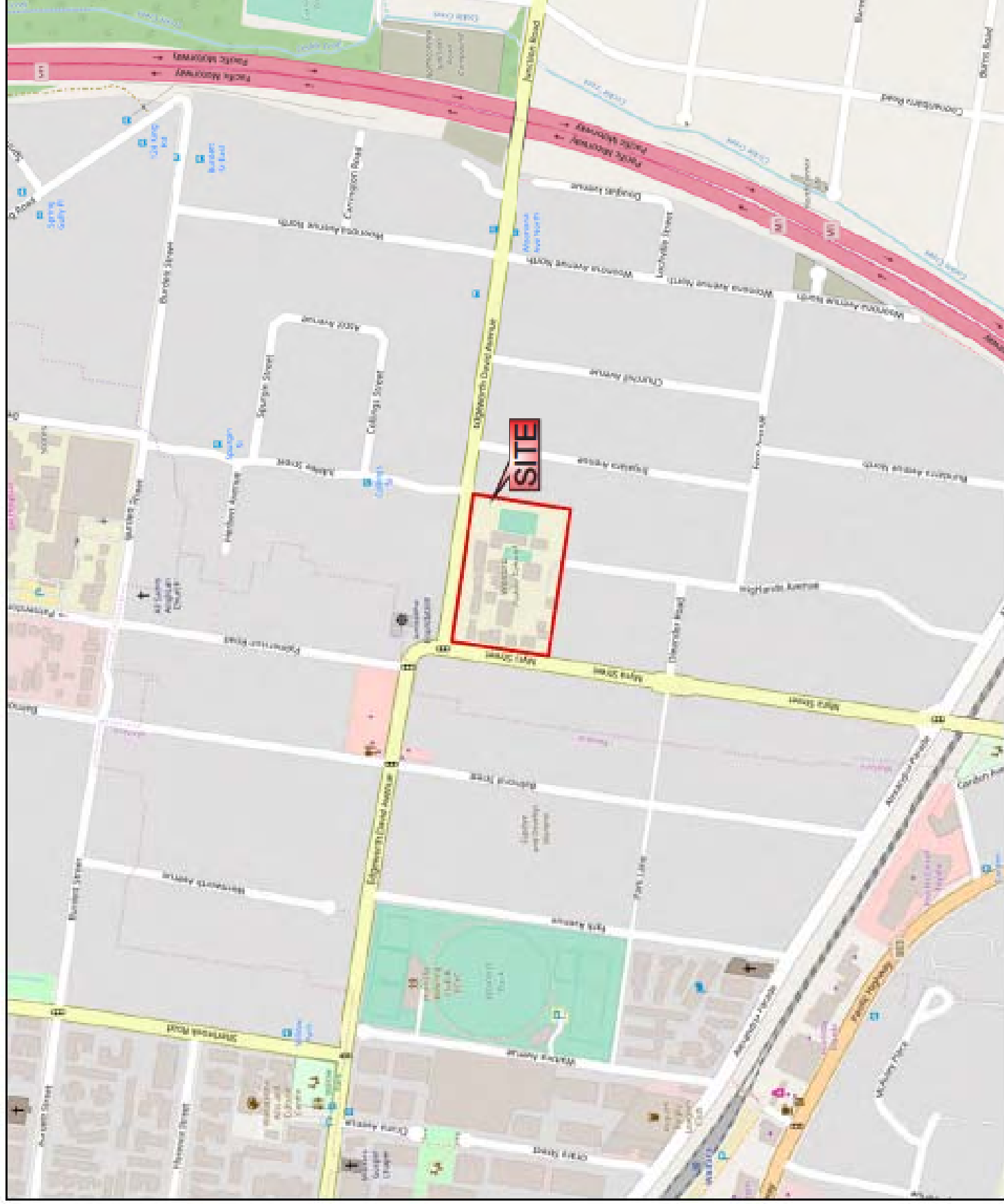


Coord. Sys: GDA 1984 MGA Zone 56

48-68 Myra Street
Wahroonga, NSW

SITE LOCATION

FIGURE 1



Approximate Site Boundary





Legend: Approximate Site Boundary Sample Location			
Job No: 201003		Client: Pella Sullivan Mayrlink	
Version: R01 Rev A		Date: 31-Aug-2017	
Drawn By: B/C		Checked By: 88	
Scale: 1:1000			
0 10 20 metres		Coord. Sys: GDA 1984 MGA Zone 56	
44-68 Myra Street Wahroonga, NSW		SAMPLE LOCATIONS	
		FIGURE 3	

Appendix A Summary Tables

[illegible]

Figure 1. The effect of the concentration of the *Agrobacterium* strain on the transformation efficiency of *Agrobacterium* strain 101. The concentration of the *Agrobacterium* strain 101 was varied from 10⁶ to 10⁹ cells/ml. The transformation efficiency was determined by the number of transformants per 10⁶ cells. The data are the mean $\pm$ SD of three independent experiments. The asterisk indicates a significant difference ($P < 0.05$) from the control.

Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The *Agrobacterium* strains were incubated in the presence of 100 mg/ml of gentamicin and 100 mg/ml of rifampicin. The concentration of the *Agrobacterium* suspension was 10⁶ cells/ml. The transformation efficiency was determined by the number of transformants per 10⁶ cells. The data are the mean ± SD of three independent experiments.



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Appendix B Photographic Log

PHOTOGRAPH 1: LOCATION OF BH01 IN THE CENTRAL NORTHERN PORTION OF THE SITE, FACING NORTH. PICTURED IS AN EXAMPLE OF TYPICAL ASPHALT SEALED SURFACES



PHOTOGRAPH 3: LOCATION OF BH05 IN THE NORTH WESTERN CORNER OF THE SITE, FACING EAST. PICTURED IS AN EXAMPLE OF CONCRETE AND RUBBER SEALED SURFACES



PHOTOGRAPH 2: LOCATION OF BH02 IN THE SOUTH EASTERN CORNER OF THE SITE, FACING WEST. PICTURED IS AN EXAMPLE OF GRASSED AND ARTIFICIAL TURF SURFACES



PHOTOGRAPH 4: LOCATION OF BH08 IN THE CENTRAL WESTERN PORTION OF THE SITE, FACING SOUTH WEST. PICTURED IS AN EXAMPLE OF SEALED CONCRETE AND EXPOSED SOIL SURFACES



Job No: 53053

Client: PSM

Version: R01 Rev A

Date: 29/03/17

Drawn By: S.G

Checked By: SB

Not to Scale

Coord: Sycmle

Waitara Public School

48-58 Myra Street,
Wahroonga, NSW

APPENDIX B

PHOTOGRAPH 6: TYPICAL FILL MATERIAL ENCOUNTERED AT THE SITE DURING INTRUSIVE SAMPLING



PHOTOGRAPH 6: TYPICAL FILL MATERIAL ENCOUNTERED AT THE SITE DURING INTRUSIVE SAMPLING



PHOTOGRAPH 7: TYPICAL NATURAL MATERIAL ENCOUNTERED DURING INTRUSIVE SAMPLING



PHOTOGRAPH 8: TYPICAL NATURAL MATERIAL ENCOUNTERED DURING INTRUSIVE SAMPLING



Job No: 53033

Client: PSM

Version: R01 Rev A

Date: 29/03/17

Drawn By: S.G.

Checked By: S.G.

Not to Scale

Coord: Symbio

Waitara Public School

48-58 Myra Street,
Wahroonga, NSW

APPENDIX B

Appendix C Borelogs



BH01

Project Number: 53033
Client: Pells Sullivan Meynink
Project Name: Waltara Public School
Site Address: 48-58 Myra Street, Wahroonga NSW

Date: 14/08/2017
Logged By: S.Gray
Contractor: BG Drilling
Total Hole Depth (mbsgs): 4
Bore Diameter (mm): 90

Eastings (GDA 84):
Northings (GDA 84):
Zone/Area:
Reference Level:
Elevation (m):

Method	Depth (mbsgs)	Contd (mbsgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				FILL	FILL - ASPHALT		
		0.10		FILL	FILL - Silty CLAY - Brown, heterogeneous, medium plasticity, damp, soft	BH01 0.1-0.2 PID = 0 ppm	No ACM, no odours, no staining
		0.20		CH-MH	Silty CLAY - Grey, homogeneous, high plasticity, damp, stiff, becomes darker grey with depth	BH01 0.2-0.3 PID = 0 ppm	No ACM, no odours, no staining
	0.5						
	1.0					BH01 0.9-1.0 PID = 0 ppm	No ACM, no odours, no staining
	1.5						
	2.0						
	2.5						
	3.0						
	3.5						
	4.0	3.80		SHALE	SHALE - Dark grey		
		4.00			Borehole BH01 terminated at 4m		



BH02

Project Number: 53033

Client: Pells Sullivan Meyrick

Project Name: Waitara Public School

Site Address: 48-58 Myra Street, Wairounga NSW

Date: 14/08/2017

Logged By: S.Gray

Contractor: BG Drilling

Total Hole Depth (mbsgs): 3.6

Bore Diameter (mm): 90

Eastings (GDA 84):

Northings (GDA 84):

Zone/Area:

Reference Level:

Elevation (m):

Method	Depth (mbsgs)	Corrad (mbsgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - Sandy Silty CLAY - Brown, heterogeneous, non-plastic, damp, soft	BH02 0.0-0.1 PID = 0 ppm	No ACM, no odours, no staining. QA/QC20170814-01
	0.20			CH-MH	Silty CLAY - Orange with red and grey mottles, homogeneous, high plasticity, damp, stiff, colour becomes lighter with depth	BH02 0.2-0.3 PID = 0 ppm	
	0.70			MH-CH	Clayey SILT - Grey with red mottles, high plasticity, damp, stiff		
	3.60				Borehole BH02 terminated at 3.6m		



BH03

Project Number: 53033

Client: Pells Sullivan Meyrick

Project Name: Waitara Public School

Site Address: 48-58 Myra Street, Wairounga NSW

Date: 14/08/2017

Logged By: S.Gray

Contractor: BG Drilling

Total Hole Depth (mbsg): 3.8

Bore Diameter (mm): 90

Eastings (GDA 84):

Northings (GDA 84):

Zone/Area:

Reference Level:

Elevation (m):

Method	Depth (mbsg)	Corral (mbsg)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - Sandy Silty CLAY - Brown, heterogeneous, low plasticity, dry, soft, with inclusions of a high concentration of organic matter and traces of plastic	BH03 0.0-0.1 PID = 0 ppm	No ACM, no odours, no staining
	0.25			CL-ML	Silty CLAY - Orange-brown with red and grey mottles, homogeneous, damp, stiff, becomes lighter with depth	BH03 0.3-0.4 PID = 0 ppm	No ACM, no odours, no staining
	1.00			ML-CL	Clayey SILT - Grey-brown, homogeneous, dry, firm		
	3.80				Borehole BH03 terminated at 3.8m		

Date: 14/08/2017

Logged By: S.Gray

Contractor: BG Drilling

Total Hole Depth (mbsgs): 3.5

Bore Diameter (mm): 90

Eastings (GDA 84):

Northings (GDA 84):

Zone/Area:

Reference Level:

Elevation (m):

Method	Depth (mbsgs)	Corral (mbsgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger		0.05		FI	FI - ASPHALT		
				FI	FI - Silty CLAY - Brown, heterogeneous, non-plastic, dry, very soft with traces of gravel	BH04 0.1-0.2 PID = 0 ppm	No ACM, no odours, no staining
		0.20		CL-ML	Silty CLAY - Orange-brown with red and grey mottles, homogeneous, dry, stiff	BH04 0.3-0.4 PID = 0 ppm	No ACM, no odours, no staining
	0.5						
		0.80		ML-CL	Clayey SILT - Gray with red mottles, homogeneous, low plasticity, damp, firm	BH04 0.8-0.9 PID = 0 ppm	No ACM, no odours, no staining
	1.0						
	1.5						
	2.0						
	2.5						
	3.0						
	3.5						
		3.50			Borehole BH04 terminated at 3.5m		
	4.0						



BH05

Project Number: 53033

Client: Pells Sullivan Meyrick

Project Name: Waitara Public School

Site Address: 48-58 Myra Street, Wairounga NSW

Date: 14/08/2017

Logged By: S.Gray

Contractor: BG Drilling

Total Hole Depth (mbsg): 2.8

Bore Diameter (mm): 90

Eastings (GDA 84):

Northings (GDA 84):

Zone/Area:

Reference Level:

Elevation (m):

Method	Depth (mbsg)	Corral (mbsg)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				Fill	Fill - Silty CLAY - Brown, heterogeneous, non-plastic, dry, soft, with trace inclusions of plastic and sand	BH05 0.0-0.1 PID = 0 ppm	No ACM, no odours, no staining
	0.20			CL-ML	Silty CLAY - Orange with red and grey mottles, homogeneous, low-plasticity, damp, stiff	BH05 0.1-0.3 PID = 0 ppm	
	0.50			CL-ML	Silty CLAY - Grey with red mottles, homogeneous, low plasticity, damp, stiff		
	1.0					BH05 0.8-0.9 PID = 0 ppm	
	2.0			ML-CL	Clayey SILT - Grey with red mottle, low plasticity, damp, firm		
	2.80				Borehole BH05 terminated at 2.8m		



BH06

Project Number: 53033

Client: Pells Sullivan Meynink

Project Name: Waltara Public School

Site Address: 48-58 Myra Street, Wahroonga NSW

Date: 14/08/2017

Logged By: S.Gray

Contractor: BG Drilling

Total Hole Depth (mbsgs): 2.9

Bore Diameter (mm): 90

Eastings (GDA 84):

Northings (GDA 84):

Zone/Area:

Reference Level:

Elevation (m):

Method	Depth (mbsgs)	Contd (mbsgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger	0.05 0.10			Fill	Fill - Silty CLAY - Brown, heterogeneous, non-plastic, dry, soft, with trace inclusions of plastic	BH06 0.0-0.1 PID = 0 ppm	No ACM, no odours, no staining
				CL-ML	Fill - Silty CLAY - Grey with red mottles, heterogeneous, low plasticity, damp, very stiff Silty CLAY - Grey, heterogeneous, low plasticity, dry, very stiff	BH06 0.2-0.3 PID = 0 ppm	
	0.5						
	1.0						
	1.5						
	2.0						
	2.5						
	3.0	2.90			Borehole BH06 terminated at 2.9m		
	3.5						
	4.0						



BH07

Project Number: 53033

Client: Pells Sullivan Meyrick

Project Name: Waitara Public School

Site Address: 48-58 Myra Street, Wairounga NSW

Date: 14/08/2017

Logged By: S.Gray

Contractor: BG Drilling

Total Hole Depth (mbsgs): 3

Bore Diameter (mm): 90

Eastings (GDA 84):

Northings (GDA 84):

Zone/Area:

Reference Level:

Elevation (m):

Method	Depth (mbsgs)	Correlat (mbsgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger		0.05		FI	FI - ASPHALT	BH07 0.1-0.2 PID = 0 ppm	No ACM, no odours, no staining
				FI	FI - Silty CLAY - Brown, heterogeneous, non-plastic, dry, soft		
		0.15		CH-MH	Silty CLAY - Orange-brown with red and grey mottles, homogeneous, high plasticity, damp, stiff	BH07 0.2-0.3 PID = 0 ppm	
		0.30		CL-MH	Silty CLAY - Grey with red mottles, homogeneous, low plasticity, damp, stiff	BH07 0.4-0.5 PID = 0 ppm	
	0.5						
	1.0						
	1.5						
	2.0						
	2.5						
	3.0						
	3.5						
	4.0						
		3.00			Borehole BH07 terminated at 3m		



BH08

Project Number: 53033

Client: Pells Sullivan Meynink

Project Name: Waitara Public School

Site Address: 48-58 Myra Street, Wahroonga NSW

Date: 14/08/2017

Logged By: S.Gray

Contractor: BG Drilling

Total Hole Depth (mbsgs): 2.6

Bore Diameter (mm): 90

Eastings (GDA 84):

Northings (GDA 84):

Zone/Area:

Reference Level:

Elevation (m):

Method	Depth (mbsgs)	Correlat (mbsgs)	Graphic Log	Lithological Class	Lithological Description	Samples Tests Remarks	Additional Observations
Solid Flight Auger				FI	FI - CONCRETE		
		0.10		FI	FI - Sandy Silty CLAY - brown, heterogeneous, non-plastic, wet, with inclusions of gravel and plastic	BH08 0.1-0.2 PID = 0 ppm	No ACM, no odours, no staining
		0.20		CL-ML	Silty CLAY - Orange-brown with red and grey mottles, homogeneous, low plasticity, damp, firm		
		0.40		CL-ML	Silty CLAY - Grey with red and orange mottles, homogeneous, low plasticity, firm	BH08 0.3-0.4 PID = 0 ppm	No ACM, no odours, no staining
	0.5						
	1.0						
	1.5						
	2.0						
	2.5						
	2.60				Borehole BH08 terminated at 2.6m		
	3.0						
	3.5						
	4.0						

Appendix D Historical Aerial Photographs

Legend:

Approximate Investigation Area (A
DP309739)

JBS&G

Job No: 53033

Client: Pells Sullivan Meynink

Version: Aerials

Date: 30-Aug-2017

Drawn By: BC

Checked By: SB

Scale 1:1,500

01020

metres

Coor. Sys. GDA 1994 MGA Zone 56

48-58 Myra Street
Wahroonga, NSW

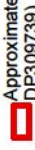
HISTORICAL AERIAL
PHOTOGRAPH 1943

FIGURE 1943

File Name: 53033_1943
Reference: Six Maps Imagery - 1943

Legend:

Approximate Investigation Area (A
DP309739)



Job No: 53033

Client: Pells Sullivan Meynink

Version: Aerials

Date: 30-Aug-2017

Drawn By: BC

Checked By: SB

Scale 1:1,500



0 10 20



metres

Coor. Sys. GDA 1994 MGA Zone 56

48-58 Myra Street
Wahroonga, NSW

HISTORICAL AERIAL
PHOTOGRAPH 1951

FIGURE 1951



Legend:

Approximate Investigation Area (A
DP309739)



Job No: 53033

Client: Pells Sullivan Meynink

Version: Aerials Date: 30-Aug-2017

Drawn By: BC Checked By: SB

Scale 1:1,500



0 10 20
metres

Coor. Sys. GDA 1994 MGA Zone 56

48-58 Myra Street
Wahroonga, NSW

HISTORICAL AERIAL
PHOTOGRAPH 1961

FIGURE 1961



Legend:

Approximate Investigation Area (A
DP309739)



Job No: 53033

Client: Pells Sullivan Meynink

Version: Aerials Date: 30-Aug-2017

Drawn By: BC Checked By: SB

Scale 1:1,500



0 10 20
metres

Coor. Sys. GDA 1994 MGA Zone 56

48-58 Myra Street
Wahroonga, NSW

HISTORICAL AERIAL
PHOTOGRAPH 1970

FIGURE 1970



Legend:

Approximate Investigation Area (A
DP309739)



Job No: 53033

Client: Pells Sullivan Meynink

Version: Aerials

Date: 30-Aug-2017

Drawn By: BC

Checked By: SB

Scale 1:1,500



0 10 20
metres

Coor. Sys. GDA 1994 MGA Zone 56

48-58 Myra Street
Wahroonga, NSW

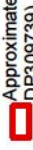
HISTORICAL AERIAL
PHOTOGRAPH 1982

FIGURE 1982



Legend:

Approximate Investigation Area (A
DP309739)



Job No: 53033

Client: Pells Sullivan Meynink

Version: Aerials

Date: 30-Aug-2017

Drawn By: BC

Checked By: SB

Scale 1:1,500



0 10 20



metres

Coor. Sys. GDA 1994 MGA Zone 56

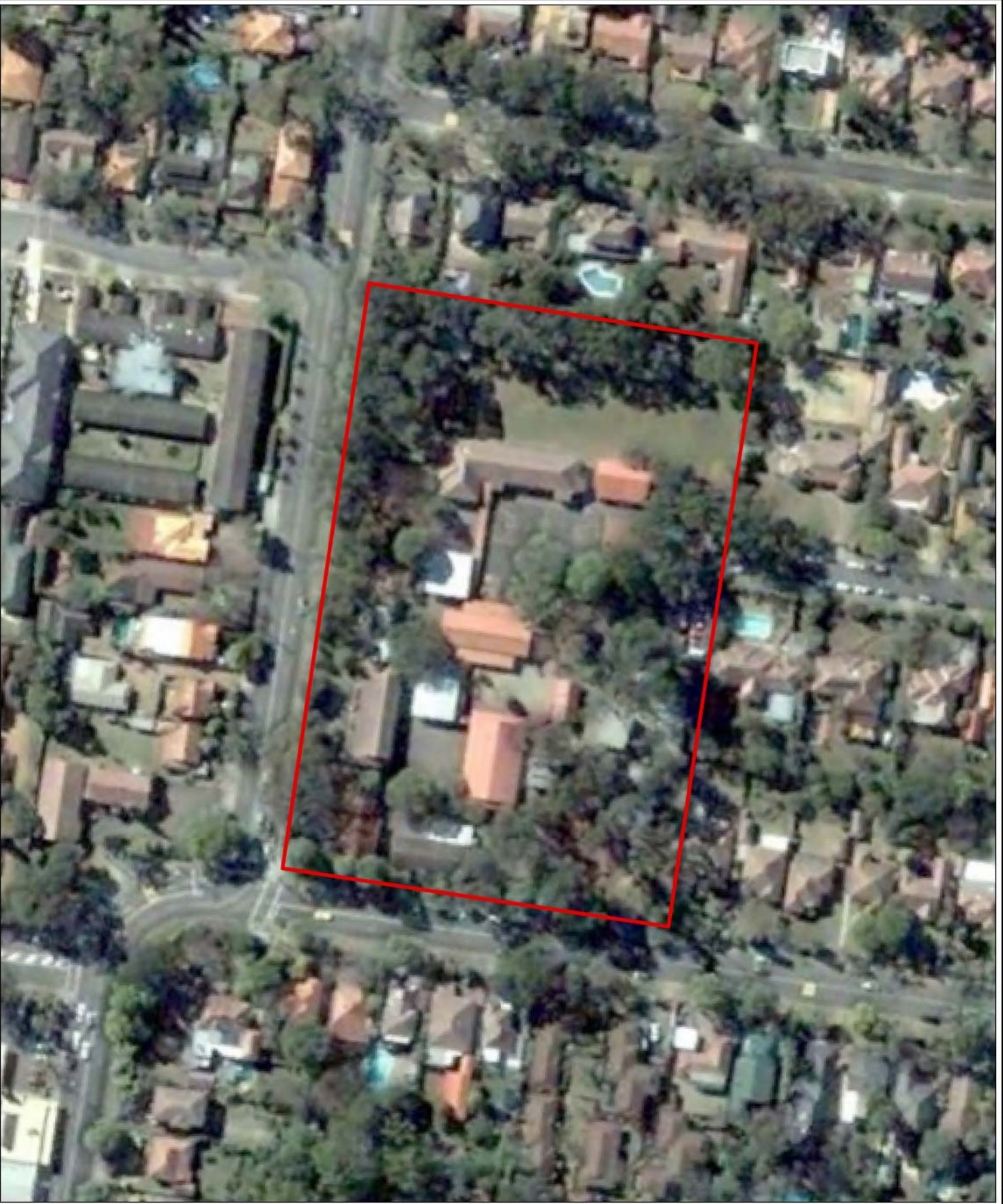
48-58 Myra Street
Wahroonga, NSW

HISTORICAL AERIAL
PHOTOGRAPH 1991

FIGURE 1991



Legend:  Approximate Investigation Area (A DP309739)			
Job No: 53033		Client: Pells Sullivan Meynink	
Version: Aerials		Date: 30-Aug-2017	
Drawn By: BC		Checked By: SB	
Scale: 1:1,500			
0 10 20  metres		Coor. Sys: GDA 1994 MGA Zone 56	
48-58 Myra Street Wahroonga, NSW		HISTORICAL AERIAL PHOTOGRAPH 2003	
		FIGURE 2003	



Legend:

Approximate Investigation Area (A
DP309739)



Job No: 53033

Client: Pells Sullivan Meynink

Version: Aerials

Date: 30-Aug-2017

Drawn By: BC

Checked By: SB

Scale 1:1,500



0 10 20
metres

Coor. Sys. GDA 1994 MGA Zone 56

48-58 Myra Street
Wahroonga, NSW

HISTORICAL AERIAL
PHOTOGRAPH 2009

FIGURE 2009





Legend:
Approximate Investigation Area (A
DP309739)



Job No: 53033

Client: Pells Sullivan Meynink

Version: Aerials

Date: 30-Aug-2017

Drawn By: BC

Checked By: SB

Scale 1:1,500



0 10 20
metres

Coor. Sys. GDA 1994 MGA Zone 56

48-58 Myra Street
Wahroonga, NSW

AERIAL
PHOTOGRAPH 2017

FIGURE 2017

Appendix E Land Titles

ABN: 42 166 543 255
Ph: 02 9099 7400
Fax: 02 9232 7141

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

Summary of Owners Report

LPI

Sydney

Address: 48 – 58 Myra Street, Wahroonga

Description: Lot A D.P. 309739

<u>Date of Acquisition and term held</u>	<u>Registered Proprietor(s) & Occupations where available</u>	<u>Reference to Title at Acquisition and sale</u>
18.07.1894 (1894 to 1924)	Caroline Hordern (Married Woman)	Vol 1134 Fol 93
19.06.1924 (1924 to Date)	# His Most Gracious Majesty King George the Fifth (For the Purposes of the Public Instruction Act of 1880) Now # Minister of Education	Vol 1134 Fol 93 Now A/309739

Denotes Current Registered Proprietor

Easements & Leases: -NIL

Note: D.P. 1207229 – Proposed Easement

Yours Sincerely
James McDonnell
9 August 2017

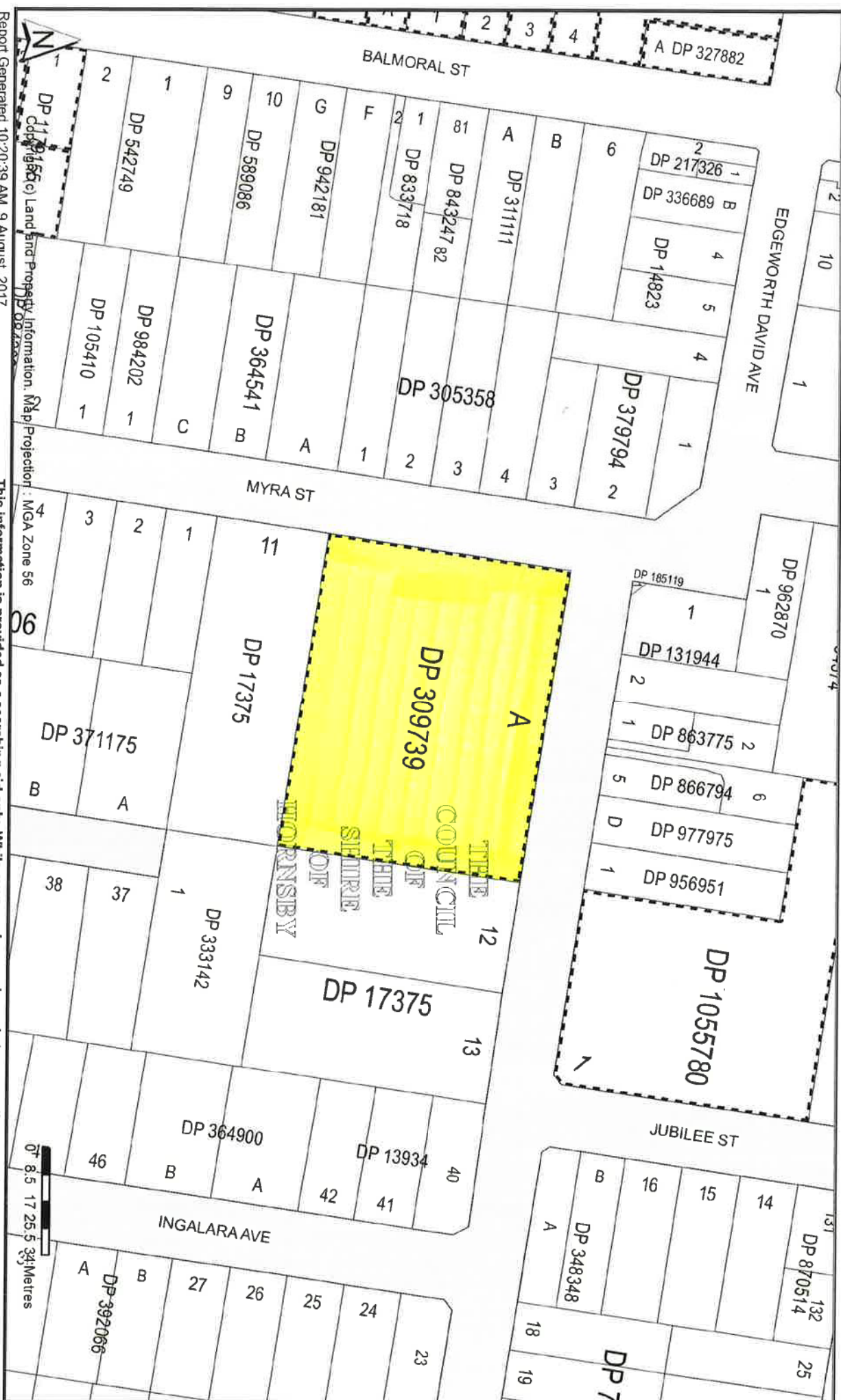
Cadastral Records Enquiry Report

Requested Parcel : Lot A DP 309739

LGA: HORNSBY

Parish : SOUTH COLAH

County : CUMBERLAND



Report Generated 10:20:39 AM, 9 August, 2017
Copyright © Land and Property Information ABN: 23 519 493 925

This information is provided as a searching aid only. While every endeavour is made to ensure the current cadastral pattern is accurately reflected, the Registrar General cannot guarantee the information provided.

For all ACTIVITY PRIOR to SEPT 2002 you must refer to the RGS Charting and Reference Maps.

Cadastral Records Enquiry Report

Requested Parcel : Lot A DP 309739

Identified Parcel : Lot A DP 309739

Locality : WAHROONGA

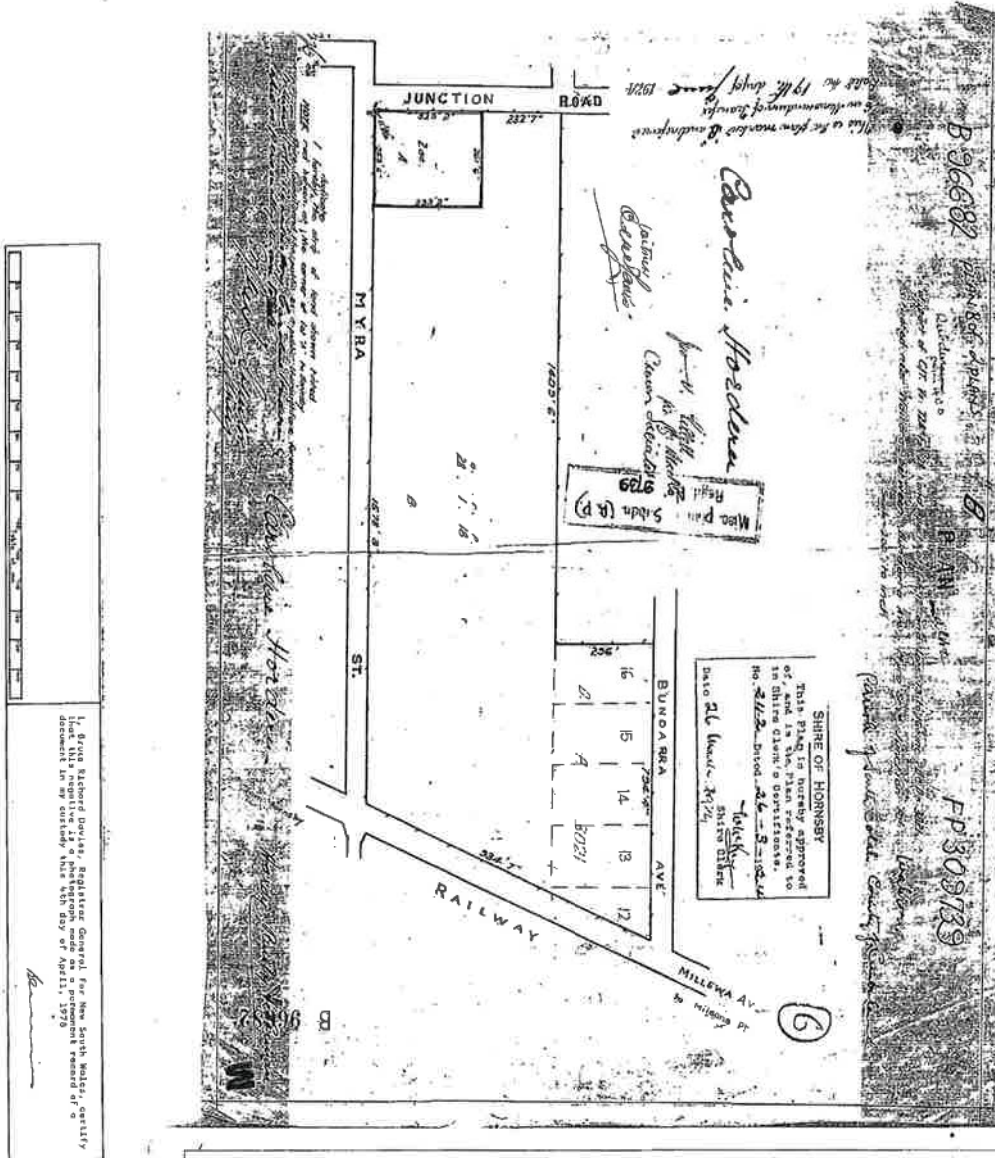
LGA : HORNSBY

Parish : SOUTH COLAH

County : CUMBERLAND

	Status	Surv/Comp	Purpose
DP309739 Lot(s): A			
 DP1207229	REGISTERED	SURVEY	EASEMENT
DP327882 Lot(s): A			
 DP1223259	REGISTERED	COMPILATION	EASEMENT
DP363698 Lot(s): A, B			
 DP1210895	REGISTERED	COMPILATION	EASEMENT
DP370816 Lot(s): 2, 3, 4			
 DP1234454	UNREGISTERED	SURVEY	CONSOLIDATION
Lot(s): 1, 2, 3, 4			
 DP1210895	REGISTERED	COMPILATION	EASEMENT
DP1055780 Lot(s): 1			
 DP590729	HISTORICAL	COMPILATION	CONSOLIDATION
 DP977975	HISTORICAL	COMPILATION	UNRESEARCHED
DP1064660 Lot(s): 30			
 DP364173	HISTORICAL	COMPILATION	UNRESEARCHED
 DP1004656	REGISTERED	SURVEY	SUBDIVISION
DP1147409 Lot(s): 2			
 CA153616 - LOT 2 DP1147409			
DP1179155 Lot(s): 1, 2			
 DP388844	HISTORICAL	SURVEY	UNRESEARCHED
SP90375			
 DP129733	HISTORICAL	COMPILATION	DEPARTMENTAL
 DP327882	HISTORICAL	SURVEY	UNRESEARCHED
 DP1202599	REGISTERED	SURVEY	CONSOLIDATION
 DP1223259	REGISTERED	COMPILATION	EASEMENT

Caution: For all **ACTIVITY PRIOR to SEPT 2002** you must refer to the RGs Charting and Reference Maps.



I, GUY RICHARD JONES, Registrar General for New South Wales, certify that this is a true and correct copy of the original plan as a permanent record of a document in my custody this 15th day of April, 1979.

CONVERSION TABLE FOR SEPARATION OF LOTS			
FEET INCHES	NETRES	AC NO P	HA
0	0	0	0
1 3/4	2.448	0	0
2 3/4	2.448	0	0
3 3/4	2.448	0	0
4 3/4	2.448	0	0
5 3/4	2.448	0	0
6 3/4	2.448	0	0
7 3/4	2.448	0	0
8 3/4	2.448	0	0
9 3/4	2.448	0	0
10 3/4	2.448	0	0
11 3/4	2.448	0	0
12 3/4	2.448	0	0
13 3/4	2.448	0	0
14 3/4	2.448	0	0
15 3/4	2.448	0	0
16 3/4	2.448	0	0
17 3/4	2.448	0	0
18 3/4	2.448	0	0
19 3/4	2.448	0	0
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31 3/4	2.448	0	0
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36 3/4	2.448	0	0
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64 3/4	2.448	0	0
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69 3/4	2.448	0	0
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71 3/4	2.448	0	0
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96 3/4	2.448	0	0
97 3/4	2.448	0	0
98 3/4	2.448	0	0
99 3/4	2.448	0	0
100 3/4	2.448	0	0

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE

7/8/2017 1:05PM

FOLIO: A/309739

First Title(s): SEE PRIOR TITLE(S)

Prior Title(s): VOL 3621 FOL 154

Recorded -----	Number -----	Type of Instrument -----	C.T. Issue -----
2/9/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
28/6/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
28/11/1994	U791955	DEPARTMENTAL DEALING	EDITION 1
14/4/2015	DP1207229	DEPOSITED PLAN	

*** END OF SEARCH ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: A/309739

SEARCH DATE	TIME	EDITION NO	DATE
7/8/2017	1:07 PM	1	28/11/1994

LAND

LOT A IN DEPOSITED PLAN 309739
AT WAITARA
LOCAL GOVERNMENT AREA HORNSBY
PARISH OF SOUTH COLAH COUNTY OF CUMBERLAND
TITLE DIAGRAM DP309739

FIRST SCHEDULE

MINISTER FOR EDUCATION

(DD U791955)

SECOND SCHEDULE (1 NOTIFICATION)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)

NOTATIONS

NOTE: THE CERTIFICATE OF TITLE FOR THIS FOLIO OF THE REGISTER DOES
NOT INCLUDE SECURITY FEATURES INCLUDED ON COMPUTERISED
CERTIFICATES OF TITLE ISSUED FROM 4TH JANUARY, 2004. IT IS
RECOMMENDED THAT STRINGENT PROCESSES ARE ADOPTED IN VERIFYING THE
IDENTITY OF THE PERSON(S) CLAIMING A RIGHT TO DEAL WITH THE LAND
COMPRISED IN THIS FOLIO.

DP1207229 NOTE: PLAN OF PROPOSED EASEMENT

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Appendix F EPA Records

Your search for: **General Search** with the following criteria

Suburb - wahroonga

returned 5 results

[Export to excel](#)

1 of 1 Pages

[Search Again](#)

Number	Name	Location	Type	Status	Issued date
6546	ADVENTIST HEALTHCARE LIMITED	185 FOX VALLEY ROAD, WAHROONGA, NSW 2076	POEO licence	No longer in force	14 Apr 2000
1044478	ADVENTIST HEALTHCARE LIMITED	185 FOX VALLEY ROAD, WAHROONGA, NSW 2076	s.58 Licence Variation	Issued	14 Feb 2005
1047037	ADVENTIST HEALTHCARE LIMITED	185 FOX VALLEY ROAD, WAHROONGA, NSW 2076	s.58 Licence Variation	Issued	27 Apr 2005
20570	LENDLEASE ENGINEERING PTY LIMITED	BETWEEN WINDSOR ROAD, BAULKHAM HILLS and M2 MOTORWAY, PENNANT HILLS AND M1 MOTORWAY., WAHROONGA, NSW 2076	POEO licence	Issued	03 Jun 2015
1535081	LENDLEASE ENGINEERING PTY LIMITED	BETWEEN WINDSOR ROAD, BAULKHAM HILLS and M2 MOTORWAY, PENNANT HILLS AND M1 MOTORWAY., WAHROONGA, NSW 2076	s.58 Licence Variation	Issued	14 Dec 2015

17 August 2017

List current as of 10 August 2017.

Suburb/City	Site description and address	Activity that caused contamination	EPA site management class see explanations
WAGGA WAGGA	Former Wiradjuri landfill Narrung STREET	Landfill	Under assessment
WAHROONGA	7-Eleven Service Station 1579 Pacific HIGHWAY	Service Station	Under assessment
WAHROONGA	Coles Express Wahroonga 1601 Pacific HIGHWAY	Service Station	Regulation under CLM Act not required
WAITARA	Caltex Service Station 59-61 Pacific HIGHWAY	Service Station	Regulation under CLM Act not required
WALGETT	Former Shell Depot Castlereagh HIGHWAY	Other Petroleum	Regulation under CLM Act not required

Search results

Your search for: LGA: Hornsby Shire Council

Matched 10 notices relating to 2 sites.

[Search Again](#)

[Refine Search](#)

Suburb	Address	Site Name	Notices related to this site
HORNSBY	194- 206 Pacific HIGHWAY	Coles Express Hornsby	4 current and 3 former
PENNANT HILLS	386 Pennant Hills ROAD	Shell Coles Express Pennant Hills West	3 current

Page 1 of 1

17 August 2017

Appendix G Section 149 (2) and (5) Certificate



Online Services Portal
Public User
Hornsby Shire Council

PLANNING CERTIFICATE UNDER SECTION 149 (2)
ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 AS AMENDED

Certificate Number: C1719117
Reference: 53033:66245
Issue Date: 31 July 2017
Receipt No.: 6097759
Fee Paid: \$133.00

ADDRESS: No. Waitara Public Sch, 48-58 Myra Street, WAHROONGA NSW
2076
DESCRIPTION: Lot 11 DP 17375, Lot 13 DP 17375, Lot 12 DP 17375, Lot A DP
309739, Lot 1 DP 333142

The land is zoned: R2 Low Density Residential

The information contained in this certificate needs to be read in conjunction with the provisions of the Environmental Planning and Assessment Regulation 2000.

**THIS CERTIFICATE IS DIRECTED TO THE FOLLOWING MATTERS
PRESCRIBED UNDER SECTION 149 (2) OF THE ABOVE ACT.**

1. Names of relevant planning instruments and DCPs

- (1) The name of each environmental planning instrument that applies to the carrying out of development on the land.

(A) Local Environmental Plans

The Hornsby Local Environmental Plan (HLEP) 2013, as amended, applies to all land in the Shire unless otherwise stated in this certificate.

Refer to Council's website www.hornsby.nsw.gov.au/hlep to view the HLEP.

State Environmental Planning Policies

SEPP No. 1 - Development Standards
 SEPP No. 19 - Bushland in Urban Areas
 SEPP No. 21 - Caravan Parks
 SEPP No. 30 - Intensive Agriculture
 SEPP No. 33 - Hazardous and Offensive Development
 SEPP No. 44 - Koala Habitat Protection
 SEPP No. 50 - Canal Estate Development
 SEPP No. 55 - Remediation of Land
 SEPP No. 62 – Sustainable Aquaculture
 SEPP No. 64 – Advertising and Signage
 SEPP No. 65 – Design Quality of Residential Apartment Development
 SEPP No. 70 – Affordable Housing (Revised Schemes)
 SEPP No. 71 – Coastal Protection
 SEPP (Building Sustainability Index: BASIX) 2004
 SEPP (Housing for Seniors or People with a Disability) 2004
 SEPP (State Significant Precincts) 2005
 SEPP (Mining, Petroleum Production and Extractive Industries) 2007
 SEPP (Miscellaneous Consent Provisions) 2007
 SEPP (Infrastructure) 2007
 SEPP (Exempt and Complying Development Codes) 2008
 SEPP (Affordable Rental Housing) 2009
 SEPP (State and Regional Development) 2011

Deemed State Environmental Planning Policies

SREP No. 20 - Hawkesbury-Nepean River (No. 2 - 1997).

- (2) The name of each **proposed environmental planning instrument** that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act (unless the Secretary has notified the

council that the making of the proposed instrument has been deferred indefinitely or has not been approved).

(A) **Proposed Local Environmental Plans**

YES

Council has re-exhibited a *Housekeeping Planning Proposal* that seeks to amend the *HLEP 2013* to resolve some of the identified issues raised during the exhibition period which were outside the scope of a translation. The *Planning Proposal* also seeks to rectify a number of anomalies and mapping issues that have been identified since the Plan came into force in October 2013. At its meeting on 13 July 2016, Council resolved to endorse the Planning Proposal and forward it to the Department of Planning and Environment for its making.

(B) **Proposed State Environmental Planning Policies**

YES

Draft *State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017 (draft SEPP)* applies to the land. The *draft SEPP* provides controls for child care facilities, schools, universities and TAFEs. It consolidates national and state requirements for child care facilities, and expands exempt and complying development provisions for schools and tertiary institutions. The *draft SEPP* can be viewed on the Department of Planning and Environment's website.

YES

Draft *State Environmental Planning Policy (Vegetation) 2017 (Vegetation SEPP)* has been exhibited. The *Vegetation SEPP* is proposed to safeguard native vegetation in by providing a consistent approach to land clearing in NSW. The *Vegetation SEPP* will also ensure the biodiversity offset scheme will apply to all clearing of native vegetation that exceeds the offset thresholds and does not require development consent. Further information on the *Vegetation SEPP* can be obtained by viewing the proposal <http://planspolicies.planning.nsw.gov.au>

- (3) The name of each development control plan that applies to the carrying out of development on the land.

Hornsby Development Control Plan (HDCP) 2013

Refer to Council's website www.hornsby.nsw.gov.au/hdcp to view the HDCP.

- (4) In this clause, proposed environmental planning instrument includes a planning proposal for a LEP or a draft environmental planning instrument.

2. Zoning of land use under relevant LEPs

For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP).

- (A) The HLEP 2013 applies to the land unless otherwise stated in this certificate and identifies the land to be:

R2 Low Density Residential

- (B) The purpose for which the instrument provides that development may be carried out within the zone without the need for development consent:

Refer to Attachment

Note: Also refer to the applicable SEPP instrument for provisions regarding Development without Consent and Exempt Development

- (C) The purposes for which the instrument provides that development may not be carried out within the zone except the development consent:

Refer to Attachment

Note: Also refer to the applicable SEPP instrument for provisions regarding Development with Consent.

- (D) The purposes for which the instrument provides that development is prohibited within the zone:

Refer to Attachment

- (E) Whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed?

NO

- (F) Whether the land includes or comprises critical habitat?

NO

- (G) Whether the land is in a conservation area (however described)?

YES

- (H) Whether an item of environmental heritage (however described) is situated on the land?

YES

- 2A. Zoning and land use under State Environmental Planning Policy (Sydney Region Growth Centres) 2006**

To the extent that the land is within any zone (however described) under:

- (a) Part 3 of the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006 and (the 2006 SEPP)*, or
- (b) a Precinct Plan (within the meaning of the 2006 SEPP), or
- (c) a proposed Precinct Plan that is or has been the subject of community consultation or on public exhibition under the ACT.

NO

3. Complying Development

Whether or not the land is land on which complying development may be carried out under each of the codes for complying development because of the provisions of clauses 1.17A(1)(c) to (e), (2), (3) and (4), 1.18(1)(c3) and 1.19 of *State Environmental Planning Policy (Exempt and Complying Developments Code) 2008*. If complying development may not be carried out on that land because of the provisions of clauses 1.17A(c) and (d) and 1.19 of that policy, the reasons why it may not be carried out under that clause.

General Housing Code and Rural Housing Code

Complying Development under the General Housing Code or Rural Housing Code **may not** be carried out on the land. The land is affected by specific land exemptions.

Note. Any specific land exemptions listed apply to all or part of the land. Complying development that is located on a part of the land that does not comprise the land that forms a specific land exemption may be carried out on that part of the land. The land that does not satisfy the various land based requirements under Clauses 1.17A, 1.18 and 1.19 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* are shown coloured red in Council's web-based Mapping Application by ticking the "Code SEPP-Non Complying Land/General and Rural Housing" map layers. The Mapping Application can be accessed on desktop computers, tablets or mobile phones by clicking on the relevant link on Council's HLEP webpage www.hornsby.nsw.gov.au/hlep

- All or part of the land is within a heritage conservation area. Complying development that is only the erection of a detached outbuilding and construction of a swimming pool **may** be carried out on the land, if the heritage conservation area is the only specific land exemption. (Clause 1.19).
- All or part of the land is an item that is listed under Schedule 5 Environmental Heritage of the *HLEP*. Complying development that is located on a part of the land that does not comprise the land that is listed under Schedule 5 Environmental Heritage of the *HLEP* may be carried out on that part of the land, if the heritage item is the only specific land exemption. (Clause 1.17A)

Commercial and Industrial (New Buildings and Additions) Code

Complying Development under the Commercial and Industrial (New Buildings and Additions) Code **may not** be carried out on the land. The land is affected by specific land exemptions.

Note. Any specific land exemptions listed apply to all or part of the land. Complying development that is located on a part of the land that does not comprise the land that forms a specific land exemption may be carried out on that part of the land. The land that does not satisfy the various land based requirements under Clauses 1.17A, 1.18 and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 are shown coloured orange in Council's web-based Mapping Application by ticking the "Code SEPP-Non Complying Land/Commercial and Industrial" map layers. The Mapping Application can be accessed on desktop computers, tablets or mobile phones by clicking on the relevant link on Council's HLEP webpage www.hornsby.nsw.gov.au/hlep

- All or part of the land is within a heritage conservation area. Complying development that is only the erection of a detached outbuilding and construction of a swimming pool **may** be carried out on the land, if the heritage conservation area is the only specific land exemption. (Clause 1.19).
- All or part of the land is an item that is listed under Schedule 5 Environmental Heritage of the *HLEP*. Complying development that is located on a part of the land that does not comprise the land that is listed under Schedule 5 Environmental Heritage of the *HLEP* may be carried out on that part of the land, if the heritage item is the only specific land exemption. (Clause 1.17A)

Housing Alterations, General Development, Commercial and Industrial Alterations, Container Recycling Facilities, Subdivisions, Demolition and Fire Safety Codes (Other Codes)

Complying Development under the Housing Alterations Code, General Development Code, Commercial and Industrial Alterations Code, Container Recycling Facilities, Subdivisions Code, Demolition Code or Fire Safety Code **may not** be carried out on the land. The land is affected by specific land exemptions.

Note. Any specific land exemptions listed apply to all or part of the land. Complying development that is located on a part of the land that does not comprise the land that forms a specific land exemption may be carried out on that part of the land. The land that does not satisfy the various land based requirements under Clauses 1.17A, 1.18 and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 are shown coloured purple in Council's web-based Mapping Application by ticking the "Code SEPP-Non Complying Land/Codes Other" map layers. The Mapping Application can be accessed on desktop computers, tablets or mobile phones by clicking on the relevant link on Council's HLEP webpage www.hornsby.nsw.gov.au/hlep

- All or part of the land is an item that is listed under Schedule 5 Environmental Heritage of the *HLEP*. Complying development that is located on a part of the land that does not comprise the land that is listed under Schedule 5 Environmental Heritage of the *HLEP* may be carried out on that part of the land, if the heritage item is the only specific land exemption. (Clause 1.17A)

4.

Coastal Protection

Whether or not the land is affected by the operation of Section 38 or 39 of the Coastal Protection Act 1979, but only to the extent that the council has been so notified by the Department of Services, Technology and Administration.

NO

4A. Certain information relating to beaches and coasts

- (1) In relation to a coastal council – whether an order has been made under Part 4D of the Coastal Protection Act 1979 in relation to temporary coastal protection works (within the meaning of the Act) on the land (or on public land adjacent to that land), except where the council is satisfied that such an order has been fully complied with.

NO

- (2) In relation to a coastal council:

(a) whether the council has been notified under Section 55X of the Coastal Protection Act 1979, that temporary coastal protection works (within the meaning of that Act) have been placed on the land (or on public land adjacent to that land), and

(b) if works have been so placed – whether the council is satisfied that the works have been removed and the land restored in accordance with that Act.

NO

4B. Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works

Whether the owner (or previous owner) of the land has been consented in writing to the land being subject to annual charges under Section 496B of the Local Government Act 1993 for coastal protection services that relate to existing coastal protection works (within the meaning of Section 553B of that Act).

NO

Note: “Existing coastal protection works” are works to reduce the impact of coastal hazards on land (such as seawalls, revetments, groynes and beach nourishment) that existed before the commencement of Section 553B of the Local Government Act 1993.

5. Mine subsidence

Whether or not the land is proclaimed to be a mine subsidence district within the meaning of section 15 of the Mine Subsidence Compensation Act 1961?

NO

6. Road widening and road realignment

Whether or not the land is affected by any road widening or road alignment under –

- (A) Division 2 of Part 3 of the Roads Act 1993; or

NO

- (B) any environmental planning instrument; or

NO

- (C) any resolution of council?

NO

7. Council and other public authority policies on hazard risk restrictions

Whether or not the land is affected by a policy:

- (a) adopted by council, or
- (b) 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 because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulfate soils or any other risk (other than flooding)?

Council's and other public authorities' policies on hazard risk restrictions are as follows:

- (A) **Landslip**

NO

- (B) **Bushfire**

NO

- (C) **Tidal inundation**

NO

- (D) **Subsidence**

NO

- (E) **Acid Sulfate Soils**

NO

- (F) **Land contamination**

NO

Council's electronic property records do not identify the land to be contaminated, being contaminated, as having been remediated or being remediated. Notwithstanding, consideration of Council's policy and the application of provisions under relevant State legislation may still be warranted if upon further evaluation the land is found to be contaminated or potentially contaminated.

Section 1.C.3.4 Land Contamination of the *Hornsby DCP 2013* contains provisions that restrict the development of land affected by contamination or that is potentially contaminated. Specifically, the provisions may require preliminary contamination assessments, detailed investigations, remedial action plans, validation reports and site audit statements to be undertaken pursuant to *SEPP No. 55 Remediation of Land* before a site is suitable for certain development.

Hornsby DCP 2013 can be viewed on Council's website hornsby.nsw.gov.au/hdcp or at Council's Administration Building or Libraries.

Notes: Council undertakes a thorough review of all relevant records (including hard copy property files) for land within zones with a higher propensity for potentially contaminating land uses (i.e. non-residential zoned land) to identify previously approved land uses which have the potential to cause contamination in accordance with the *Managing Land Contamination - Planning Guidelines*. The result of this review is provided on Certificates issued under Section 149(5) of the *EP&A Act 1979*.

If you have any queries regarding a landowner's obligations in relation to contamination issues, it is recommended that you seek your own independent professional advice.

- (G) **Any other risk**

NO**7A. Flood related development controls information**

- (1) Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls?

NO

- (2) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls?

NO

- (3) Word and expressions in this clause have the same meaning as in the instrument set out in the Schedule to the *Standard Instrument (Local Environmental Plans) Order 2006*.

8. Land reserved for acquisition

Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Act.

(A) **State Environmental Planning Policy?**

NO

(B) **Hornsby Local Environmental Plan 2013?**

NO

(C) **Planning Proposal?**

NO

9. Contribution plans

The name of each contribution plan applying to the land:

Hornsby Section 94 Development Contributions Plan 2014 – 2024
Hornsby Section 94A Development Contributions Plan 2014 – 2024

9A. Biodiversity Certified land

Whether the land is biodiversity certified land under Part 7AA of the Threatened Species Conservation Act 1995?

NO

10. Biobanking Agreements

Whether the land is land to which a biobanking agreement under part 7A of the Threatened Species Conservation Act 1995 relates, (but only if the council has been notified of the existence of the agreement by the Secretary of the Department of Environment, Climate Change and Water)?

NO

11. Bush fire prone land

Has all or part of the land been identified as bush fire prone land?

NO

12. Property vegetation plans

Has the council been notified that a property vegetation plan under the Native Vegetation Act 2003 applies to this land?

NO

13. Orders under Trees (Disputes Between Neighbours) Act 2006

Whether an order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on this land (but only if the council has been notified of the order)?

NO

14. Directions under Part 3A

Whether there is a direction by the Minister in force under Section 75P_(2)(c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of project or a stage of a project on the land under Part 4 of the Act does not have effect?

NO

15. Site compatibility certificates and conditions for seniors housing

(a) Whether there is a current site compatibility certificate (seniors housing) of which council is aware, issued under State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on this land?

NO

(b) Whether there are any terms of a kind referred to in clause 18(2) of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 that have imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land?

NO

16. Site compatibility certificates for infrastructure

Whether there is a valid site compatibility certificate (infrastructure), issued in respect of proposed development on this land?

NO

17. Site compatibility certificates and conditions for affordable rental housing

(1) Whether there is a current site compatibility certificate (affordable rental housing), of which the council is aware, in respect of proposed development on the land?

NO

(2) Whether there are any terms of a kind referred to in clause 17(1) or 38(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as a condition of consent to a development application in respect of the land?

NO

18. Paper subdivision information

(1) The name of any development plan adopted by a relevant authority that applies to the land or that is proposed to be subject to a consent ballot.

NO DEVELOPMENT PLAN APPLIES

(2) The date of any subdivision order that applied to the land.

NO SUBDIVISION ORDER APPLIES

(3) Words and expressions used in this clause have the same meaning as they have in Part 16C of this Regulation.

19. Site verification certificates

Whether there is a current site verification certificate, of which the council is aware, in respect of the land?

NO

Note: The following matters are prescribed by section 59(2) of the **Contaminated Land Management Act 1997** as additional matters to be specified in a planning certificate:

(a) that the land to which the certificate relates is significantly contaminated land within the meaning of the Act - if the land (or part of the land) is significantly contaminated land at the date when the certificate is issued,

NO

(b) that the land to which the certificate relates is subject to a management order within the meaning of the Act – if it is subject to such an order at the date when the certificate is issued,

NO

(c) that the land to which the certificate relates is the subject of an approved voluntary management proposal within the meaning of that Act – if it is the subject of such an approved proposal at the date when the certificate is issued,

NO

(d) that the land to which the certificate relates is subject to an ongoing maintenance order within the meaning of the Act – if it is subject to such an order at the date when the certificate is used,

NO

(e) that the land to which the certificate relates is the subject of a site audit statement within the meaning of the Act – if a copy of such a statement has been provided at any time to the local authority issuing the certificate.

NO

Note: Section 26 of the *Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009* provides that a planning certificate must include advice about any exemption under section 23 or authorisation under section 24 of that Act if the council is provided with a copy of the exemption or authorisation by the Co-ordinator General under that Act.

NO

The NSW Infrastructure Co-ordinator General **has not** issued an order under Section 23 or an authorisation under Section 24 of the *Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009*.

20.

Loose-fill asbestos insulation

Whether the land includes any residential premises (within the meaning of Division 1A of Part 8 of the *Home Building Act 1989*) that are listed on the register that is required to be maintained under that Division?

NO

**THIS PART IS DIRECTED TO THE FOLLOWING MATTERS
PRESCRIBED UNDER SECTION 149 (5) OF THE ABOVE ACT**

NOTE: "When information pursuant to Section 149 (5) is requested the council is under no obligation to furnish any of the information supplied herein pursuant to that Section. Council draws your attention to Section 149 (6), which states that a council shall not incur any liability in respect of any advice provided in good faith pursuant to sub-section (5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this certificate."

- A.** Whether a resolution to prepare a Planning Proposal applies to the land?

NO

- B.** Whether there are draft amendments to the Hornsby Development Control Plan that are on exhibition, have been exhibited or have been adopted by Council for exhibition applying to the land?

NO

- C.** Whether there are any provisions applying to the land that control the management of trees and vegetation?

YES

Tree and Vegetation Preservation Provisions contained within Hornsby DCP apply to the land.

Note: The Hornsby LEP and Hornsby DCP can be viewed on Council's website www.hornsby.nsw.gov.au/hlep or at Council's Administration Building or Libraries.

- D.** Whether there are any provisions within the Hornsby LEP applying to the land that controls the management of biodiversity?

NO

- E.** Whether there are any provisions applying to the land within the Hornsby Local Environmental Plan or Hornsby Development Control Plan that control development within a foreshore area?

NO

- F.** Whether Council has adopted a Voluntary Planning Agreement within the meaning of S93F of the Environmental Planning and Assessment Act, 1979, as amended, in relation to the land?

NO

- G.** Whether the land is within or adjacent to the North West Rail Link as identified on the maps provided by Transport NSW?

NO

- H.** Whether the land is subject to the North West Rail Link Corridor Strategy prepared by the Department of Planning and Infrastructure?

NO

- I.** Whether the land is within or adjacent to an existing rail corridor?

NO

- J.** Whether the land is in a rural area or located adjacent to a rural area in which agriculture occurs?

NO

- K.** Whether Council's records show a history of potentially contaminating land use and the land is zoned:

- Business, Industrial and/or SP2 Infrastructure; or

NO

- RU1 Primary Production, RU2 Rural Landscape, RU4 Primary Production Small Lots or E3 Environmental Management.

NO

- Any other risk

NO

Note: This is NOT a statement on whether or not the property is affected by contamination. Council has a policy on contaminated land which may restrict the development of the land. This policy is implemented when zoning, land use changes or further development is proposed on lands which are contaminated, or have previously been used for certain purposes and the contamination status of the land is uncertain. Accordingly, consideration of Council's policy and the application of provisions under relevant State legislation is warranted. If you have any queries regarding a landowner's obligations in relation to contamination issues, it is recommended that you seek your own independent professional advice.

- L.** Whether the land is subject to risk of "future" exposure to tidal inundation?

NO

- M.** Whether the land is within or adjacent to the NorthConnex motorway link corridor as identified on the maps provided by the NorthConnex project team?

NO

- N.** Whether there is potential for loose-fill asbestos insulation to be found on properties that are not listed on the NSW Department of Fair Trading's Loose-Fill Asbestos Public Register

YES

Note: Some residential homes located in Hornsby Shire have been identified as containing loose-fill asbestos insulation in the roof space. The NSW Department of Fair Trading maintains a Public Register of homes that are affected by loose-fill asbestos insulation.

You should make your own enquiries as to the age of the buildings on the land to which this certificate relates, and if it contains a building construction prior to 1980, it is recommended that any potential purchaser obtain advice from a licensed asbestos assessor to determine whether loose-fill asbestos is present in any building on the land and, if so, the risk (if any) this may pose for the building's occupants.

Further information can be obtained by contacting the NSW Department of Fair Trading and viewing the Department's website.

STEPHEN FEDOROW



Acting General Manager per

PLEASE NOTE: COUNCIL RETAINS THE ELECTRONIC ORIGINAL OF THIS CERTIFICATE.

WHERE THIS CERTIFICATE REFERS TO INFORMATION DISPLAYED ON COUNCIL'S WEBSITE OR TO ANY EXTERNAL WEBSITE, IT REFERS TO INFORMATION DISPLAYED ON THE WEBSITE ON THE DATE THIS CERTIFICATE IS ISSUED.

Hornsby Local Environmental Plan 2013 - Land Use Table

Zone R2Low Density Residential

1Objectives of zone

- To provide for the housing needs of the community within a low density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.

2Permitted without consent

Environmental protection works; Home occupations

3Permitted with consent

Boarding houses; Building identification signs; Business identification signs; Child care centres; Community facilities; Dwelling houses; Educational establishments; Emergency services facilities; Exhibition homes; Flood mitigation works; Group homes; Home-based child care; Home businesses; Information and education facilities; Places of public worship; Public administration buildings; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Respite day care centres; Roads; Tourist and visitor accommodation; Veterinary hospitals; Water reticulation systems

4Prohibited

Backpackers' accommodation; Farm stay accommodation; Hotel or motel accommodation; Serviced apartments; Any other development not specified in item 2 or 3

Appendix H Heritage Records

Section 1. Aboriginal Places listed under the National Parks and Wildlife Act.

Your search did not return any matching results.

Section 2. Items listed under the NSW Heritage Act.

Your search did not return any matching results.

Section 3. Items listed by Local Government and State Agencies.

Your search returned 6 records.

Item name 	Address	Suburb	LGA	Information source
Brierden - Garden	55 Myra Street	Wahroonga	Hornsby	LGOV
Brierdene	55 Myra Street	Wahroonga	Hornsby	LGOV
Garden	7-9 Myra Street	Wahroonga	Hornsby	LGOV
Street Trees	Myra Street	Wahroonga	Hornsby	LGOV
Tenterfield and Garden	7-9 Myra Street	Wahroonga	Hornsby	LGOV
Uniting Church	79 Edgeworth David Avenue	Wahroonga	Hornsby	LGOV

There was a total of 6 records matching your search criteria.

12 records found, displaying all records.			Records per page: 20 ▾
Place Name	Location	Local Government	Source
Briars, The	14 Woonona Avenue, Wahroonga	Ku-Ring-Gai	NSW Heritage Register
Highlands	9 Highlands Avenue, Wahroonga	Hornsby	NSW Heritage Register
Highlands including Grounds and Trees	9 Highlands Av, Wahroonga	Hornsby Shire	Register of the National Estate
Kinross, Outbuildings and Curtilage	Wahroonga St, Raymond Terrace	Port Stephens Shire	Register of the National Estate
Mahratia and Site	1526 Pacific Highway, Wahroonga	Ku-Ring-Gai	NSW Heritage Register
Purulia	16 Fox Valley Road, Wahroonga	Ku-Ring-Gai	NSW Heritage Register
Purulia and Garden	16 Fox Valley Rd, Wahroonga	Ku-ring-gai Municipality	Register of the National Estate
Redleaf	8 Redleaf Av, Wahroonga	Ku-ring-gai Municipality	Register of the National Estate
Rose Seidler House	69-71 Clissold Road, Wahroonga	Ku-Ring-Gai	NSW Heritage Register
Rose Seidler House	69-71 Clissold Rd, Wahroonga	Ku-ring-gai Municipality	Register of the National Estate
St John's Uniting Church, Hall and Manse	61-65 Coonanbarra Road, Wahroonga	Ku-Ring-Gai	NSW Heritage Register
Wahroonga Railway Station group	North Shore railway, Wahroonga	Ku-Ring-Gai	NSW Heritage Register

Appendix I Calibration & Decontamination Records

PROJECT NAME: <u>waitara Public School</u>	PROJECT NO: <u>53033</u>
FIELD DATES: <u>14/8/17</u>	FIELD STAFF: <u>SG</u>

CALIBRATION SUMMARY
EQUIPMENT: <u>PID</u>
CALIBRATION STANDARD: <u>isobutylene (100ppm)</u>

DATE	TIME	READING (ppm _v)	COMMENTS
14/8/17	7:50am	99ppm	cal ok (isobutylene)
		0ppm	cal ok

DECONTAMINATION SUMMARY			
EQUIPMENT: <u>N/A</u> (SFA → drill rig)			
1. Was the equipment decontaminated appropriately prior to sampling at each location?	Y	N	☒ NA
2. Was excess soil removed by scraping, brushing or wiping with disposable towels?	Y	N	☒ NA
3. Was the equipment contaminated with grease, tar or similar material?	Y	N	☒ NA
If so, was the equipment steam cleaned or rinsed with pesticide-grade acetone:hexane?	Y	N	☒ NA
4. Was phosphate-free detergent used to wash the equipment?	Y	N	☒ NA
5. Was the equipment rinsed with clean water?	Y	N	☒ NA
6. Was the equipment then rinsed with deionised water?	Y	N	☒ NA
7. Were all sample containers cleaned and acid or solvent washed prior to sample collection?	Y	N	☒ NA
WERE ANY ADDITIONAL DECONTAMINATION MEASURES REQUIRED? PROVIDE DETAILS.			
<u>Fresh nitrile gloves were used for each sample collection.</u>			

Appendix J QA/QC Results

[illegible]

Appendix K Laboratory Documentation

013024

eurofins

CHAIN OF CUSTODY

page 1 of 2



PROJECT NO.: 53033		LABORATORY BATCH NO.:												
PROJECT NAME: ESA 3 schools		SAMPLERS: SG												
DATE NEEDED BY: STD TAT		QC LEVEL: NEPM (2013)												
PHONE: Sydney: 02 8245 0300 Perth: 08 9488 0100 Brisbane: 07 3112 2688														
SEND REPORT & INVOICE TO: (1) adminnsw@jbsg.com.au; (2) sburns@jbsg.com.au; (3) sgray@jbsg.com.au														
COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:														
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	pH	CEC	PH	% Clay	TOC	HOLD	IDENTIFICATION	TYPE OF ASBESTOS ANALYSIS	NEPM/MA	NOTES:
BH01 0.1-0.2	SOIL	14/8		Jar + ice		X	+	+	+	X			X	
↓ 0.1-0.3				Bag (good)										
↓ 0.2-0.3				Jar + ice										
↓ 0.9-1.0				Bag + Jar + ice										
BH02 0-0.1						X	+	+	+	X			X	
↓ 0.2-0.3														
BH03 0-0.1						X	+	+	+	X			X	
↓ 0.3-0.4														
BH04 0.1-0.2						X	+	+	+	X			X	
↓ 0.3-0.4														
↓ 0.8-0.9														
BH05 0-0.1						X	+	+	+	X			X	
↓ 0.2-0.3														
↓ 0.8-0.9														
BH06 0-0.1						X	+	+	+	X			X	
↓ 0.2-0.3														
BH07 0.05-0.15						X	+	+	+	X			X	
↓ 0.2-0.3														
↓ 0.4-0.5														

NAME: Sgray	DATE: 14/8/17	RECEIVED BY: NAME: Moko	DATE: 14/8/17	FOR RECEIVING LAB USE ONLY:
OF: JBS&G		DATE: 3:56pm		COOLER SEAL - Yes..... No..... Intact..... Broken.....
NAME:	DATE:	NAME: Egray	DATE:	COOLER TEMP..... deg C
OF:		NAME:	DATE:	COOLER SEAL - Yes..... No..... Intact..... Broken.....
		OF:		COOLER TEMP..... deg C

Container & Preservative Codes: P = Plastic; J = Soil Jar; B = Glass Jar; N = Nitric Acid Presv.; C = Sodium Hydroxide Presv.; VC = Hydrochloric Acid Presv. Vial; VS = Sulfuric Acid Presv. Vial; S = EDTA Presv.; ST = Sterile Bottle; Q = Other

IMSQ Form 013 - Chain of Custody - Generic

[illegible]

Sample Receipt Advice

Company name: **JBS & G Australia (NSW) P/L**

Contact name: **Scott Burrows**

Project name: **ESA 3 SCHOOLS**

Project ID: **53033**

COC number: **Not provided**

Turn around time: **5 Day**

Date/Time received: **Aug 14, 2017 3:56 PM**

Eurofins | mgt reference: **558537**

Sample information

- ☒ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☒ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt
Sample Receipt : 10 degrees Celsius.
- ☒ All samples have been received as described on the above COC.
- ☒ COC has been completed correctly.
- ☒ Attempt to chill was evident.
- ☒ Appropriately preserved sample containers have been used.
- ☒ All samples were received in good condition.
- ☒ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ☒ Appropriate sample containers have been used.
- ☒ Sample containers for volatile analysis received with zero headspace.
- ☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Scott Burrows - SBurrows@jbsg.com.au.

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
NSW 2000

Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #:
Phone:
Fax:

Received: Aug 14, 2017 3:56 PM
Due: Aug 21, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail							BTEXN and Volatile TRH				X	
							JBS&G Suite 2	X				
							Cation Exchange Capacity	X				
							Moisture Set	X				
							Total Organic Carbon	X				
							pH (1:5 Aqueous extract)	X				
							HOLD	X				
							Asbestos - WA guidelines			X		
							% Clay			X		
							External Laboratory					
							No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID
							1	BH01 0.1-0.2	Aug 14, 2017		Soil	S17-Au16810
							2	BH01 0.2-0.3	Aug 14, 2017		Soil	S17-Au16812
							3	BH01 0.9-1.0	Aug 14, 2017		Soil	S17-Au16813
							4	BH02 0-0.1	Aug 14, 2017		Soil	S17-Au16814
							5	BH02 0.2-0.3	Aug 14, 2017		Soil	S17-Au16815
							6	BH03 0-0.1	Aug 14, 2017		Soil	S17-Au16816
							7	BH03 0.3-0.4	Aug 14, 2017		Soil	S17-Au16817
8	BH04 0.1-0.2	Aug 14, 2017		Soil	S17-Au16818							
9	BH04 0.3-0.4	Aug 14, 2017		Soil	S17-Au16819							
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
NSW 2000
Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #: 558537
Phone: 02 8245 0300
Fax:

Received: Aug 14, 2017 3:56 PM
Due: Aug 21, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail				BTEXN and Volatile TRH		JBS&G Suite 2		Cation Exchange Capacity		Moisture Set		Total Organic Carbon		pH (1:5 Aqueous extract)		HOLD		Asbestos - WA guidelines		% Clay	
Melbourne Laboratory - NATA Site # 1254 & 14271						X		X		X		X		X		X					
Sydney Laboratory - NATA Site # 18217																				X	
Brisbane Laboratory - NATA Site # 20794																					
Perth Laboratory - NATA Site # 23736																		X			
10	BH04 0.8-0.9	Aug 14, 2017	Soil			S17-Au16820										X					
11	BH05 0.0-1	Aug 14, 2017	Soil			S17-Au16821				X		X		X				X			
12	BH05 0.2-0.3	Aug 14, 2017	Soil			S17-Au16822										X					
13	BH05 0.8-0.9	Aug 14, 2017	Soil			S17-Au16823										X					
14	BH06 0.0-1	Aug 14, 2017	Soil			S17-Au16824				X		X		X				X			
15	BH06 0.2-0.3	Aug 14, 2017	Soil			S17-Au16825										X					
16	BH07 0.05-0.15	Aug 14, 2017	Soil			S17-Au16826						X		X				X			
17	BH07 0.2-0.3	Aug 14, 2017	Soil			S17-Au16827								X							
18	BH07 0.4-0.5	Aug 14, 2017	Soil			S17-Au16828								X							
19	BH08 0.1-0.2	Aug 14, 2017	Soil			S17-Au16829								X				X		X	
20	BH08 0.3-0.4	Aug 14, 2017	Soil			S17-Au16830								X							

Company Name: JBS & G Australia (NSW) P/L
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Sydney
NSW 2000

Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #:
Phone:
Fax:

Received: Aug 14, 2017 3:56 PM
Due: Aug 21, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Project Name: ESA 3 SCHOOLS
Project ID: 53033

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

[illegible]

Certificate of Analysis



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025-Testing
 The results of the tests, calibrations and/or
 measurements included in this document are traceable
 to Australian/national standards.

JBS & G Australia (NSW) P/L

Level 1, 50 Margaret St

Sydney

NSW 2000

Attention: Scott Burrows
Report 558537-AID
Project Name ESA 3 SCHOOLS
Project ID 53033
Received Date Aug 14, 2017
Date Reported Aug 23, 2017

Methodology:

Asbestos Fibre
 Identification

Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques.

NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.

Unknown Mineral
 Fibres

Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.

NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.

Subsampling Soil
 Samples

The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed.

NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.

Bonded asbestos-
 containing material
 (ACM)

The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.

NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.

Limit of Reporting

The performance limitation of the AS4964 method is around 0.1 g/kg (0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis where required, this is considered to be at the nominal reporting limit of 0.01 % (w / w). The examination of large sample sizes (500 mL is recommended) may improve the likelihood of identifying ACM in the > 2mm fraction. The NEPM screening level of 0.001 % (w / w) asbestos in soil for FA (friable asbestos) and AF (asbestos fines) then applies where they are able to be quantified by gravimetric procedures. This quantitative screening is not generally applicable to FF (free fibres) and results of Trace Analysis are referred.

NOTE: NATA News March 2014, p.7, states in relation to AS4964: "This is a qualitative method with a nominal reporting limit of 0.01%" and that currently in Australia "there is no validated method available for the quantification of asbestos". Accordingly, NATA Accreditation does not cover the performance of this service (indicated with an asterisk). This report is consistent with the analytical procedures and reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended) and the Western Australia Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, 2009, including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil, June 2011.

Project Name ESA 3 SCHOOLS
Project ID 53033
Date Sampled Aug 14, 2017
Report 558537-AID

Client Sample ID	Eurofins mgt Sample No.	Date Sampled	Sample Description	Result
BH01 0.1-0.2	17-Au16810	Aug 14, 2017	Approximate Sample 639g Sample consisted of: Grey-brown fine grain soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No respirable fibres detected. ^{M11}
BH02 0-0.1	17-Au16814	Aug 14, 2017	Approximate Sample 557g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No respirable fibres detected. ^{M11}
BH03 0-0.1	17-Au16816	Aug 14, 2017	Approximate Sample 533g Sample consisted of: Brown coarse grain soil	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No respirable fibres detected. ^{M11}
BH04 0.1-0.2	17-Au16818	Aug 14, 2017	Approximate Sample 595g Sample consisted of: Brown fine grain soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No respirable fibres detected. ^{M11}
BH05 0-0.1	17-Au16821	Aug 14, 2017	Approximate Sample 592g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No respirable fibres detected. ^{M11}
BH06 0-0.1	17-Au16824	Aug 14, 2017	Approximate Sample 478g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No respirable fibres detected. ^{M11}
BH07 0.05-0.15	17-Au16826	Aug 14, 2017	Approximate Sample 608g Sample consisted of: Brown fine grain soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No respirable fibres detected. ^{M11}
BH08 0.1-0.2	17-Au16829	Aug 14, 2017	Approximate Sample 598g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No respirable fibres detected. ^{M11}

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported. A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Perth	Aug 21, 2017	Indefinite

ABN : 50 005 085 521
e.mail : EnviroSales@eurofins.com
web : www.eurofins.com.au

Melbourne
3-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
NSW 2000
Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.: 558537
Report #: 02 8245 0300
Phone:
Fax:

Received: Aug 14, 2017 3:56 PM
Due: Aug 21, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	BH01 0.1-0.2	Aug 14, 2017		Soil	S17-Au16810	X	X	X	X
2	BH01 0.2-0.3	Aug 14, 2017		Soil	S17-Au16812				
3	BH01 0.9-1.0	Aug 14, 2017		Soil	S17-Au16813				
4	BH02 0-0.1	Aug 14, 2017		Soil	S17-Au16814	X	X	X	X
5	BH02 0.2-0.3	Aug 14, 2017		Soil	S17-Au16815				
6	BH03 0-0.1	Aug 14, 2017		Soil	S17-Au16816	X	X	X	X
7	BH03 0.3-0.4	Aug 14, 2017		Soil	S17-Au16817				
8	BH04 0.1-0.2	Aug 14, 2017		Soil	S17-Au16818	X	X	X	X
9	BH04 0.3-0.4	Aug 14, 2017		Soil	S17-Au16819				
External Laboratory									
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794						X			
Perth Laboratory - NATA Site # 23736							X		
JBS&G Suite 2							X		
BTEXN and Volatile TRH							X		
Cation Exchange Capacity							X		
Moisture Set							X		
Total Organic Carbon							X		
pH (1:5 Aqueous extract)							X		
HOLD							X		
Asbestos - WA guidelines									
% Clay									

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
NSW 2000

Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #:
Phone:
Fax:

Received: Aug 14, 2017 3:56 PM
Due: Aug 21, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Project Name: ESA 3 SCHOOLS
Project ID: 53033

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail		21	22	23	24	Test Counts
Melbourne Laboratory - NATA Site # 1254 & 14271	QA20170814-01	Aug 14, 2017	Soil	S17-Au16831		
	QC20170814-01	Aug 14, 2017	Soil	S17-Au16832		
	TRIP BLANK	Aug 14, 2017	Water	S17-Au16833		
	TRIP SPIKE	Aug 14, 2017	Water	S17-Au16834		
Sydney Laboratory - NATA Site # 18217						
Brisbane Laboratory - NATA Site # 20794						
Perth Laboratory - NATA Site # 23736						
% Clay						8
Asbestos - WA guidelines				X		8
HOLD					X	13
pH (1:5 Aqueous extract)						8
Total Organic Carbon						8
Moisture Set					X	9
Cation Exchange Capacity						8
BTEXN and Volatile TRH						2
JBS&G Suite 2						9

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis
LOR	Limit of Reporting
COC	Chain of Custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Western Australia Department of Health
NOHSC	National Occupational Health and Safety Commission
ACM	Bonded asbestos-containing material means any material containing more than 1% asbestos and comprises asbestos-containing-material which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin. Common examples of ACM include but are not limited to: pipe and boiler insulation, sprayed-on fireproofing, troweled-on acoustical plaster, floor tile and mastic, floor linoleum, transite shingles, roofing materials, wall and ceiling plaster, ceiling tiles, and gasket materials. This term is restricted to material that cannot pass a 7 mm x 7 mm sieve. This sieve size is selected because it approximates the thickness of common asbestos cement sheeting and for fragments to be smaller than this would imply a high degree of damage and hence potential for fibre release.
FA	FA comprises friable asbestos material and includes severely weathered cement sheet, insulation products and woven asbestos material. This type of friable asbestos is defined here as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. This material is typically unbonded or was previously bonded and is now significantly degraded (crumbling).
PACM	Presumed Asbestos-Containing Material means thermal system insulation and surfacing material found in buildings, vessels, and vessel sections constructed no later than 1980 that are assumed to contain greater than one percent asbestos but have not been sampled or analyzed to verify or negate the presence of asbestos.
AF	Asbestos fines (AF) are defined as free fibres, or fibre bundles, smaller than 7mm. It is the free fibres which present the greatest risk to human health, although very small fibres (< 5 microns in length) are not considered to be such a risk. AF also includes small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve. (Note that for bonded ACM fragments to pass through a 7 mm x 7 mm sieve implies a substantial degree of damage which increases the potential for fibre release.)
AC	Asbestos cement means a mixture of cement and asbestos fibres (typically 90:10 ratios).

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N/A	Not applicable
M11	NATA accreditation does not cover the performance of this service.

Asbestos Counter/Identifier:

Rhys Thomas Senior Analyst-Asbestos (WA)

Authorised by:

Matthew Deaves Senior Analyst-Asbestos (WA)



Glenn Jackson
National Operations Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

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Certificate of Analysis

JBS & G Australia (NSW) P/L
Level 1, 50 Margaret St
Sydney
NSW 2000



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention: **Scott Burrows**

Report **558537-S**
Project name **ESA 3 SCHOOLS**
Project ID **53033**
Received Date **Aug 14, 2017**

Client Sample ID			BH01 0.1-0.2	BH02 0-0.1	BH03 0-0.1	BH04 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S17-Au16810	S17-Au16814	S17-Au16816	S17-Au16818
Date Sampled			Aug 14, 2017	Aug 14, 2017	Aug 14, 2017	Aug 14, 2017
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	87	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	110	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	197	< 50
BTEX						
Denzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	67	69	69	68
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	190	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			BH01 0.1-0.2	BH02 0-0.1	BH03 0-0.1	BH04 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S17-Au16810	S17-Au16814	S17-Au16816	S17-Au16818
Date Sampled			Aug 14, 2017	Aug 14, 2017	Aug 14, 2017	Aug 14, 2017
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	107	93	92	94
p-Terphenyl-d14 (surr.)	1	%	116	134	123	132
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	0.3	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	0.12	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	0.12	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 Organochlorine pesticides (Total)*	0.1	mg/kg	0.42	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other organochlorine pesticides (Total)*	0.1	mg/kg	0.3	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	110	88	93	86
Tetrachloro-m-xylene (surr.)	1	%	80	64	72	67
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	110	88	93	86
Tetrachloro-m-xylene (surr.)	1	%	80	64	72	67

Client Sample ID			BH01 0.1-0.2	BH02 0-0.1	BH03 0-0.1	BH04 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S17-Au16810	S17-Au16814	S17-Au16816	S17-Au16818
Date Sampled			Aug 14, 2017	Aug 14, 2017	Aug 14, 2017	Aug 14, 2017
Test/Reference	LOR	Unit				
% Clay	1	%	40	6.3	13	31
Conductivity (1:5 aqueous extract at 25°C)	10	uS/cm	49	17	26	30
pH (1:5 Aqueous extract)	0.1	pH Units	7.2	6.7	5.7	5.3
Total Organic Carbon	0.1	%	2.7	3.2	9.2	4.0
% Moisture	1	%	17	11	19	16
Heavy Metals						
Arsenic	2	mg/kg	4.5	3.3	3.2	20
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	17	9.9	9.1	27
Copper	5	mg/kg	6.4	6.6	< 5	< 5
Lead	5	mg/kg	27	17	26	29
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Zinc	5	mg/kg	15	22	19	5.4
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	27	15	21	4.3

Client Sample ID			BH05 0-0.1	BH06 0-0.1	BH07 0.05-0.15	BH08 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S17-Au16821	S17-Au16824	S17-Au16826	S17-Au16829
Date Sampled			Aug 14, 2017	Aug 14, 2017	Aug 14, 2017	Aug 14, 2017
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr)	1	%	71	76	76	68
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100

Client Sample ID			BH05 0-0.1	BH06 0-0.1	BH07 0.05-0.15	BH08 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S17-Au16821	S17-Au16824	S17-Au16826	S17-Au16829
Date Sampled			Aug 14, 2017	Aug 14, 2017	Aug 14, 2017	Aug 14, 2017
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2 Fluorobiphenyl (surr.)	1	%	95	91	93	134
p-Terphenyl-d14 (surr.)	1	%	135	126	123	128
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4,4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4,4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4,4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 Organochlorine pesticides (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other organochlorine pesticides (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	87	94	93	87
Tetrachloro-m-xylene (surr.)	1	%	66	74	70	70

Client Sample ID			BH05 0-0.1	BH06 0-0.1	BH07 0.05-0.15	BH08 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			S17-Au16821	S17-Au16824	S17-Au16826	S17-Au16829
Date Sampled			Aug 14, 2017	Aug 14, 2017	Aug 14, 2017	Aug 14, 2017
Test/Reference	LOR	Unit				
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchloredate (surr.)	1	%	87	94	93	87
Tetrachloro-m-xylene (surr.)	1	%	66	74	70	70
% Clay	1	%	21	31	40	16
Conductivity (1:5 aqueous extract at 25°C)	10	uS/cm	33	27	29	66
pH (1:5 Aqueous extract)	0.1	pH Units	6.1	5.5	5.0	7.0
Total Organic Carbon	0.1	%	3.0	3.1	2.3	0.4
% Moisture	1	%	14	16	17	15
Heavy Metals						
Arsenic	2	mg/kg	5.9	4.7	7.0	4.1
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	19	17	19	15
Copper	5	mg/kg	17	< 5	< 5	13
Lead	5	mg/kg	42	36	24	14
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	19	< 5	< 5	15
Zinc	5	mg/kg	44	12	8.4	21
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	14	6.7	2.2	17

Client Sample ID			QC20170814-01
Sample Matrix			Soil
Eurofins mgt Sample No.			S17-Au16832
Date Sampled			Aug 14, 2017
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	20	mg/kg	< 20
TRH C10-C14	20	mg/kg	< 20
TRH C15-C28	50	mg/kg	< 50
TRH C29-C36	50	mg/kg	< 50
TRH C10-36 (Total)	50	mg/kg	< 50
BTEX			
Benzene	0.1	mg/kg	< 0.1
Toluene	0.1	mg/kg	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2
o-Xylene	0.1	mg/kg	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3
4-Bromofluorobenzene (surr.)	1	%	76

Client Sample ID			QC20170814-01
Sample Matrix			Soil
Eurofins mgt Sample No.			S17-Au16832
Date Sampled			Aug 14, 2017
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene ^{N02}	0.5	mg/kg	< 0.5
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20
TRH C6-C10	20	mg/kg	< 20
TRH >C10-C16	50	mg/kg	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50
TRH >C16-C34	100	mg/kg	< 100
TRH >C34-C40	100	mg/kg	< 100
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	< 0.5
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	90
p-Terphenyl-d14 (surr.)	1	%	116
Organochlorine Pesticides			
Chlordanes - Total	0.1	mg/kg	< 0.1
4,4'-DDD	0.05	mg/kg	< 0.05
4,4'-DDE	0.05	mg/kg	< 0.05
4,4'-DDT	0.05	mg/kg	< 0.05
a-BHC	0.05	mg/kg	< 0.05
Aldrin	0.05	mg/kg	< 0.05
b-BHC	0.05	mg/kg	< 0.05
d-BHC	0.05	mg/kg	< 0.05
Dieldrin	0.05	mg/kg	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05
Endrin	0.05	mg/kg	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05
Heptachlor	0.05	mg/kg	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05

Client Sample ID			QC20170814-01
Sample Matrix			Soil
Eurofins mgt Sample No.			S17-Au16832
Date Sampled			Aug 14, 2017
Test/Reference	LOR	Unit	
Organochlorine Pesticides			
Hexachlorobenzene	0.05	mg/kg	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05
Toxaphene	1	mg/kg	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05
Vic EPA IWRG 621 Organochlorine pesticides (Total)*	0.1	mg/kg	< 0.1
Vic EPA IWRG 621 Other organochlorine pesticides (Total)*	0.1	mg/kg	< 0.1
Dibutylchloroendate (surr.)	1	%	82
Tetrachloro-m-xylene (surr.)	1	%	58
Polychlorinated Biphenyls			
Aroclor-1016	0.1	mg/kg	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1
Total PCB*	0.1	mg/kg	< 0.1
Dibutylchloroendate (surr.)	1	%	82
Tetrachloro-m-xylene (surr.)	1	%	58
% Moisture	1	%	8.2
Heavy Metals			
Arsenic	2	mg/kg	2.8
Cadmium	0.4	mg/kg	< 0.4
Chromium	5	mg/kg	5.7
Copper	5	mg/kg	11
Lead	5	mg/kg	19
Mercury	0.1	mg/kg	< 0.1
Nickel	5	mg/kg	< 5
Zinc	5	mg/kg	37

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.

A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
JBS&G Suite 2			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Aug 17, 2017	14 Day
- Method: LTM-ORG-2010 TRH C6-C36			
BTEX	Melbourne	Aug 17, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Aug 17, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Aug 17, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Melbourne	Aug 17, 2017	14 Day
- Method: LTM-ORG-2140 PAH and Phenols in Soils by GCMS			
Organochlorine Pesticides	Melbourne	Aug 17, 2017	14 Day
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Polychlorinated Biphenyls	Melbourne	Aug 17, 2017	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Metals M8	Melbourne	Aug 17, 2017	28 Days
- Method: LTM-MET-3030 by ICP-OES (hydride ICP-OES for Mercury)			
% Clay	Brisbane	Aug 22, 2017	6 Day
- Method: LTM-GEN-7040			
pH (1:5 Aqueous extract)	Melbourne	Aug 17, 2017	7 Day
- Method: LTM-GEN-7090 pH in soil by ISE			
Total Organic Carbon	Melbourne	Aug 10, 2017	20 Day
- Method: APHA 5310B Total Organic Carbon			
Conductivity (1:5 aqueous extract at 25°C)	Melbourne	Aug 17, 2017	7 Day
- Method: LTM-INO-4030			
Cation Exchange Capacity	Melbourne	Aug 18, 2017	180 Days
- Method: LTM-MET-3060 - Cation Exchange Capacity (CEC) & Exchangeable Sodium Percentage (ESP)			
% Moisture	Melbourne	Aug 14, 2017	14 Day
- Method: LTM-GEN-7080 Moisture			

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
NSW 2000

Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #:
Phone:
Fax:

Received: Aug 14, 2017 3:56 PM
Due: Aug 21, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail	BTEXN and Volatile TRH			X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
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NSW 2000
Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #: 558537
Phone: 02 8245 0300
Fax:

Received: Aug 14, 2017 3:56 PM
Due: Aug 21, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail				BTEXN and Volatile TRH		JBS&G Suite 2		Cation Exchange Capacity		Moisture Set		Total Organic Carbon		pH (1:5 Aqueous extract)		HOLD		Asbestos - WA guidelines		% Clay	
Melbourne Laboratory - NATA Site # 1254 & 14271						X		X		X		X		X		X					
Sydney Laboratory - NATA Site # 18217																				X	
Brisbane Laboratory - NATA Site # 20794																					
Perth Laboratory - NATA Site # 23736																		X			
10	BH04 0.8-0.9	Aug 14, 2017	Soil			S17-Au16820															
11	BH05 0.0-1	Aug 14, 2017	Soil			S17-Au16821						X									
12	BH05 0.2-0.3	Aug 14, 2017	Soil			S17-Au16822						X									
13	BH05 0.8-0.9	Aug 14, 2017	Soil			S17-Au16823															
14	BH06 0.0-1	Aug 14, 2017	Soil			S17-Au16824						X									
15	BH06 0.2-0.3	Aug 14, 2017	Soil			S17-Au16825						X									
16	BH07 0.05-0.15	Aug 14, 2017	Soil			S17-Au16826						X									
17	BH07 0.2-0.3	Aug 14, 2017	Soil			S17-Au16827										X					
18	BH07 0.4-0.5	Aug 14, 2017	Soil			S17-Au16828										X					
19	BH08 0.1-0.2	Aug 14, 2017	Soil			S17-Au16829										X				X	
20	BH08 0.3-0.4	Aug 14, 2017	Soil			S17-Au16830										X					

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
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Sample Detail				BTEXN and Volatile TRH				JBS&G Suite 2				Cation Exchange Capacity				Moisture Set				Total Organic Carbon				pH (1:5 Aqueous extract)				HOLD				Asbestos - WA guidelines				% Clay							
Melbourne Laboratory - NATA Site # 1254 & 14271 Sydney Laboratory - NATA Site # 18217 Brisbane Laboratory - NATA Site # 20794 Perth Laboratory - NATA Site # 23736								X				X				X				X				X				X				X				X							
21	QA20170814-01	Aug 14, 2017	Soil	S17-Au16831																																							
22	QC20170814-01	Aug 14, 2017	Soil	S17-Au16832																																							
23	TRIP BLANK	Aug 14, 2017	Water	S17-Au16833																																							
24	TRIP SPIKE	Aug 14, 2017	Water	S17-Au16834																																							
Test Counts								8				8				13				8				9				8				8				8				2			

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre
ug/L: micrograms per litre	ppm: Parts per million
ppb: Parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres	

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4,4'-DDD	mg/kg	< 0.05			0.05	Pass	
4,4'-DDE	mg/kg	< 0.05			0.05	Pass	
4,4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
Method Blank							
% Clay	%	< 1			1	Pass	
Conductivity (1:5 aqueous extract at 25°C)	uS/cm	< 10			10	Pass	
Total Organic Carbon	%	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	104			70-130	Pass	
TRH C10-C14	%	96			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	102			70-130	Pass	
Toluene	%	110			70-130	Pass	
Ethylbenzene	%	112			70-130	Pass	
m&p-Xylenes	%	112			70-130	Pass	
Xylenes - Total	%	112			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	101			70-130	Pass	
TRH C6-C10	%	97			70-130	Pass	
TRH >C10-C16	%	107			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	84			70-130	Pass	
Acenaphthylene	%	90			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Anthracene	%	85			70-130	Pass	
Benz(a)anthracene	%	94			70-130	Pass	
Benzo(a)pyrene	%	89			70-130	Pass	
Benzo(b&j)fluoranthene	%	89			70-130	Pass	
Benzo(g,h,i)perylene	%	88			70-130	Pass	
Benzo(k)fluoranthene	%	91			70-130	Pass	
Chrysene	%	92			70-130	Pass	
Dibenz(a,h)anthracene	%	96			70-130	Pass	
Fluoranthene	%	78			70-130	Pass	
Fluorene	%	91			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	91			70-130	Pass	
Naphthalene	%	90			70-130	Pass	
Phenanthrene	%	103			70-130	Pass	
Pyrene	%	78			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
4,4'-DDD	%	120			70-130	Pass	
4,4'-DDE	%	104			70-130	Pass	
4,4'-DDT	%	75			70-130	Pass	
a-BHC	%	105			70-130	Pass	
Aldrin	%	105			70-130	Pass	
b-BHC	%	102			70-130	Pass	
d-BHC	%	108			70-130	Pass	
Dieldrin	%	103			70-130	Pass	
Endosulfan I	%	102			70-130	Pass	
Endosulfan II	%	105			70-130	Pass	
Endosulfan sulphate	%	94			70-130	Pass	
Endrin	%	103			70-130	Pass	
Endrin aldehyde	%	98			70-130	Pass	
Endrin ketone	%	94			70-130	Pass	
g-BHC (Lindane)	%	115			70-130	Pass	
Heptachlor	%	101			70-130	Pass	
Heptachlor epoxide	%	103			70-130	Pass	
Hexachlorobenzene	%	102			70-130	Pass	
Methoxychlor	%	82			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	75			70-130	Pass	
LCS - % Recovery							
% Clay	%	96			70-130	Pass	
Total Organic Carbon	%	100			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	99			80-120	Pass	
Cadmium	%	104			80-120	Pass	
Chromium	%	104			80-120	Pass	
Copper	%	105			80-120	Pass	
Lead	%	106			80-120	Pass	
Mercury	%	97			75-125	Pass	
Nickel	%	107			80-120	Pass	
Zinc	%	105			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Organochlorine Pesticides				Result 1				
4,4'-DDD	M17-Au21805	NCP	%	105		70-130	Pass	
4,4'-DDE	M17-Au21805	NCP	%	92		70-130	Pass	
4,4'-DDT	M17-Au21805	NCP	%	87		70-130	Pass	
a-BHC	M17-Au21805	NCP	%	98		70-130	Pass	
Aldrin	M17-Au21805	NCP	%	89		70-130	Pass	
b-BHC	M17-Au21805	NCP	%	94		70-130	Pass	
d-BHC	M17-Au21805	NCP	%	96		70-130	Pass	
Dieldrin	M17-Au21805	NCP	%	90		70-130	Pass	
Endosulfan I	M17-Au21805	NCP	%	86		70-130	Pass	
Endosulfan II	M17-Au21805	NCP	%	93		70-130	Pass	
Endosulfan sulphate	M17-Au21805	NCP	%	90		70-130	Pass	
Endrin	M17-Au21805	NCP	%	96		70-130	Pass	
Endrin aldehyde	M17-Au21805	NCP	%	87		70-130	Pass	
Endrin ketone	M17-Au21805	NCP	%	91		70-130	Pass	
g-BHC (Lindane)	M17-Au21805	NCP	%	105		70-130	Pass	
Heptachlor	M17-Au21805	NCP	%	90		70-130	Pass	
Heptachlor epoxide	M17-Au21805	NCP	%	87		70-130	Pass	
Hexachlorobenzene	M17-Au21805	NCP	%	100		70-130	Pass	
Methoxychlor	M17-Au21805	NCP	%	109		70-130	Pass	
Spike - % Recovery								
Polycyclic Aromatic Hydrocarbons				Result 1				
Acenaphthene	S17-Au16814	CP	%	77		70-130	Pass	
Acenaphthylene	S17-Au16814	CP	%	77		70-130	Pass	
Anthracene	S17-Au16814	CP	%	75		70-130	Pass	
Benz(a)anthracene	S17-Au16814	CP	%	79		70-130	Pass	
Benzo(a)pyrene	S17-Au16814	CP	%	74		70-130	Pass	
Benzo(b&j)fluoranthene	S17-Au16814	CP	%	78		70-130	Pass	
Benzo(g,h,i)perylene	S17-Au16814	CP	%	86		70-130	Pass	
Benzo(k)fluoranthene	S17-Au16814	CP	%	70		70-130	Pass	
Chrysene	S17-Au16814	CP	%	83		70-130	Pass	
Dibenz(a,h)anthracene	S17-Au16814	CP	%	100		70-130	Pass	
Fluoranthene	S17-Au16814	CP	%	86		70-130	Pass	
Fluorene	S17-Au16814	CP	%	77		70-130	Pass	
Indeno(1,2,3-cd)pyrene	S17-Au16814	CP	%	76		70-130	Pass	
Naphthalene	S17-Au16814	CP	%	83		70-130	Pass	
Phenanthrene	S17-Au16814	CP	%	75		70-130	Pass	
Pyrene	S17-Au16814	CP	%	88		70-130	Pass	
Spike - % Recovery								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1				
TRH C6-C9	S17-Au16816	CP	%	91		70-130	Pass	
TRI C10-C14	S17-Au16016	CP	%	113		70-130	Pass	
Spike - % Recovery								
BTEX				Result 1				
Benzene	S17-Au16816	CP	%	82		70-130	Pass	
Toluene	S17-Au16816	CP	%	89		70-130	Pass	
Ethylbenzene	S17-Au16816	CP	%	91		70-130	Pass	
m&p-Xylenes	S17-Au16816	CP	%	95		70-130	Pass	
o-Xylene	S17-Au16816	CP	%	93		70-130	Pass	
Xylenes - Total	S17-Au16816	CP	%	94		70-130	Pass	
Spike - % Recovery								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1				
Naphthalene	S17-Au16816	CP	%	70		70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C10	S17-Au16816	CP	%	90			70-130	Pass	
TRH >C10-C16	S17-Au16816	CP	%	128			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1260	S17-Au16829	CP	%	108			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S17-Au16829	CP	%	97			75-125	Pass	
Cadmium	S17-Au16829	CP	%	105			75-125	Pass	
Chromium	S17-Au16829	CP	%	93			75-125	Pass	
Copper	S17-Au16829	CP	%	96			75-125	Pass	
Lead	S17-Au16829	CP	%	101			75-125	Pass	
Mercury	S17-Au16829	CP	%	112			70-130	Pass	
Nickel	S17-Au16829	CP	%	91			75-125	Pass	
Zinc	S17-Au16829	CP	%	97			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g,h,i)perylene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a,h)anthracene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S17-Au16810	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Clay	B17-JI12854	NCP	%	24	25	7.0	30%	Pass	
Total Organic Carbon	S17-Au06582	NCP	%	1.0	0.9	8.2	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S17-Au16814	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S17-Au16814	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S17-Au16814	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S17-Au16814	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S17-Au16814	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S17-Au16814	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S17-Au16814	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S17-Au16814	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S17-Au16814	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S17-Au16814	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	

Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	S17-Au16814	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
TRH C6-C10	S17-Au16814	CP	mg/kg	< 20	< 20	<1	30%	Pass
TRH >C10-C16	S17-Au16814	CP	mg/kg	< 50	< 50	<1	30%	Pass
TRH >C16-C34	S17-Au16814	CP	mg/kg	< 100	< 100	<1	30%	Pass
TRH >C34-C40	S17-Au16814	CP	mg/kg	< 100	< 100	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Conductivity (1:5 aqueous extract at 25°C)	S17-Au16818	CP	uS/cm	30	33	11	30%	Pass
pH (1:5 Aqueous extract)	S17-Au16818	CP	pH Units	5.3	5.3	pass	30%	Pass
Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Chlordanes - Total	S17-Au16826	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
4,4'-DDD	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
4,4'-DDE	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
4,4'-DDT	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
a-BHC	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Aldrin	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
b-BHC	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
d-BHC	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Dieldrin	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan I	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan II	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan sulphate	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin aldehyde	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin ketone	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
g-BHC (Lindane)	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Heptachlor	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Heptachlor epoxide	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Hexachlorobenzene	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Methoxychlor	S17-Au16826	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Toxaphene	S17-Au16826	CP	mg/kg	< 1	< 1	<1	30%	Pass
Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	S17-Au16826	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1221	S17-Au16826	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1232	S17-Au16826	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1242	S17-Au16826	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1248	S17-Au16826	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1254	S17-Au16826	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1260	S17-Au16826	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Total PCB*	S17-Au16026	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
% Moisture	S17-Au16826	CP	%	17	16	4.0	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S17-Au16826	CP	mg/kg	7.0	7.3	4.0	30%	Pass
Cadmium	S17-Au16826	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
Chromium	S17-Au16826	CP	mg/kg	19	18	1.0	30%	Pass
Copper	S17-Au16826	CP	mg/kg	< 5	< 5	<1	30%	Pass
Lead	S17-Au16826	CP	mg/kg	24	24	1.0	30%	Pass
Mercury	S17-Au16826	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass

Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Nickel	S17-Au16826	CP	mg/kg	< 5	< 5	<1	30%	Pass
Zinc	S17-Au16826	CP	mg/kg	8.4	8.9	5.0	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S17-Au16829	CP	mg/kg	4.1	4.1	<1	30%	Pass
Cadmium	S17-Au16829	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
Chromium	S17-Au16829	CP	mg/kg	15	16	4.0	30%	Pass
Copper	S17-Au16829	CP	mg/kg	13	13	1.0	30%	Pass
Lead	S17-Au16829	CP	mg/kg	14	14	<1	30%	Pass
Mercury	S17-Au16829	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Nickel	S17-Au16829	CP	mg/kg	15	15	2.0	30%	Pass
Zinc	S17-Au16829	CP	mg/kg	21	21	1.0	30%	Pass

Quality Control Analyte Summary Compliance

The table below is the actual occurrence of QC performed on the batch of samples within this report and as defined below

Analysis	Samples Analysed	Laboratory Duplicates Reported	Laboratory Matrix Spikes Reported	Method Blanks Reported	Laboratory Control Samples Reported
BTEX	9	1	1	1	1
Total Recoverable Hydrocarbons - 1999 NEPM	9	1	1	2	1
Total Recoverable Hydrocarbons - 2013 NEPM	9	1	1	2	1
Polycyclic Aromatic Hydrocarbons	9	1	1	1	1
Organochlorine Pesticides	9	1	1	1	1
Polychlorinated Biphenyls	9	1	1	1	1
% Clay	8	1	NA	1	1
Conductivity (1:5 aqueous extract at 25°C)	8	1	NA	1	NA
pH (1:5 Aqueous extract)	8	1	NA	NA	NA
Total Organic Carbon	8	1	NA	1	1
% Moisture	9	1	NA	NA	NA
Heavy Metals	9	2	1	1	1

Quality Control Parameter Frequency Compliance follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure April 2011, Schedule B3, Guideline on Laboratory Analysis of Potentially Contaminated Soils and US EPA SW-846 Chapter 1: 'Quality Control'.

It comprises the following when a laboratory process batch is deemed to consist of up to 20 samples that are similar in terms of matrix and test procedure, and are processed as one unit for QC purposes. If more than 20 samples are being processed, they are considered as more than one batch.

Method blank

One method blank per process batch.

Laboratory duplicate

There should be at least one duplicate per process batch, or two duplicates if the process batch exceeds 10 samples.

Laboratory control sample (LCS)

There should be at least one LCS per process batch.

Matrix spikes

There should be one matrix spike per matrix type per process batch.

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Nibha Vaidya	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Jonathon Angell	Senior Analyst-Inorganic (QLD)
Joseph Edouard	Senior Analyst-Organic (VIC)
Matthew Deaves	Senior Analyst-Asbestos (WA)
Rhys Thomas	Senior Analyst-Asbestos (WA)



Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Certificate of Analysis

JBS & G Australia (NSW) P/L
Level 1, 50 Margaret St
Sydney
NSW 2000



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention: **Scott Burrows**

Report **558537-W**
Project name **ESA 3 SCHOOLS**
Project ID **53033**
Received Date **Aug 14, 2017**

Client Sample ID			TRIP BLANK	TRIP SPIKE
Sample Matrix			Water	Water
Eurofins mgt Sample No.			S17-Au16833	S17-Au16834
Date Sampled			Aug 14, 2017	Aug 14, 2017
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene ^{N02}	0.01	mg/L	< 0.01	122%
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	-
TRH C6-C10	0.02	mg/L	< 0.02	92%
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	0.02	mg/L	< 0.02	77%
BTEX				
Benzene	0.001	mg/L	< 0.001	97%
Toluene	0.001	mg/L	< 0.001	106%
Ethylbenzene	0.001	mg/L	< 0.001	128%
m&p-Xylenes	0.002	mg/L	< 0.002	125%
o-Xylene	0.001	mg/L	< 0.001	126%
Xylenes - Total	0.003	mg/L	< 0.003	125%
4-Bromofluorobenzene (surr.)	1	%	88	121

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.

A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons	Sydney	Aug 21, 2017	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
JBS&G Suite 2			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Aug 21, 2017	7 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Aug 21, 2017	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
NSW 2000

Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #: 558537
Phone: 02 8245 0300
Fax:

Received: Aug 14, 2017 3:56 PM
Due: Aug 21, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	BH01 0.1-0.2	Aug 14, 2017		Soil	S17-Au16810	
2	BH01 0.2-0.3	Aug 14, 2017		Soil	S17-Au16812	
3	BH01 0.9-1.0	Aug 14, 2017		Soil	S17-Au16813	
4	BH02 0-0.1	Aug 14, 2017		Soil	S17-Au16814	
5	BH02 0.2-0.3	Aug 14, 2017		Soil	S17-Au16815	
6	BH03 0-0.1	Aug 14, 2017		Soil	S17-Au16816	
7	BH03 0.3-0.4	Aug 14, 2017		Soil	S17-Au16817	
8	BH04 0.1-0.2	Aug 14, 2017		Soil	S17-Au16818	
9	BH04 0.3-0.4	Aug 14, 2017		Soil	S17-Au16819	
External Laboratory						
					% Clay	
					Asbestos - WA guidelines	
					HOLD	
					pH (1:5 Aqueous extract)	
					Total Organic Carbon	
					Moisture Set	
					Cation Exchange Capacity	
					JBS&G Suite 2	
					BTEXN and Volatile TRH	

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
NSW 2000

Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #:
Phone:
Fax:

Received: Aug 14, 2017 3:56 PM
Due: Aug 21, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

[illegible]

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
NSW 2000
Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #: 558537
Phone: 02 8245 0300
Fax:

Received: Aug 14, 2017 3:56 PM
Due: Aug 21, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail				BTEXN and Volatile TRH															
				JBS&G Suite 2															
				Cation Exchange Capacity															
				Moisture Set															
				Total Organic Carbon															
				pH (1:5 Aqueous extract)															
				HOLD															
				Asbestos - WA guidelines															
				% Clay															

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre
ug/L: micrograms per litre	ppm: Parts per million
ppb: Parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres	

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions									
Naphthalene			mg/L	< 0.01			0.01	Pass	
TRH C6-C10			mg/L	< 0.02			0.02	Pass	
Method Blank									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions									
TRH C6-C9			mg/L	< 0.02			0.02	Pass	
Method Blank									
BTEX									
Benzene			mg/L	< 0.001			0.001	Pass	
Toluene			mg/L	< 0.001			0.001	Pass	
Ethylbenzene			mg/L	< 0.001			0.001	Pass	
m&p-Xylenes			mg/L	< 0.002			0.002	Pass	
o-Xylene			mg/L	< 0.001			0.001	Pass	
Xylenes - Total			mg/L	< 0.003			0.003	Pass	
LCS - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions									
Naphthalene			%	74			70-130	Pass	
TRH C6-C10			%	85			70-130	Pass	
LCS - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions									
TRH C6-C9			%	89			70-130	Pass	
LCS - % Recovery									
BTEX									
Benzene			%	110			70-130	Pass	
Toluene			%	88			70-130	Pass	
Ethylbenzene			%	73			70-130	Pass	
m&p-Xylenes			%	78			70-130	Pass	
o-Xylene			%	75			70-130	Pass	
Xylenes - Total			%	77			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions									
				Result 1					
Naphthalene		S17-Au20909	NCP	%	110		70-130	Pass	
TRH C6-C10		S17-Au20909	NCP	%	110		70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions									
				Result 1					
TRH C6-C9		S17-Au20909	NCP	%	114		70-130	Pass	
Spike - % Recovery									
BTEX									
				Result 1					
Benzene		S17-Au20909	NCP	%	82		70-130	Pass	
Toluene		S17-Au20909	NCP	%	102		70-130	Pass	
Ethylbenzene		S17-Au20909	NCP	%	108		70-130	Pass	
m&p-Xylenes		S17-Au20909	NCP	%	115		70-130	Pass	
o-Xylene		S17-Au20909	NCP	%	116		70-130	Pass	
Xylenes - Total		S17-Au20909	NCP	%	115		70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions									
				Result 1	Result 2	RPD			
Naphthalene		S17-Au20908	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
TRH C6-C10		S17-Au20908	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass

Duplicate								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD		
TRH C6-C9	S17-Au20908	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass
Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	S17-Au20908	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Toluene	S17-Au20908	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Ethylbenzene	S17-Au20908	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
m&p-Xylenes	S17-Au20908	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass
o-Xylene	S17-Au20908	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Xylenes - Total	S17-Au20908	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass

Quality Control Analyte Summary Compliance

The table below is the actual occurrence of QC performed on the batch of samples within this report and as defined below

Analysis	Samples Analysed	Laboratory Duplicates Reported	Laboratory Matrix Spikes Reported	Method Blanks Reported	Laboratory Control Samples Reported
Total Recoverable Hydrocarbons - 1999 NEPM	2	1	1	1	1
Total Recoverable Hydrocarbons - 2013 NEPM	2	1	1	1	1
BTEX	2	1	1	1	1

Quality Control Parameter Frequency Compliance follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure April 2011, Schedule B3, Guideline on Laboratory Analysis of Potentially Contaminated Soils and US EPA SW-846 Chapter 1: 'Quality Control'.

It comprises the following when a laboratory process batch is deemed to consist of up to 20 samples that are similar in terms of matrix and test procedure, and are processed as one unit for QC purposes. If more than 20 samples are being processed, they are considered as more than one batch.

Method blank

One method blank per process batch.

Laboratory duplicate

There should be at least one duplicate per process batch, or two duplicates if the process batch exceeds 10 samples.

Laboratory control sample (LCS)

There should be at least one LCS per process batch.

Matrix spikes

There should be one matrix spike per matrix type per process batch.

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within Holding Time	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

Authorised By

Nibha Vaidya Analytical Services Manager



Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Sample Receipt Advice

Company name: **JBS & G Australia (NSW) P/L**
Contact name: **Scott Burrows**
Project name: **ESA 3 SCHOOLS**
Project ID: **53033**
COC number: **013024| 09180**
Turn around time: **5 Day**
Date/Time received: **Aug 17, 2017 2:24 PM**
Eurofins | mgt reference: **559207**

Sample information

- ☒ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☒ All samples have been received as described on the above COC.
- ☒ COC has been completed correctly.
- ☒ Attempt to chill was evident.
- ☒ Appropriately preserved sample containers have been used.
- ☒ All samples were received in good condition.
- ☒ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ☒ Appropriate sample containers have been used.
- ☒ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Scott Burrows - SBurrows@jbsg.com.au.

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
NSW 2000

Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #:
Phone:
Fax:

Received: Aug 17, 2017 2:24 PM
Due: Aug 24, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Metals M8	
Polycyclic Aromatic Hydrocarbons						X	X
USA Leaching Procedure						X	X
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	BH01 0.1-0.2	Not Provided		US Leachate	M17-Au22278	X	X
2	BH02 0.0-0.1	Not Provided		US Leachate	M17-Au22279	X	X
3	BH03 0.0-0.1	Not Provided		US Leachate	M17-Au22280	X	X
4	BH04 0.1-0.2	Not Provided		US Leachate	M17-Au22281	X	X
5	BH05 0.0-0.1	Not Provided		US Leachate	M17-Au22282	X	X
6	BH06 0.0-0.1	Not Provided		US Leachate	M17-Au22283	X	X
7	BH07 0.05-0.15	Not Provided		US Leachate	M17-Au22284	X	X
8	BH08 0.1-0.2	Not Provided		US Leachate	M17-Au22285	X	X
Test Counts						8	8

Certificate of Analysis

JBS & G Australia (NSW) P/L
Level 1, 50 Margaret St
Sydney
NSW 2000



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention: **Scott Burrows**

Report **559207-L-V2**
Project name **ESA 3 SCHOOLS**
Project ID **53033**
Received Date **Aug 17, 2017**

Client Sample ID			BH01 0.1-0.2 US Leachate M17-Au22278 Not Provided	BH02 0.0-0.1 US Leachate M17-Au22279 Not Provided	BH03 0.0-0.1 US Leachate M17-Au22280 Not Provided	BH04 0.1-0.2 US Leachate M17-Au22281 Not Provided
Sample Matrix						
Eurofins mgt Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	74	94	76	104
p-Terphenyl-d14 (surr.)	1	%	81	111	86	118
Heavy Metals						
Arsenic	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Cadmium	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Chromium	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Copper	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Lead	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Mercury	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Nickel	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Zinc	0.01	mg/L	< 0.01	< 0.01	0.02	< 0.01
USA Leaching Procedure						
Leachate Fluid ^{C01}		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	5.9	5.7	5.6	5.5
pH (Leachate fluid)	0.1	pH Units	5.0	5.0	5.0	5.0
pH (off)	0.1	pH Units	5.7	5.5	5.3	5.3
pH (USA HCl addition)	0.1	pH Units	1.9	1.9	1.9	1.9

Client Sample ID			BH05 0.0-0.1 US Leachate M17-Au22282 Not Provided	BH06 0.0-0.1 US Leachate M17-Au22283 Not Provided	BH07 0.05-0.15 US Leachate M17-Au22284 Not Provided	BH08 0.1-0.2 US Leachate M17-Au22285 Not Provided
Sample Matrix						
Eurofins mgt Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	90	137	62	148
p-Terphenyl-d14 (surr.)	1	%	104	146	93	132
Heavy Metals						
Arsenic	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Cadmium	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Chromium	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Copper	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Lead	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Mercury	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Nickel	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Zinc	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
USA Leaching Procedure						
Leachate Fluid ^{C01}		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	5.6	5.6	5.5	5.5
pH (Leachate fluid)	0.1	pH Units	5.0	5.0	5.0	5.0
pH (off)	0.1	pH Units	5.4	5.3	5.3	5.6
pH (USA HCl addition)	0.1	pH Units	2.0	2.0	2.0	2.0

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.

A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description

Polycyclic Aromatic Hydrocarbons

- Method: LTM-ORG-2140 PAH and Phenols in Soils by GCMS

Metals M8

- Method: LTM-MET-3030 by ICP-OES (hydride ICP-OES for Mercury)

Testing Site	Extracted	Holding Time
Melbourne	Aug 23, 2017	7 Day
Melbourne	Aug 18, 2017	28 Days

Company Name: JBS & G Australia (NSW) P/L
Address: Level 1, 50 Margaret St
Sydney
NSW 2000
Project Name: ESA 3 SCHOOLS
Project ID: 53033

Order No.:
Report #: 559207
Phone: 02 8245 0300
Fax:

Received: Aug 17, 2017 2:24 PM
Due: Aug 24, 2017
Priority: 5 Day
Contact Name: Scott Burrows

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Metals M8	
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	Polycyclic Aromatic Hydrocarbons	USA Leaching Procedure
1	BH01 0.1-0.2	Not Provided		US Leachate	M17-Au22278	X	X
2	BH02 0.0-0.1	Not Provided		US Leachate	M17-Au22279	X	X
3	BH03 0.0-0.1	Not Provided		US Leachate	M17-Au22280	X	X
4	BH04 0.1-0.2	Not Provided		US Leachate	M17-Au22281	X	X
5	BH05 0.0-0.1	Not Provided		US Leachate	M17-Au22282	X	X
6	BH06 0.0-0.1	Not Provided		US Leachate	M17-Au22283	X	X
7	BH07 0.05-0.15	Not Provided		US Leachate	M17-Au22284	X	X
8	BH08 0.1-0.2	Not Provided		US Leachate	M17-Au22285	X	X
Test Counts						8	8

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre
ug/L: micrograms per litre	ppm: Parts per million
ppb: Parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres	

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Heavy Metals										
Arsenic				mg/L	< 0.01			0.01	Pass	
Cadmium				mg/L	< 0.005			0.005	Pass	
Chromium				mg/L	< 0.01			0.01	Pass	
Copper				mg/L	< 0.01			0.01	Pass	
Lead				mg/L	< 0.01			0.01	Pass	
Mercury				mg/L	< 0.001			0.001	Pass	
Nickel				mg/L	< 0.01			0.01	Pass	
Zinc				mg/L	< 0.01			0.01	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
Heavy Metals					Result 1					
Arsenic	M17-Au20271	NCP	%		99			75-125	Pass	
Cadmium	M17-Au20271	NCP	%		98			75-125	Pass	
Chromium	M17-Au20271	NCP	%		97			75-125	Pass	
Copper	M17-Au20271	NCP	%		95			75-125	Pass	
Lead	M17-Au20271	NCP	%		99			75-125	Pass	
Mercury	M17-Au20271	NCP	%		98			70-130	Pass	
Nickel	M17-Au20271	NCP	%		96			75-125	Pass	
Zinc	M17-Au20271	NCP	%		102			75-125	Pass	
Spike - % Recovery										
Polycyclic Aromatic Hydrocarbons					Result 1					
Acenaphthene	M17-Au22279	CP	%		71			70-130	Pass	
Acenaphthylene	M17-Au22279	CP	%		81			70-130	Pass	
Anthracene	M17-Au22279	CP	%		83			70-130	Pass	
Benz(a)anthracene	M17-Au22279	CP	%		73			70-130	Pass	
Benzo(a)pyrene	M17-Au22279	CP	%		71			70-130	Pass	
Benzo(b&j)fluoranthene	M17-Au22279	CP	%		71			70-130	Pass	
Benzo(g,h,i)perylene	M17-Au22279	CP	%		71			70-130	Pass	
Benzo(k)fluoranthene	M17-Au22279	CP	%		84			70-130	Pass	
Chrysene	M17-Au22279	CP	%		75			70-130	Pass	
Dibenz(a,h)anthracene	M17-Au22279	CP	%		78			70-130	Pass	
Fluoranthene	M17-Au22279	CP	%		73			70-130	Pass	
Fluorene	M17-Au22279	CP	%		77			70-130	Pass	
Indeno(1,2,3-cd)pyrene	M17-Au22279	CP	%		74			70-130	Pass	
Naphthalene	M17-Au22279	CP	%		73			70-130	Pass	
Phenanthrene	M17-Au22279	CP	%		73			70-130	Pass	
Pyrene	M17-Au22279	CP	%		71			70-130	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
Polycyclic Aromatic Hydrocarbons					Result 1	Result 2	RPD			
Acenaphthene	M17-Au20271	NCP	mg/L		< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	M17-Au20271	NCP	mg/L		< 0.001	< 0.001	<1	30%	Pass	
Anthracene	M17-Au20271	NCP	mg/L		< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	M17-Au20271	NCP	mg/L		< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	M17-Au20271	NCP	mg/L		< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	M17-Au20271	NCP	mg/L		< 0.001	< 0.001	<1	30%	Pass	
Benzo(g,h,i)perylene	M17-Au20271	NCP	mg/L		< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	M17-Au20271	NCP	mg/L		< 0.001	< 0.001	<1	30%	Pass	
Chrysene	M17-Au20271	NCP	mg/L		< 0.001	< 0.001	<1	30%	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Dibenz(a,h)anthracene	M17-Au20271	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	M17-Au20271	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	M17-Au20271	NCP	mg/L	0.001	0.001	13	30%	Pass	
Indeno(1,2,3-cd)pyrene	M17-Au20271	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	M17-Au20271	NCP	mg/L	0.039	0.044	11	30%	Pass	
Phenanthrene	M17-Au20271	NCP	mg/L	0.001	0.002	11	30%	Pass	
Pyrene	M17-Au20271	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M17-Au20271	NCP	mg/L	0.02	0.02	3.0	30%	Pass	
Cadmium	M17-Au20271	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Chromium	M17-Au20271	NCP	mg/L	0.03	0.03	8.0	30%	Pass	
Copper	M17-Au20271	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Lead	M17-Au20271	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Mercury	M17-Au20271	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Nickel	M17-Au20271	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Zinc	M17-Au20271	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

This report has been revised (V2) to include samples from project number 53033 only.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Nibha Vaidya	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)



Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

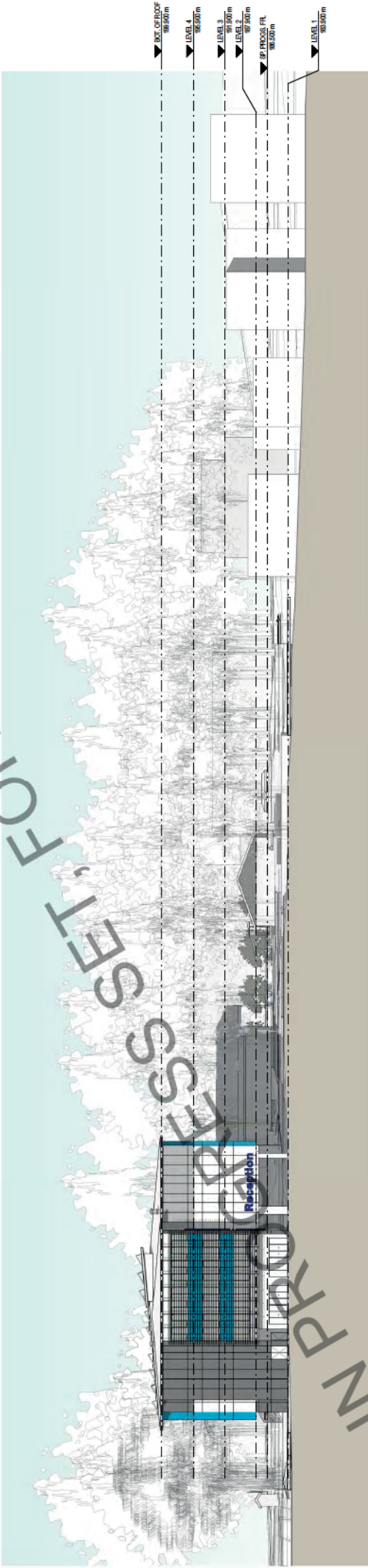
Measurement uncertainty of test data is available on request or please [click here](#).

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Appendix L Proposed Development Plans



1 SITE ELEVATION-EDGEWORTH DAVID AVENUE
SCALE 1:250



2 SITE ELEVATION-MYRA STREET
SCALE 1:250

0 250 500 750 1000 1250mm
SCALE 1:250
DATE: 20/07/2017



NSW
GOVERNMENT
TSA
MANAGEMENT

ISSUED FOR DEVELOPMENT APPLICATION
No. Revision: Nil
Author: [blank]
Date: 24.07.2017

AA

CSP

SAF

24.07.2017

Client: NSW DEPARTMENT OF EDUCATION
Project: WAITARA PUBLIC SCHOOL REDEVELOPMENT
Title: SITE ELEVATIONS
Drawing No: 21-26108.WA-DA-AR-1010
Rev: A

Designer: S. BUDNAN
Design: A. MILLER
Check: P. MACCUNA
Approved: [blank]
Normalized: [blank]
Responsible Architect: [blank]
Scale: 1:250

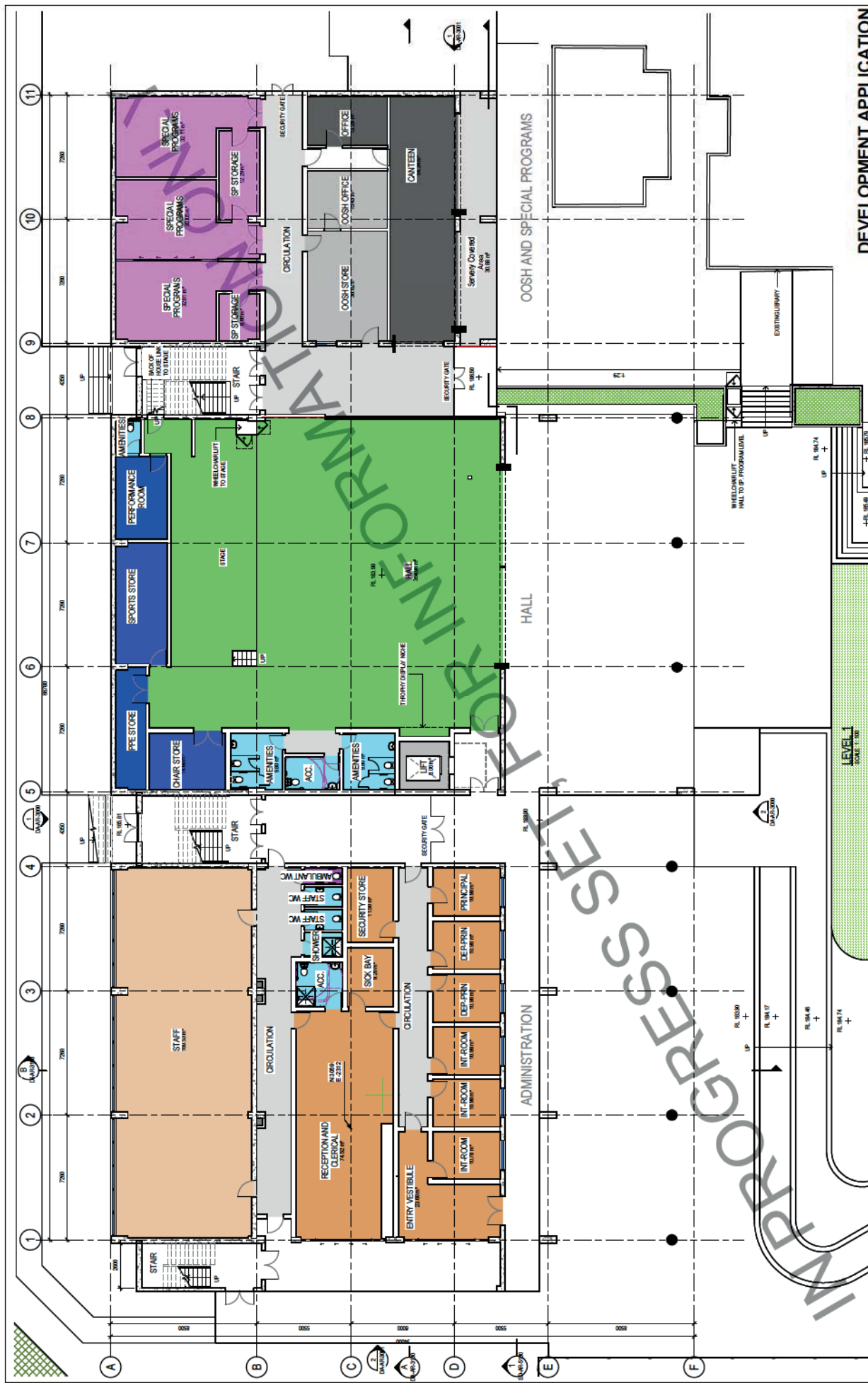
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DEVELOPMENT APPLICATION

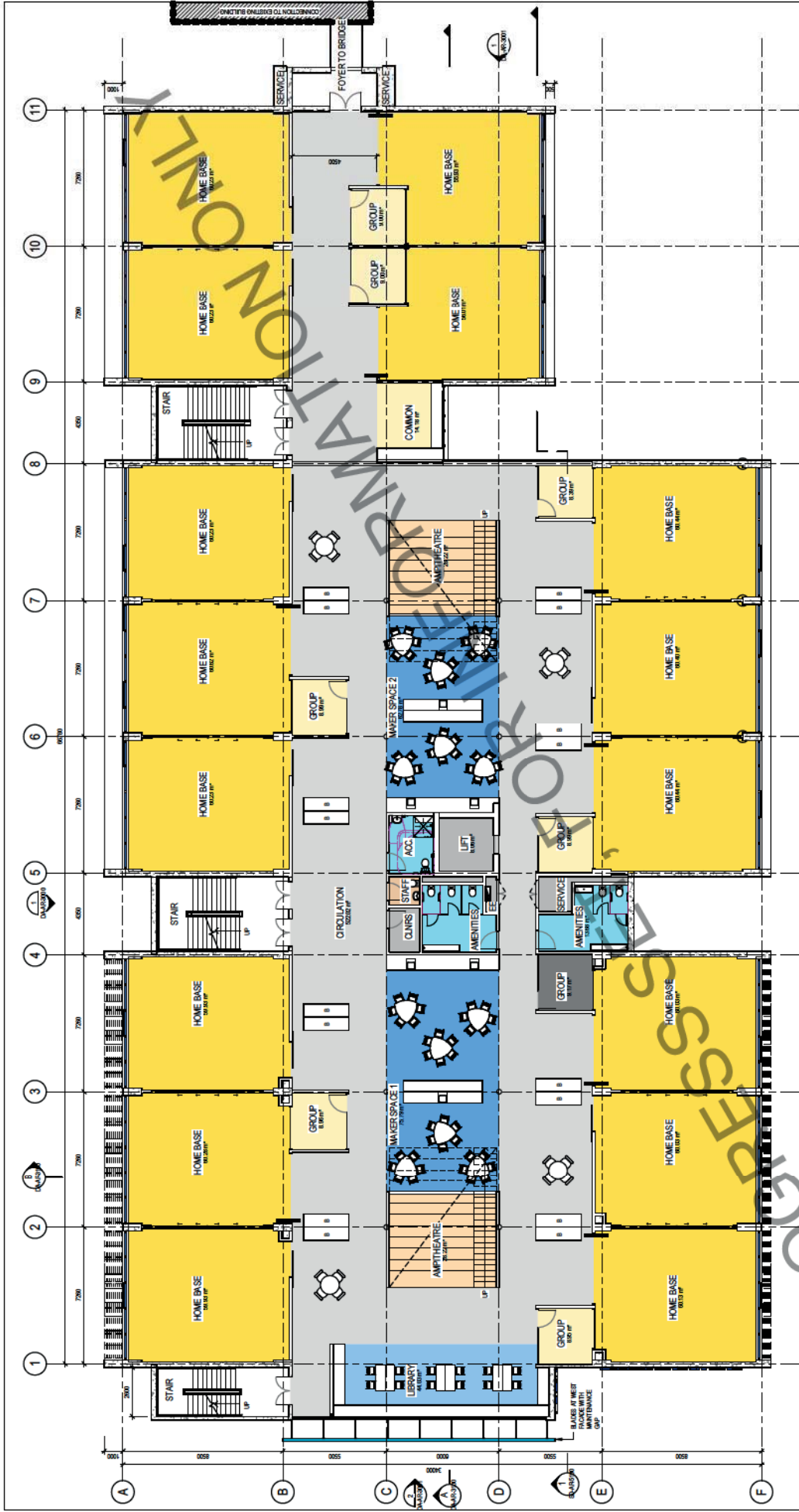
NSW DEPARTMENT OF EDUCATION
WAITARA PUBLIC SCHOOL REDEVELOPMENT
SITE ELEVATIONS

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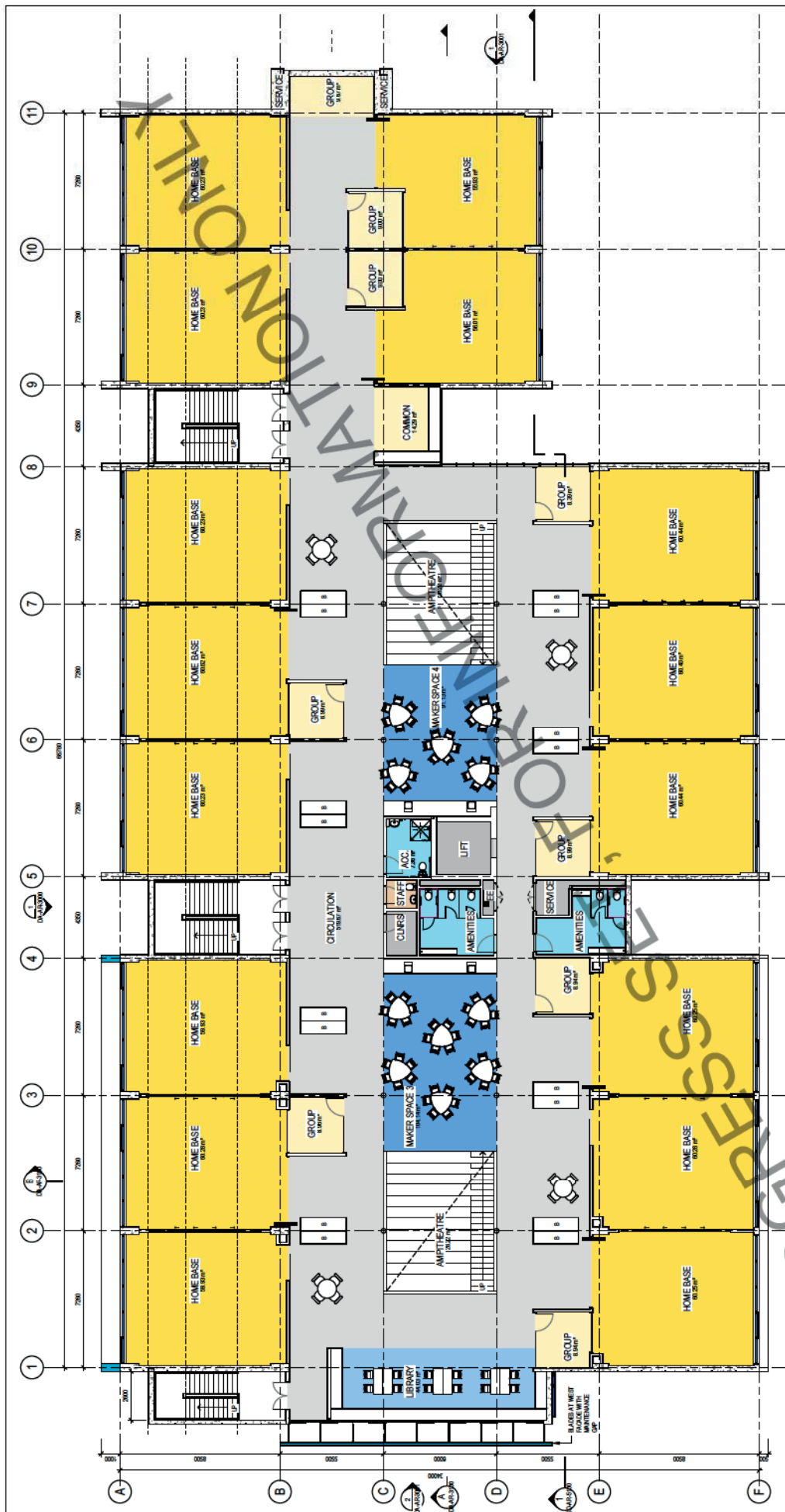
DEVELOPMENT APPLICATION

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DEVELOPMENT APPLICATION

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DEVELOPMENT APPLICATION

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