Site Audit Report

0503-1609

Lot 4 in Proposed Sub division PPN DP 1202362
Western Sydney University
Cnr Hawkesbury and Darcy Roads, Westmead NSW

6 October 2016

51370/104277

JBS&G Australia Pty Ltd

www.jbsg.com.au

NSW Site Auditor Scheme
SITE AUDIT STATEMENT

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the Contaminated Land Management Act 1997 on 31st October 2012. For more information about completing this form, go to Part IV.

PART I: Site audit identification

Site audit statement no. 0503-1609

This site audit is a **statutory audit**/~~non-statutory audit~~* within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details (as accredited under the *Contaminated Land Management Act 1997*)

Name	**Andrew Lau**	Company	**JBS&G**		
Address	**Level 1, 50 Margaret Street**				
	SYDNEY	**NSW**		Postcode	**2000**
Phone	**02 8245 0300**	Fax	**02 8245 0399**		

Site Details

Address	**158-164 Hawkesbury and 2A Darcy Road**		
	Westmead	**NSW**	Postcode **2145**

Property description *(attach a list if several properties are included in the site audit)*

Lot 4 in proposed subdivision PPN DP 1202362

Local Government Area	**Parramatta City Council**		
Area of Site (eg. hectares)	**6588 m²**	Current zoning	**SP2 Educational Establishment**

To the best of my knowledge, the site **is**/**is not*** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

Declaration/Order/Agreement/Proposal/Notice* no(s) **N/A**

Site audit commissioned by

Name	**Andrew Wheeler**	Company	**Western Sydney University and Combined Projects (Westmead) Pty Ltd**
Address	**Locked Bag 1797**		
	Penrith NSW		Postcode **2751**
Phone	**0414 454 553**	Fax	**NA**

Name and phone number of contact person (if different from above) **N/A**

Purpose of site audit

☑ A. To determine land use suitability (please specify intended use[s])

Residential with minimal access to soil

OR

☐ ~~B(i) To determine the nature and extent of contamination, and/or~~

☐ ~~B(ii) To determine the appropriateness of an investigation/remedial action/management plan*, and/or~~

☐ ~~B(iii) To determine if the land can be made suitable for a particular use or uses by~~ implementation of a specified remedial action plan/management plan* *(please specify ~~intended use[s]~~)*

Information sources for site audit

Consultancy(ies) which conducted the site investigation(s) and/or remediation

Coffey Environments Pty Ltd

Geotechnique Pty Ltd

P Clifton and Associates Pty Ltd

- Environmental Site Assessment, University of Western Sydney, Hawkesbury Road, Westmead, Coffey Environments Pty Ltd, 13 February 2008 (Coffey 2008).
- Sampling Analysis and Quality Plan, UWS Westmead Campus Redevelopment Project, Lot 1 in DP107786, 158-164 Hawkesbury Road, Westmead, Geotechnique Pty Ltd, 10 February 2012 (GPL 2012a).
- Supplementary Environmental Site Assessment, UWS Westmead Campus Redevelopment Project, Lot 7 and Part Lot 8 in DP107785, Cnr Hawkesbury and Darcy Roads, Westmead, Geotechnique Pty Ltd, 2 August 2012 (GPL 2012b).
- Remedial Action Plan, UWS Westmead Campus Redevelopment Project, Lot 7 and Part Lot 8 in DP107785. Cnr Hawkesbury and Darcy Roads, Westmead, Geotechnique Pty Ltd, 11 October 2012 (GPL 2012c).
- Waste Classification, WSU Westmead Campus Redevelopment Project Lot 7 and Part Lot 8 in DP1077852 Corner Hawkesbury and Darcy Roads, Westmead, Geotechnique Pty Ltd, Report No 12619/2-L1, 10 February 2016 (GPL 2016a).
- Additional Contamination Assessment, WSU Westmead Campus Redevelopment Project, Lot 7 and Part Lot 8 in DP 1077852, Cnr Hawkesbury and Darcy Roads, Westmead, Geotechnique Pty Ltd, Report No 12619/2-AA, 9 March 2016 (GPL 2016b).
- Validation Report Following Removal of Asbestos Impacted Soil, Western Sydney University Westmead Campus Hawkesbury Road, Westmead NSW, P Clifton & Associates Pty Ltd, 31 May 2016 (PCA 2016).

- Validation, WSU Westmead Campus Redevelopment Project, Lot 7 and Part Lot 8 in DP 1077852, Corner Hawkesbury and Darcy Roads, Westmead, Geotechnique Pty Ltd, Report No 12619/3-AAR1, 9 June (GPL 2016c).

Other information reviewed (including previous site audit reports and statements relating to the site)

- *Site Audit Report,0503-1107 University of Western Sydney*, UWS Westmead Campus, Cnr Hawkesbury and Darcy Roads, Westmead NSW, JBS Environmental Pty Ltd, November 2012 (JBS 2012).

Site audit report

Title	**Site Audit Report, Lot 4 in Proposed Sub division PPN DP 1202362, Western Sydney University, Cnr Hawkesbury and Darcy Roads, Westmead NSW**

Report no. **51370/104 277 (Rev 0)** Date **6 October 2016**

PART II: Auditor's findings

Please complete either Section A or Section B, **not** both. *(Strike out the irrelevant section.)*

Use Section A where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land use(s).

Use Section B where the audit is to determine the nature and extent of contamination and/or the appropriateness of an investigation or remedial action or management plan and/or whether the site can be made suitable for a specified land use or uses subject to the successful implementation of a remedial action or management plan.

Section A

☑ **I certify that, in my opinion, the site is SUITABLE for the following use(s)** *(tick all appropriate uses and strike out those not applicable)*:

- ☐ ~~Residential, including substantial vegetable garden and poultry~~
- ☐ ~~Residential, including substantial vegetable garden, excluding poultry~~
- ☐ ~~Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~
- ☐ ~~Day care centre, preschool, primary school~~
- ☑ Residential with minimal opportunity for soil access, including units
- ☐ ~~Secondary school~~
- ☐ ~~Park, recreational open space, playing field~~
- ☑ Commercial/industrial
- ☐ ~~Other (please specify)~~

~~**subject to compliance with the following environmental management plan** *(insert title, date and author of plan)* **in light of contamination remaining on the site:**~~

~~**OR**~~

☐ ~~I certify that, in my opinion, the site is NOT SUITABLE for any use due to the risk of harm from contamination.~~

Section B

Purpose of the plan[1] which is the subject of the audit

I certify that, in my opinion:

☐ the nature and extent of the contamination HAS/HAS NOT* been appropriately determined

AND/OR

☐ the investigation/remedial action plan/management plan* IS/IS NOT* appropriate for the purpose stated above

AND/OR

☐ the site CAN BE MADE SUITABLE for the following uses *(tick all appropriate uses and strike out those not applicable)*:

- ☐ Residential, including substantial vegetable garden and poultry
- ☐ Residential, including substantial vegetable garden, excluding poultry
- ☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
- ☐ Day care centre, preschool, primary school
- ☐ Residential with minimal opportunity for soil access, including units
- ☐ Secondary school
- ☐ Park, recreational open space, playing field
- ☐ Commercial/industrial
- ☐ Other (please specify) – .....

if the site is remediated/managed* in accordance with the following remedial action plan/management plan*

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

Overall comments

- The site assessment activities and remediation and validation works are considered to have met the requirements of the Contaminated Sites. Guidelines for the NSW Site Auditor Scheme (2nd Edition) (DEC 2006).
- Additional soil and groundwater investigations in former building footprints and in the vicinity of the former UST were undertaken by the consultant (GPL 2016b and GPL 2016c) in accordance with auditor requirements (JBS&G 2012), with no further contamination identified.
- The soil contamination, primarily identified as heavy metal, PAH and asbestos during the investigation works, was appropriately remediated in accordance with the RAP (GPL 2012c). The validation reports (GPL 2016c and PCA 2016) detail the validation results and findings from the site inspections confirming the effectiveness of the remediation works.
- Remediation works completed at the site included excavation and off-site disposal of impacted fill in remediation Areas 1 and 4. The excavations were validated with no residual concentration of contaminants exceeding relevant criteria.
- There is no evidence of migration of contaminants from the site which is likely to result in any unacceptable risks to surrounding human or ecological receptors.
- The site (Lot 4 in PPN DP 1202382) is considered suitable for the proposed landuse (i.e., residential with minimal access to soils) as defined in Section 3 of Schedule B7 NEPC 2013.
- The landuse suitability is not subject to any ongoing monitoring or management requirements.

PART III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority under the *Contaminated Land Management Act 1997* (Accreditation No. **0503**).

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997,* and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Andrew Lau
6 October 2016

PART IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remedial action or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use(s) of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A or Section B of Part II, **not both**.

In **Section A** the auditor may conclude that the land is *suitable* for a specified use(s) OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further remediation or investigation of the site was needed to render the site fit for the specified use(s). Any **condition** imposed should be limited to implementation of an environmental management plan to help ensure the site remains safe for the specified use(s). The plan should be legally enforceable: for example a requirement of a notice under the *Contaminated Land Management Act 1997* (CLM Act) or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of the *Environmental Planning and Assessment Act 1979*.

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

In **Section B** the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or whether land can be made suitable for a particular land use or uses upon implementation of a remedial action or management plan.

By certifying that a site *can be made suitable* for a use or uses *if* remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

In **Part III** the auditor certifies his/her standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to:

EPA (NSW)
Contaminated Sites Section
PO Box A290, SYDNEY SOUTH NSW 1232
nswauditors@epa.nsw.gov.au

AND

the local council for the land which is the subject of the audit.

Site Audit Report
0503-1609

Lot 4 in Proposed Sub division PPN DP 1202362
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Cnr Hawkesbury and Darcy Roads, Westmead NSW

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51370/104277
JBS&G Australia Pty Ltd

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Appendices

Abbreviations

A list of the common abbreviations used throughout this report is provided below.

As	Arsenic
AST	Aboveground Storage Tank
Cd	Cadmium
Cr	Chromium
Cu	Copper
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
B(a)P	Benzo (a) pyrene
EPA	NSW Environment Protection Authority
DO	Dissolved oxygen
DoP	NSW Department of Planning
DQO	Data Quality Objectives
DP	Deposited Plan
EC	Electrical conductivity
EH	Redox potential
EPA	New South Wales Environment Protection Authority
Hg	Mercury
HIL	Health Based Investigation Level
LOR	Limit of Reporting
MAH	Monocyclic Aromatic Hydrocarbon
Ni	Nickel
OCP	Organochlorine Pesticide
SAR	Site Audit Report
SAS	Site Audit Statement
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PIL	(Provisional) Phytotoxicity Based Investigation Level
PCB	Polychlorinated Biphenyls
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percentage Difference
TPH	Total Petroleum Hydrocarbons (C_6-C_9 and C_{10}-C_{36})
UST	Underground Storage Tank
Zn	Zinc

1. Introduction

1.1 Introduction and Background

Andrew Lau, of JBS&G Australia Pty Ltd (JBS&G), was engaged by Western Sydney University and Combined Projects (Westmead) Pty Ltd (the client) on 26 November 2015 to conduct a site audit of Lot 4 in PPN DP 1202362 ('the site') in the proposed plan of subdivision of Lot 7 in DP 1077852 and Lot 2 in DP 1211982 at the Western Sydney University Westmead Campus (the campus) located at the corner of Hawkesbury and Darcy Roads, Westmead, NSW. Refer to **Appendix C** for a layout of the campus and the boundary of the site.

Andrew Lau is a Site Auditor accredited by the NSW Environment Protection Authority (EPA) under the Contaminated Land Management Act 1997 (CLM Act 1997) (Accreditation Number 0503). The audit reference number is 0503-1610.

A Site Audit Report (SAR) and Site Audit Statement (SAS) was previously issued (Audit no. 0503-1107) for the campus by Andrew Lau on 9 November 2012 (JBS&G 2012). The objectives of the previous site audit were to independently review an Environmental Site Assessment Report (ESA) and a remedial action plan (RAP) prepared for the campus by the consultant, Geotechnique Pty Ltd (GPL), to determine the appropriateness of the RAP and ultimately determine if the land can be made suitable for the intended uses by implementation of the RAP.

Audit opinion was provided that the campus can be made suitable for the proposed mixed residential, commercial and open space land use by implementation of the RAP, subject to the following conditions:

- The additional investigations proposed in the Remediation Action Plan (GPL 2012c) must be reviewed and accepted by a Site Auditor.
- The Asbestos Management Plan must be reviewed and accepted by a Site Auditor prior to commencement of remediation works.
- The validation report must be reviewed and accepted by a Site Auditor at the conclusion of the proposed remediation works, and a statement issued by a Site Auditor confirming the suitability of the site for residential, commercial and open space uses.

This site audit pertains to 'Lot 4' of the proposed subdivision of the campus. It is understood that the site is to be redeveloped for residential land-use following subdivision.

1.2 Objectives of the Audit

The objective of this site audit were to:

- Independently review an additional contamination assessment undertaken in previously inaccessible areas and a site validation report prepared following completion of on-site remediation works; and
- Prepare a Site Audit Report (SAR) and issue a Site Audit Statement (SAS) providing an opinion as to whether the remediation works reviewed in the Section B SAS (JBS&G 2012) were completed appropriately and provide an opinion on suitability of the site for the proposed residential land-use.

In accordance with the requirements of the CLM Act 1997, the site audit was undertaken with consideration to:

- The provisions of the CLM Act, Regulations and subsequent amendments;
- The provisions of any environmental planning instruments applying to the site; and

- Relevant guidelines made or approved by the EPA (**Appendix A**).

1.3 Type of Audit

The audit was initially commenced as a non-statutory audit. However, the auditor became aware of the conditions of consent imposed by the Parramatta City Council (DA/571/2014) on 5 April 2016 which required that development to be carried out in accordance with the Site Audit Report and Remedial Action Plan (Ref No. 0503-1107), dated November 2012.

Additionally, the auditor opinion provided in Section B Site Audit Statement (JBS&G 2012) was subject to compliance with the condition that 'the validation report must be reviewed and accepted by a Site Auditor at the conclusion of the proposed remediation works, and a statement issued by a Site Auditor confirming the suitability of the site for residential, commercial and open space uses.' As such, the audit was deemed statutory in nature with a site audit notification (SAN) provided to EPA on 8 April 2016 (EPA reference number DOC16/176882).

1.4 Documents Reviewed

The following documents were reviewed as part of this site audit:

- Environmental Site Assessment, University of Western Sydney, Hawkesbury Road, Westmead, Coffey Environments Pty Ltd, 13 February 2008 (Coffey 2008).
- Sampling Analysis and Quality Plan, UWS Westmead Campus Redevelopment Project, Lot 1 in DP107785, 158-164 Hawkesbury Road, Westmead, Geotechnique Pty Ltd, 10 February 2012 (GPL 2012a).
- Supplementary Environmental Site Assessment, UWS Westmead Campus Redevelopment Project, Lot 7 and Part Lot 8 in DP107785, Cnr Hawkesbury and Darcy Roads, Westmead, Geotechnique Pty Ltd, 2 August 2012 (GPL 2012b).
- Remedial Action Plan, UWS Westmead Campus Redevelopment Project, Lot 7 and Part Lot 8 in DP107785, Cnr Hawkesbury and Darcy Roads, Westmead, Geotechnique Pty Ltd, 11 October 2012 (GPL 2012c).
- Waste Classification, WSU Westmead Campus Redevelopment Project Lot 7 and Part Lot 8 in DP1077852 Corner Hawkesbury and Darcy Roads, Westmead, Geotechnique Pty Ltd, Report No 12619/2-L1, 10 February 2016 (GPL 2016a).
- Additional Contamination Assessment, WSU Westmead Campus Redevelopment Project, Lot 7 and Part Lot 8 in DP 1077852, Cnr Hawkesbury and Darcy Roads, Westmead, Geotechnique Pty Ltd, Report No 12619/2-AA, 9 March 2016 (GPL 2016b).
- Validation Report Following Removal of Asbestos Impacted Soil, Western Sydney University Westmead Campus Hawkesbury Road, Westmead NSW, P Clifton & Associates Pty Ltd, 31 May 2016 (PCA 2016).
- Validation, WSU Westmead Campus Redevelopment Project, Lot 7 and Part Lot 8 in DP 1077852, Corner Hawkesbury and Darcy Roads, Westmead, Geotechnique Pty Ltd, Report No 12619/3-AAR1, 9 June (GPL 2016c).

Additional correspondence relating to the site audit is provided in **Appendix B**.

1.5 Site Inspections

The site was inspected on the dates shown in **Table 1.1**.

Table 1.1: Summary of Audit Inspections

Date	Attendance	Purpose
12 December 2015	Andrew Wheeler (UWS) Anwar Barbhuyia (Geotechnigque)	Site inspection during remediation and validation works

	Philip Clifton (P Clifton & Associates) Andrew Lau (JBS&G)	

1.6 Chronology of Site Assessment, Remediation and Audit Works Undertaken at the Site

The process of the assessment, remediation, validation and audits undertaken at the site has been chronologically listed in **Table 1.2**.

Table 1.2: Summary of Assessment, Remediation, Validation and Audit Works Undertaken at the Site

Date	Purpose
November 2011	Commencement of Site Audit and review of consultant's Environmental Site Assessment (ESA) report (Coffey 2008) and conduct site inspection
November 2011	Preparation of Interim Audit Advice (0503-1107-001) by the Site Auditor (JBS 2011) (refer to **Appendix B**) which provided comments on the ESA (Coffey 2008).
February 2012	Preparation of the Sampling, Analytical and Quality Plan by GPL (GLP 2012a). The SAQP included sampling measures necessary to undertake the Supplementary ESA at the site.
March - April 2012	Fieldworks for the Supplementary ESA (GPL 2012b) were undertaken by GPL.
August 2012	Preparation of Supplementary ESA (GPL 2012b) by GPL, which incorporated additional information and investigation activities as requested by the Site Auditor (JBS 2011). The consultant (GPL 2012b) concluded that, "...the site could be made suitable for the proposed rezoning for residential, commercial and open space development, if the following steps are carried out: sampling and testing of soils beneath the site features, to be demolished as a part of the redevelopment, after removal; development of a RAP to remediate the lead and asbestos contamination with elevated metals concentrations already identified, plus any other contamination that might be identified through the recommended additional sampling and testing, followed by appropriate validation."
October 2012	Preparation of the RAP (GPL 2012c) by GPL which documents the procedures required to remediate the site for the proposed residential, commercial and open space land uses.
November 2012	Preparation of Section B Site Audit Statement 0503-1107 and Site Audit Report (JBS 2012) concluding that the remediation /validation works outlined in the (GPL 2012c) are considered suitable for the proposed residential, commercial and open space land uses subject to: • Implementation of remediation/validation measures outlined in the RAP (GPL 2012c); • Auditor review and acceptance of any additional investigations to be conducted beneath the removed buildings and additional soil investigation to be conducted at the former UST area of the site as proposed in the RAP (GPL 2012c); and • Auditor review and acceptance of the asbestos management plan prior to commencement of remediation works.
February 2016	Preparation of a letter report including a waste classification of contaminated soil within Remediation Areas 1 to 6 and 8 at the site (GPL 2016a).
March 2016	Preparation of additional contamination assessment report (GPL 2016b) targeting the soil beneath former buildings.
March 2016	Preparation of Validation Report by consultant (GPL) outlining site remediation and validation of Areas 1, 2, 3, 6 and 8. The report also included a contamination assessment of the shale bedrock within the former underground fuel storage tank area within the site.
May 2016	Preparation of Validation Report following Removal of Asbestos Impacted Soil (PCA 2016).
June 2016	Issue of final site validation report
October 2016	Preparation of Section A Site Audit Statement (0503-1609) and accompanying site audit report (JBS&G 2016) confirming that the remediation and validation

	works were completed in accordance with the RAP and that the site is suitable for proposed residential use.

2. Site Description

2.1 Site Identification

The site details have been summarised in **Table 2.1** and described in further detail in the following sections. Plans identifying the subject site has been presented in **Appendix C**. The location and lay out of the site is shown in **Appendix D**.

Table 2.1: Summary Site Details ('Lot 4' in proposed subdivision)

Street Address	Corner of Hawkesbury and Darcy Roads, Westmead, NSW
Property Description	Lot 4 in proposed plan of subdivision PPN DP 1202362 (**Appendix C**)
Parish	St. John
County	Cumberland
Local Government Area	Parramatta City Council
Property Size	6588 m^2
Zoning	SP2 Educational Establishment
Previous Use	Educational Facility
Proposed Use	Residential with minimal accessible soils

2.2 Site layout and Activities

The campus is located at the southwest corner of Hawkesbury and Darcy Roads (which marks the north and east site boundaries), and is irregular in shape with frontage to Hawkesbury Road of about 170 m.

At the time of the supplementary site assessment works in March and April 2012, the consultant (GPL 2012b) reported the following:

- The campus comprised of eight buildings, including two heritage buildings.
- One gravel covered car park was located at the northern portion, with the remainder of the campus covered with lawn, trees and concrete driveways.
- There were no obvious asbestos, ash materials, odour, discolouration of soils/vegetation or petroleum hydrocarbon staining on the ground surface that would indicate the potential for contamination.
- No chemical storage was noted.
- No air emissions were observed emanating from either the campus or neighbouring properties.
- An underground storage tank was present at the campus, understood to be located within 'Lot 5' in the proposed subdivision, based on a sketch in the NSW WorkCover records as obtained for the site.

At the time of the site remediation works, the consultant (GPL 2016c) reported that all campus buildings were demolished, with the exception of the two heritage buildings in the south eastern portion of the campus (understood to be located within 'Lot 1' in the proposed subdivision). The consultant further observed that a small bitumen car park adjacent to the heritage building remained, while the gravel carpark and driveway in the northern portion of the campus was cleared with construction of new roads underway. Additionally, no chemical storage was noted within the campus.

2.3 Topography

At the time of site remediation works, the consultant (GPL 2016c) reported the ground surface of the campus generally sloped moderately to gently downward to the north. The southern portion was noted to be higher than the northern portion (former car park area). The southern and eastern portions were generally flat, whilst the south western part slopes towards the south west.

2.4 Soils and Geology

The consultant (GPL 2012b) undertook a review of published geological information. Based on information from the *1:100,000 Geological Series Sheet 9030, Edition 1* (1991), type, nature and extent of fill material, the site is underlain by the Triassic aged Ashfield Shale of the Wianamatta Shale Group, comprising black to dark grey shale and laminites.

The consultant (GPL 2012b) reviewed the Soil Landscape Map of Penrith (Soil Landscape Series Sheet 9030, Scale 1:100,000, 1989) prepared by the Soil Conservation Service of NSW, and reported the landscape at the site is likely to belong to the Lucas Heights landscape area and typically consist of highly permeable surface soils. The site is also located within developed terrain. Medium to high density development, usually with extensive paving, terracing or landscaping is indicated.

Fill was identified in various parts of the campus, ranging in thickness from 0.1 m to 1.85 m. Sub-surface profile in the south western (TP1, TP3 and TP10) and eastern portion (TP16) of the site generally comprised topsoil silty/sandy clay (up to 200 mm), underlain by fil material comprising silty clay/clayey sand to depths up to 0.4 mm. Fill material was underlain by natural silty clay. Fill encountered in the northern portion of the site (TP11) comprised dark brown silty clay with traces of organic matter to depths up to 1.6 m bgs and was underlain by natural silty clay. Fibrous cement pieces were reported at TP2.

2.5 Hydrology

The consultant (GPL 2012b) reported that Toongabbie Creek is situated approximately 700m to the north of the campus. The consultants (Coffey 2008 and GPL 2012b) made no comment on the presence or fate of surface water, the potential for flooding at the campus, nor the presence of stormwater infrastructure located at the campus.

2.6 Hydrogeology

The consultant (Coffey 2008) conducted a review of the NSW government Registered Bore Database, which indicated one registered groundwater bore was located close to the campus, approximately 600 m to the north of the site. This bore was installed as a test bore, drilled to a depth of 282 m below ground level (bgs), with a water bearing zone found between 23 to 24 m bgs and a yield of 0.10 L/s.

No groundwater or seepage water was encountered during soil sampling in test pit/borehole locations to a maximum depth of 2.5 m bgs (GPL 2012b and GPL 2016c). The consultant (GPL 2012b) reported that groundwater was encountered in on-site monitoring wells between 6.82 and 9.36 m bgs, with the inferred groundwater flow direction generally to the north.

2.7 Surrounding Environment

The consultant (GPL 2012b) reported that the campus is surrounded by the following:

- North – Darcy Road with Westmead Hospital beyond;
- South – a railway line with residential properties beyond;
- East – Hawkesbury Road with a combined commercial and residential area; and
- West – Parramatta Marist High School and open sports fields.

2.8 Audit Findings

The information provided by the consultants (Coffey 2008, GPL 2012b, GPL 2016c) in regards to the site condition and surrounding environment has been checked against and generally meets the requirements of EPA 1997. The information provided was also consistent with the observations made during a site audit inspections listed in **Table 1.1**. Overall, the information provided by the consultants (Coffey 2008, GPL 2012b and GPL 2016c), information supplemented by observations

made during the site audit inspections and review of publicly available information in relation to the site condition and the surrounding environment is considered adequate for the purposes of the site audit, with the following exceptions:

Acid Sulfate Soils

The consultants (Coffey 2008, GPL 2012b and GBL 2016b) did not report on the occurrence of acid sulfate soils within the soil profile at the site. For completeness, the auditor reviewed the Australian Soil Resource Information System (ASRIS) on 7 April 2016, which reports that there is extremely low probability of occurrence of acid sulfate soils within the soil profile located on the site (Findings provided in **Appendix E**).

Climate

The consultants (Coffey 2008, GPL 2012b and GPL 2016c) did not report on the climate of the site area.

For completeness, the auditor conducted a review of Bureau of Meteorology (BOM) climate statistics for Parramatta North (Masons Drive)[1] which indicates the following:

- Mean maximum temperatures ranging from 17.4° C in July to 28.4° C in January;
- Mean minimum temperatures ranging from 6.2° C in July to 17.6° C in February; and
- Mean monthly rainfall ranging from 45.5 mm in July to 121.2 mm in February, with an average annual rainfall of 970.6 mm.

In general, the climate of the site area is described as comprising warm summers and mild winters, rainfall was described as occurring throughout the year with wetter periods from January to June.

Drainage and Runoff

The consultants (Coffey 2008, GPL 2012b) did not report on the drainage and runoff at the site. Based on the observations made during site inspection and regional topography, surface water runoff is anticipated to flow towards the north/northeast, with localised runoff likely to the southwest at the southwest portion of the campus.

Lot and DP Reference

The auditor notes that the consultant (GPL 2012b and GPL 2012c) reported the campus as located within an incorrect Deposited Plan on the title page of the ESA report (GPL 2012b) and the RAP (GPL 2012c). The title pages of both reports reference DP107785, however, the campus is located within DP1077852. The auditor notes that the correct DP (DP1077852) was listed within the contents of both reports. Additionally, as noted in GPL 2012b, the previous consultant (Coffey 2008) reported an incorrect Lot number for the campus, which was incorrectly listed as Lot 1 in DP1077852 (refer to **Section 3.7** for additional detail). Correct Lot and DP numbers were referenced during subsequent assessment and validation works (GPL 2016b and GPL 2016c).

[1] Bureau of Meteorology Climate Statistics for Parramatta North (Masons Drive), http://www.bom.gov.au/climate/averages/tables/cw_066124.shtml, accessed 7 April 2016.

3. Site History

3.1 Site History Information Sources

The consultant (GPL 2012b) relied on historical information as conducted by the previous consultant (Coffey 2008) as reported from the following sources:

- Interviews with site personnel.
- Historical title search.
- Parramatta City Council information (including a review of s.149 certificates).
- NSW WorkCover dangerous goods licensing records.
- NSW EPA records.
- Aerial Photographs (1951, 1961, 1970, 1978, 1986, 1994 and 2004).

The campus history as presented by (Coffey 2008) is summarised as follows:

- Between 1911 and 1967, the land was owned by the Trustee of the Superior Council of Australia of the Society of St Vincent De Paul.
- Between 1967 and 1986, the land was owned by the Trustee of Marist Brothers.
- Between 1986 and 1998, the land was owned by the Nepean College of Advanced Education.
- Since 1998 the land has been owned by the University of Western Sydney for teaching purposes, with a portion of the site leased to the NSW Police department and used for indoor training purposes.

3.2 Interview with Site Personnel

The consultant (Coffey 2008) conducted an interview with Barbara Dene (a campus property manager) and Richard Doyle (long term employee of the campus) with the following information provided:

- Historical site buildings at the southern portion of the campus were constructed in the late 1910s and early 1920s. At this time the campus was owned by St Vincent De Paul who developed the campus lands with the Marist Brothers. On completion of the development, St Vincent De Paul handed the site over to the Marist Brothers who opened an orphanage called the Westmead Boys Home.
- There has been little change to the campus structures since construction and present day, however a building located at the far south western portion of the campus was utilised as a printery between the 1950s and 1960s. The printery was reportedly a minor operation with minimal chemical usage.
- During the 1950s and 1960s, the land to the immediate west of the campus was utilised as a small piggery.
- There was no reported bulk storage of chemicals at the site, and site personnel were unaware of an underground storage tank removed from site in 1991 or 1992 (refer **Section 3.4** for additional detail).
- The most recent development at the campus was the current NSW Police building and auditorium constructed in the early 1990s. The car park at the northern portion of the campus was also constructed at this time.

3.3 Historical Title Search

A titles search was undertaken by the consultant (Coffey 2008), with the search results indicating the following:

- The campus is known as Lot 1 DP1077852, and was formally known as Lot 10 DP876866, Lot 42 DP876232, Lot 1 DP748029, Lot 11 DP732693, Lot 2 DP228390 and Lot B DP419990.
- At the time of reporting, the legal records indicate that Lot 1 DP1077852 was owned by the University of Western Sydney.
- The current proprietor of the site, the University of Western Sydney, has owned the site since 1998.
- A review of the historical site information indicates that the land had previously been owned from 1911to 1967 by the Trustees of the Superior Council of Australia of the Society of St Vincent De Paul, from 1967 to 1986 by the Trustee of Marist Brother and from 1986 to 1998 by the Nepean College of Advance Education.

3.4 Regulatory Searches

Council Records

The consultant (Coffey 2008) obtained a s.149 certificate for the campus land. Specific information obtained from the s.149 certificate indicated that the land is not affected by any of the matters contained in Clause 59(2) of the Contaminated Land Management Act 1997, however, the land is affected by a Tree Preservation Order.

EPA Records

The consultant (Coffey 2008) conducted a search for contaminated land records on the NSW Department of Environment and Conservation (DEC) database, with no records found for the campus land. In addition, the consultant (Coffey 2008) also reported that with respect to the Contaminated Land Management Act 1997, the land has not been declared an investigation area or remediation site, is not subject to an investigations order or remediation order, is not the subject of a voluntary investigation proposal (or voluntary remediation proposal) and is not the subject of a site audit statement.

WorkCover Dangerous Goods Records

The consultant (Coffey 2008) requested a WorkCover records search for licenses to store dangerous goods. The consultant reported these records included a 5000 L UST used for the storage of mineral spirits was licensed to the site owner (University of Western Sydney). The WorkCover records indicate that the UST was abandoned and removed from site between 1991 and 1992. The UST was located to the immediate east of the current main administration building at the southern portion of the site (north eastern portion of proposed 'Lot 5').

3.5 Aerial Photographs

The consultant (Coffey 2008) undertook an aerial photograph review of the campus with the following information provided:

- The 1951 photograph shows the land is divided into two distinct areas (southern and northern). The southern area contains 3 large brick buildings surrounding a central courtyard, with a smaller building located to the immediate south of the courtyard and a larger building located in the south western portion of the site. Four smaller buildings are located north of the courtyard. The northern area is comprised of a large open field area with some trees along the western site boundary.

- No significant changes were noted in subsequent photographs (1961, 1970, 1978, and 1986), with the exception of the removal of some campus buildings to the north of the main courtyard, and a rugby pitch was observed in the 1978 aerial photograph at the open field area of the northern portion of the site.
- The 1994 aerial photograph shows a large building and auditorium to the west of the northern area, with the open field/rugby pitch area now a car park.
- No significant changes were observed in the 2004 aerial photograph.

3.6 Previous Reports

The consultant (GPL 2012b) undertook an assessment of previous works conducted on the campus land, in line with NSW EPA guidelines, consisting of the Coffey 2008 ESA. The consultant (Coffey 2008) did not provide a review of previous environmental reports, and did not document if a request was made to the client whether previous investigations were available for the site.

The following review of the Coffey 2008 ESA was reported by the consultant (GPL 2012b):

3.6.1 Environmental Site Assessment (Coffey 2008)

Coffey undertook an ESA at the campus in late 2007 (Coffey 2008). The objectives of the ESA were to identify past and present potential contaminating activities, potential contaminants, assess the identified areas and contaminants of concern, assess if further remediation, management or investigation activities are required to render the land suitable for the proposed mixed use development (comprising commercial retail and offices, hotel and public bar, childcare centre, residential apartments, parking), and assess the waste classification of soils at the site for off-site disposal.

The scope of work included:

- A review of site history information, soils and geological maps;
- Field work comprising soil sampling from 50 boreholes, eight surface samples and groundwater monitoring at four locations; and
- Laboratory analysis of soil and groundwater samples for potential contaminants of concern and data assessment and reporting.

At the time of inspection, the campus comprised eight buildings, including two heritage buildings, the northern portion was a gravel covered car park and driveway, and grassed areas bordered the eastern and western site boundaries with a large lawn evident within the southern area between the main teaching and administration buildings. No visual or olfactory evidence of contamination such as oil staining or odours was observed across the campus.

Potential contaminants resulting from past and present activities, as well as the presence of fill materials, included the following:

- Metals, including arsenic, cadmium, chromium, copper, mercury, nickel, zinc and/or lead.
- Total petroleum hydrocarbons (TPH).
- Benzene, toluene, ethylbenzene and xylenes (BTEX).
- Polycyclic aromatic hydrocarbons (PAHs).
- Volatile organic compounds (VOCs).
- Organochlorine pesticides (OCPs).
- Polychlorinated biphenyls (PCBs).

- Asbestos.

A soil and shallow groundwater investigation was conducted by the consultant (Coffey 2012b) to assess the potential for contamination resulting from past and present site activities, as well as the presence of fill materials. Results of the investigation indicated the presence of soil containing asbestos, lead contaminated soils, and the presence of a former UST which was not investigated.

Based on the results of the ESA (Coffey 2008), the campus land was considered suitable for the proposed mixed use development subject to the following:

1. Remediation and/or management of soil containing asbestos. It was recommended by the assessing consultant (Coffey 2008) that further assessment of the extent of asbestos in soil be undertaken prior to commencement of development / remediation through a test pitting and trenching program which would allow better visual assessment of soils than the borehole investigation undertaken as part of this assessment, and it was further recommended that an inspection and testing program be implemented during the site earthworks to confirm the extent of asbestos contamination.
2. Remediation and/or management of lead contaminated soil along the western boundary around sampling locations EBH24 and EBH15. Further sampling and analysis was recommended by the assessing consultant (Coffey 2008) to delineate the extent of the lead impacted soil prior to remediation.
3. Remediation and/or management of any residual hydrocarbon soils in the vicinity of the historical UST.
4. Further assessment of the extent of mercury in soil around sample location EBH42 in the south eastern portion, followed by remediation if required.

However, the consultant (GPL 2012b) indicated that the laboratory test results certificates included with the Coffey 2008 report indicated that that the concentration of mercury in soil sample EBH42 was reported at a level below the laboratory limit of reporting, and therefore, no further assessment at this location was considered necessary by GPL.

5. Remediation or management of any as yet unidentified contamination encountered during site redevelopment. It was recommended by the assessing consultant (Coffey 2008) that a contingency plan be implemented during site earthworks documenting procedures to be followed in the event further contamination is identified during earthworks.

6. Validation of soils imported to the site during redevelopment, if any.

Groundwater

Based on preliminary groundwater monitoring as conducted by Coffey (Coffey 2008), the consultant (GPL 2012b) considered that the groundwater is unlikely to require remediation or management unless it is disturbed. However, the consultant (GPL 2012b) further reported that the monitoring well locations as presented in the Coffey ESA (Coffey 2008) were not representative of site conditions as the removed UST area was not targeted.

Waste Classification

Based on the results of the waste classification sampling, the assessing consultant (Coffey 2008) considered that some locations would require disposal to an industrial waste landfill, the majority of fill containing asbestos would likely be suitable for disposal at a licensed solid waste landfill, some locations would require disposal as solid waste, and the majority of other fill not impacted by asbestos would likely be classified as inert waste.

In addition, based on the analytical results and observations, the consultant (Coffey 2008) considered that the majority of natural soils and shale underlying the fill would meet the criteria for virgin excavated natural material (VENM).

Remediation / Management Options

The consultant (Coffey 2008) reported that the main remedial / management requirements are as follows:

- Addressing the asbestos contamination in soil. Potential remedial options for asbestos containing soil may include removal of the impacted soil to a licensed landfill or capping on-site.
- The proposed basement excavations cover a substantial portion of the site, and as such basement excavations will likely result in a substantial portion of the potentially asbestos impacted soil requiring removal. Off-site disposal of the soil would likely be an appropriate option. If this option was adopted, additional excavations of contaminated soil would be required in areas where no excavations or stripping of soil was proposed.
- Due to the proposed basement excavations, capping of all asbestos contaminated soil in-situ would not be possible. An alternate capping option for asbestos may be to excavate the asbestos impacted soil and place it in a burial pit in a portion of the site where no basement is proposed (a major constraint to such an option would be whether available space was available for a burial pit).
- A combination of the capping and off-site disposal options could also be considered.
- The same options that are available for the asbestos impacted soil are also likely to be available for the lead and mercury impacted soil.
- Regarding petroleum hydrocarbon contamination around the UST (if any), the consultant considered that either excavation and off-site disposal or excavation and remediation by landfarming may be suitable options depending on the volume and concentrations of contaminated soil.
- Once the remedial strategy is selected, the consultant recommended that a remedial action plan be prepared outlining remediation and validation procedures for the site.

3.7 Audit Findings

The site history information provided by the consultants (Coffey 2008 and GPL 2012b) has been checked against, and generally meets the requirements of, EPA 1997.

Prior to additional ESA works as conducted by the consultant (GPL 2012b), the auditor provided interim advice based on the review of the Coffey ESA (Coffey 2008). The auditor generally considered that Coffey 2008 can be used as part of the site audit, however, further assessment was required to address the following shortcomings:

- Provision of high resolution aerials as those included in the report were of an insufficient quality to reliably review historical site features.
- Additional soil and groundwater sampling around the location of the UST as Coffey (2008) received the WorkCover records after the intrusive investigation was completed.
- Additional soil sampling within the former main police auditorium (now leased to Marist Brothers) as minimal sampling was conducted during Coffey (2008).
- Additional in-fill soil samples across the entire site as Coffey reported targeted sampling was conducted (Coffey 2008). A systematic sampling strategy is recommended for the site due

to the unknown extent of cut and fill across the site. Additionally, Coffey (2008) collected soil samples directly from a solid stem auger rather than from an undisturbed sample.

- Additional sampling should be conducted underneath the buildings that are to be removed from the site.
- The additional soil sampling to be completed should be conducted using test pits which are more ideal for the identification of asbestos and fill inclusions. Based on the site visit the carpark area potentially contains a large amount of fill. Additionally asbestos was identified by Coffey (2008) in the western corner of the site which may be associated with fill materials. While a thorough inspection of the site buildings was not conducted the Auditor's representative could not see any obvious asbestos containing materials on the externals of the buildings in the western corner of the site. Therefore during the additional assessment a thorough inspection should be conducted.
- An additional groundwater assessment should be conducted as Coffey (2008) were unable to target the area where the UST is inferred to be located and the wells installed as part of Coffey (2008) were located for geotechnical reasons rather than potential groundwater impacts.
- During the additional assessment all sampling locations should be either surveyed or had GPS co-ordinates recorded. The auditor questions how the impacted locations identified in Coffey (2008) will be located as Coffey (2008) did not survey or GPS these locations.
- The additional assessment should include the green demountable (western corner of the site) as an area of environmental concern. During the site visit it was observed to contain areas at the rear which may have been used to house hazardous materials. Information from the UWS contact (Martin Smith) suggested the university maintenance team would store various materials in this area.

The above comments were incorporated into the supplementary ESA (GPL 2012b), as outlined below.

The consultant (Coffey 2008) conducted a review of NSW Department of Environment, Conservation and Climate Change (DECC) records during the initial ESA (Coffey 2008), however the auditor notes that the consultant (GPL 2012b) did not conduct an up-to-date investigation of available online databases such as the CLM register, the POEO register or the NSW or Australian Heritage database. For completeness, the auditor conducted an updated search of these databases on 20 April 2016, with the following findings (search records are provided in **Appendix E**):

- A search of the CLM register did not discover any notices related to the site.
- A search of the POEO register did not identify any licences referring to the site.
- Searches of the NSW and Australian Heritage Databases did not identify any heritage items at the site. It should be noted that the NSW Heritage Database contained some listings for the University of Western Sydney, however these listings do not pertain to the site.

As referenced by the consultant (GPL 2012b), the ESA report as prepared by Coffey (Coffey 2008) incorrectly lists the lot and DP as Lot 1 in DP1077852, which should read as Lot 7 and part Lot 8 in DP1077852. For completeness, the auditor reviewed the records for DP1077852 with the NSW Land and Property Information Division (LPI), dated 22 December 2004, and Lot 1 is not listed for DP1077852 (refer to **Appendix C** for a copy of the plan as obtained from LPI). The auditor notes that the information provided by the consultant (Coffey 2008) appears representative for the site (i.e. does not appear to include information that would be representative of off-site locations) and as such this error does not affect the suitability for assessing the historical review of the site.

Upon review of the s.149 certificate, the auditor notes the following "Special Notes" as referenced in Coffey 2008:

- Large areas of the local government area of Parramatta have the potential to be affected by acid sulfate soils which become problematic if exposed during excavation or similar activities. The Department of Planning has maps which indicated the potential occurrences of acid sulfate soils. Prior to undertaking work which involves substantial soil disturbance, you should ascertain the possibility of acid sulfate soils existing on your property.

As referenced above in **Section 2**, for completeness, the auditor reviewed the ASRIS database on 8 April 2016, which reports that there is extremely low probability of occurrence of acid sulfate soils within the soil profile located on the site (refer to **Appendix E**).

The extent of site history information presented by the consultant (GPL 2012b) and the previous consultant (Coffey 2008) is considered adequately complete for the purposes of identifying a range of potential contamination issues at the site as part of the site investigation process.

4. Conceptual Site Model

The National Environment Protection (Assessment of Site Contamination) Measure, NEPC, 1999 (as amended 2013, 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 and remediation activities.

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, groundwater, surface water, indoor and ambient air);
- Human and ecological receptors;
- Potential and complete exposure pathways; and
- Any potential preferential pathways for vapour migration (if potential for vapours identified).

4.1 Sources of Contamination

Based on the site history review, the consultants (Coffey 2008 and GPL 2012b) identified the following areas of potential contamination:

- Fill materials across the site.
- Potential soil and groundwater contamination in the vicinity of a removed UST.
- A former transformer located in the south eastern portion of the site.
- Leaching / weathering of hazardous building materials (such as asbestos) or lead in lead paint.

Based on the identified sources of contamination, the consultants (Coffey 2008 and GPL 2012b) identified the following contaminants of potential concern (COPs):

- Metals, including arsenic, cadmium, chromium, copper, mercury, nickel, zinc and/or lead.
- Total Petroleum Hydrocarbons (TPH);
- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Volatile Organic Compounds (VOCs);
- Organochlorine Pesticides (OCPs);
- Polychlorinated Biphenyls (PCBs); and
- Asbestos.

4.2 Potentially Affected Media

The consultants (Coffey 2008 and GPL 2012b) identified the COPCs that may occur in fill materials and in natural soils and groundwater at the vicinity of the removed UST.

4.3 Audit Findings

The consultants (Coffey 2008 and GPL 2012b) did not prepare a CSM that meets the requirements of the NEPC 2013, however, elements of the CSM were provided in their reports that considered some of these requirements, in particular, the consultants (Coffey 2008 and GPL 2012b) identified a number of potential contamination issues based on the findings of the site history review and the site inspection conducted as part of the investigations. The list of potential contaminants is considered to be suitable noting the site's history.

The auditor notes that the previous consultant (Coffey 2008) listed VOCs as a COPC, however no soil or groundwater samples were submitted for the full VOC suite by either consultant (Coffey 2008 and GPL 2012b). Based on the results of the field PID screening and volatile analytical sampling (BTEX/TPH C_6-C_9) activities as undertaken by both consultants (in which no elevated PID or BTEX/TPH results were reported), the auditor considers the undertaken investigation to be sufficient for assessing site conditions, and the absence of full VOC data is not considered to affect the outcome of the investigation.

The auditor notes that two elements of the CSM were not outlined by the consultants (Coffey 2008 and GPL 2012b), namely, potential exposure pathways and potential receptors. For completeness, the auditor provides the following considerations:

Potential Exposure Pathways

In consideration of the site history and potential COPCs provided by the consultants (Coffey 2008 and GPL 2012b), the primary exposure pathways by which humans could be exposed to the sources of contamination are considered to comprise:

- Direct contact with the contamination in soil (in the case of workers involved in earthworks).
- Dermal contact and inhalation of contaminated dust arising from stockpiles/unsealed surfaces and during construction activities (in the case of site visitors, site occupants, workers and adjacent property owners).
- Direct contact with potentially contaminated groundwater (in the case of workers that may come into contact with groundwater during any large excavations).

Potential human and ecological receptors

In consideration of the site history and the assessment of primary exposure pathways, a number of potential human and environmental receptors of contamination at the site were identified.

Human Receptors include:

- Site workers engaged in earth work activities.
- Site occupants/visitors and adjacent property owners during the progression of earth work/development activities.
- Future site occupants/visitors.

Environmental Receptors include:

- Off-site ecosystems primarily, Toongabbie Creek, as noted by the consultant (GPL 2012b) to be the nearest surface water receptor for the site, located approximately 700 m to the north of the site, which discharges into Parramatta River.

Overall, the auditor considers that the identified potential contamination issues and potentially contaminated media were appropriate for assessing the suitability of the site for intended use.

5. Sampling Analytical and Quality Program

5.1 Data Quality Assessment

An assessment of quality assurance and quality control (QA/QC) has been undertaken by the consultants (Coffey 2008, GPL 2012b, GPL 2016b and GPL 2016c) by developing data quality indicators (DQIs), broadly based on the seven step process referred to in DEC 2006.

The auditor has undertaken a review of the QA/QC undertaken by the consultant, which has been summarised in **Tables 5.1** against the PARCC parameters (precision, accuracy, representativeness, comparability and completeness).

Table 5.1: Data Usability Assessment (Coffey2008, GPL 2012b, GPL 2016b and GPL 2016c)

Parameter	DQIs	Requirement	Auditor Assessment
Field and Lab QA/QC			
Precision	Intra-laboratory duplicates (blind)	Collected at a rate of 1 per 20 samples. Analysed for primary contaminants of concern. RPDs less than 50%.	Soil duplicates were collected at a rate of 8% during site investigations (Coffey 2008 and GPL 2012b) and at 8% during validation (GPL 2016c); and analysed for COPCs including heavy metals, PAHs, TPH/BTEX, PCBs and asbestos (Coffey 2008); and additionally OCPs (GPL 2012b and 2016a). Validation consultant (GPL 2016b) analysed for confirmed COPCs including heavy metals, TPH/BTEX and PAHs. The auditor notes that the consultant (Coffey 2008) reported the number of intra-lab and inter lab duplicates as 10 and 7 respectively, which the auditor notes should be corrected as 11 intra-lab and 6 inter-lab duplicates. Regardless, the number of intra-laboratory and inter-laboratory soil samples remains sufficient for the investigation, and this discrepancy is not considered to affect the overall reliability of the analytical data. RPDs ranged from 0-131% (Coffey 2008 and GPL 2012b), with some metals exceeding DQI for metals (Coffey 2008) and additionally TPH C15-C28 and BaP in one sample (GPL 2016b). The consultant attributed the elevated RPDs to the heterogeneity of the fill, and the auditor concurs and considers the isolated elevated RPD results not to affect the overall reliability of data.
			Consultants (Coffey 2008 and GPL 2012b) collected groundwater duplicates at a rate of 28% and analysed for metals, TPH/BTEX (Coffey 2008); and additionally PAHs (GPL 2012b). The consultant (Coffey 2008) reported RPDs for lead, nickel, zinc, TPH C10-C14 and C15-C28 exceeding DQI. It was reported that all primary and duplicate samples exceeded the screening criteria, as such did not affect the conclusions made. The auditor notes the more recent investigation undertaken in GPL (2012b), where all RPDs reported within the acceptable range with the exception of zinc, however, as all concentrations reported by the primary and secondary laboratories were less than applicable groundwater criteria and the auditor is of the opinion that the isolated elevated RPD results do not affect the overall reliability of the analytical data.

Parameter	DQIs	Requirement	Auditor Assessment
Precision	Inter-laboratory duplicates (spilt)	Collected at a rate of 1 per 20 samples. Analysed for primary contaminants of concern. RPDs less than 50%.	Soil duplicates were collected at a rate of 6% (Coffey 2008, GPL 2012b and GPL 2016b) with RPDs ranging between 0-199%and at 8% during validation works (GPL 2016c). The auditor notes that RPDs presented by consultant (Coffey 2008) ranging from 0-131%, were incorrect which were recalculated by the auditor and found to be between 0-199% with exceedances reported for metals and TPH C29-C38. RPD exceedances were reported for metals, BaP and TPHs (GPL 2012b and 2016a) The consultant attributed the elevated RPDs to the heterogeneity of the fill. The auditor concurs with the consultant's findings and finds this acceptable and considers that this is indicative of variability of concentrations of the fill at selected locations.
			Groundwater duplicates were collected at a rate of 28% with RPDs ranging from 0-93 %. Elevated RPDs were reported for nickel and hardness, however, as all concentrations reported by the primary and secondary laboratories were less than applicable groundwater criteria and the auditor is of the opinion that the isolated elevated RPD results do not affect the overall reliability of the analytical data.
	Laboratory duplicates	One per batch. RPDs less than 50%.	Laboratory duplicates were undertaken by the primary laboratories. The reported RPDs were within the DQI, with some elevated RPDs reported as follows: • PAH compounds and nickel in soil (GPL 2016b). • Metals (copper and lead) in soil (GPL 2016c). The elevated RPDs were attributed to low concentrations of PAHs and sample heterogeneity by the NATA accredited laboratory. The auditor considers this not to affect the reliability of the analytical data.
Accuracy	Field rinsate blanks	Collected at a rate of 1 per piece of decontaminated sampling equipment. Analysed for primary contaminants of concern. Laboratory results below the laboratory limit of reporting (LOR).	Field rinsate blanks were collected during soil investigations and analysed for TPH/BTEX in Coffey (2008); for metals in GPL (2012b) and GPL (2016a); and all COPCs during validation works (GPL 2016c). All concentrations were reported either equal to or less than laboratory LOR, with toluene concentration in RV3 (GPL 2016c) reported at LOR of 0.5 µg/L. The auditor considers the soil sampling methods employed by the consultant are unlikely to have resulted in significant cross-contamination between sample locations and a review of the available analytical data does not indicate that this has occurred. None rinsate blanks were collected during GW investigations (Coffey 2008 and GPL 2012b). Disposable sampling equipment was used by the consultant and as such, the auditor does not believe this data has been compromised, and the lack of rinsate blank sample data relating to groundwater sampling field works does not affect the overall reliability of the analytical data
Accuracy	Trip blanks	Collected at a rate of 1 per day of sampling	The consultant (Coffey 2008) completed two trip blanks for two laboratory soil batches (SGS 57314 and

Parameter	DQIs	Requirement	Auditor Assessment
		where primary contaminants of concern include volatiles. Analysed for volatiles of concern. Laboratory results below laboratory LOR.	SGS 57411) and one trip blank for groundwater sampling (lab report SGS 58097), with all results reported below LOR. None were completed for soil sample batch collected 17 December 2007. The auditor considers this a minor non-conformance unlikely to affect the representativeness of the data as available trip blank data indicates no analysed TPH and BTEX parameters reported at levels exceeding the laboratory LORs, and the TPH and BTEX results of all soil sampling activities do not show a pattern of sustained elevated impact. The consultants (GPL 2012b, 2016a and 2016b) did not complete any trip blanks during site investigation and validation works and reported that the loss of volatiles is unlikely as trip spike samples were generally prepared for each day of field work to monitor volatile loss, soil samples were couriered to the laboratories in eskies with ice bricks (thereby minimising the potential exposure of the samples to ambient conditions), and all samples were confirmed by the laboratory to be intact at the time of receipt. The auditor considers this a minor non-conformance unlikely to affect the representativeness of the data as rinsate samples and trip spike samples were generally prepared and analysed for the soil sampling activities, with all sets of samples reporting favourable results.
	Trip spike	Collected at a rate of 1 per batch where primary contaminants of concern include volatiles. Laboratory results / recovery within 30 % of the spiked concentration.	Trip spikes were collected during soil sampling (Coffey 2008, GPL 2012b, GPL 2016b and GPL 2016c) and groundwater sampling (Coffey 2008), with all recoveries reported between 78% and 102%. No trip spikes were prepared during GPL (2012b) groundwater investigation, however, the consultant reported that as the collected groundwater samples were stored and transported to the laboratories in cool condition (2.9°C), the loss of volatiles from the groundwater samples is unlikely. The auditor considers this a minor non-conformance unlikely to affect the representativeness of the data.
Accuracy	Laboratory surrogate spikes	Surrogate spikes to be performed as required by NATA accreditation, generally per sample analysed. Recoveries to be within 70-130 % or 30-130 % (phenols only).	Surrogate recoveries ranged from 63-130 % and were within laboratory control limits.
	Laboratory method blanks	Laboratory method blanks to be performed as required by NATA accreditation, generally 1 blank per batch. Results to be below laboratory LOR.	All laboratory method blanks < LOR.

Parameter	DQIs	Requirement	Auditor Assessment
	Laboratory control samples (LCS)	LCS to be performed as required by NATA accreditation, generally one per 20 samples per batch. Recoveries to be within 70-130 % or 30-130 % (phenols only).	LCS recoveries ranged from 60-140 % and were within the laboratory control limits. LCS recovery was also not completed for TPH (in soil) in one batch only due to high concentrations in the sample (EIS 2013b).
	Laboratory matrix spikes (MS)	MS to be performed as required as NATA accreditation, generally one per 20 samples per batch. Recoveries to be within 70-130 % or 30-130 % (phenols only).	MS recoveries reported were generally within laboratory control limits with the exception of failed recoveries reported for some metals (GPL 2016b and GPL 2016c), however, were within the NATA accredited laboratory acceptance criteria. Consultant (GPL 2012b) reported that matrix spikes were reported by SGS (Batch No SE107033, SE106806A and SE106886A) and Envirolab (Report Nos 71483, 71276, 71064 and 71483-A). The reported recoveries were generally within laboratory acceptance limits with the exception of some metals due to high concentration of analyte and sample heterogeneity. The auditor considers that the absence of MS (as discussed above) does not reduce the precision of the testing laboratory or the accuracy of the results used for assessing site suitability.
Soil Sampling and Analytical Schedule and Sampling Methodology			
Representa-tiveness	Soil sampling locations	Samples to be collected on a representative basis consistent with the CSM.	During Coffey (2008), a total of 50 sub-surface sampling and 8 surface sampling locations were completed systematically across the campus. Subsequently, consultant (GPL 2012b) completed an additional systematic locations to supplement Coffey (2008) and 11 locations targeted at identified metals hotspots and the former UST. Following demolition of buildings, GPL (2016a) addressed previous data gaps within building footprints and completed 15 sampling locations; and additionally, the consultant (GPL 2016c) completed 5 boreholes in the vicinity of the former UST targeting the shale bedrock, according to recommendations made in Section B SAR/SAS (JBS 2012). The number of soil sampling locations and the rationale adopted by the consultants during the site investigations provided sufficient coverage, consistent with Table A, NSW EPA 1995, noting the potential areas of concern and associated COPCs identified as part of the site history review.
	Soil sampling depths and intervals	Soil sampling depths should be consistent with the anticipated distribution of contamination as detailed in the consultant's CSM.	The sampling depths and intervals at each of the sampling locations were appropriate given the identified potential contamination sources and the site geology. Soil samples were collected from the fill material, with selected samples also collected from the underlying natural soils. The sampling depth were generally appropriate to assess the vertical extent of contamination and fill

Parameter	DQIs	Requirement	Auditor Assessment
			across the site, with numerous sampling locations extending to the natural soils. Based on the nature of the remediation works completed at the site, all impacted fill material has been excavated from the site with the final validation samples mostly collected from the underlying natural clay soils and shale.
	Soil sampling methodology	Soil samples to be collected using a methodology which is appropriate for the primary contaminants of concern.	Soil samples were collected either directly from the solid stem auger (Coffey 2008); and via pushtube or directly from the centre of the excavator bucket (GPL 2012b, GPL 2016b). Details were not provided by the consultant (Coffey 2008) on how the surface samples were collected. The consultant (GPL 2016c) collected validation samples using a stainless steel trowel and also collected core samples of the shale bedrock in the vicinity of the former UST via diamond coring. The consultants reported that disposable gloves were used during the soil sampling works. Based on the sampling method adopted by the consultant (Coffey 2008), the auditor notes that the potential for volatilisation may have occurred during sampling (i.e, directly from the auger). However, comparison of the TPH and BTEX data between consultants are generally comparable, indicating that any potential volallisation occurring with differing sampling methods is considered to be low. Based on this, the auditor considers that the sampling methods adopted by the consultants are considered appropriate and are not likely to affect the representativeness of the soil data.
	Groundwater sampling locations	Groundwater sampling locations to assess areas of concern, allow for lateral delineation of contamination and assess the groundwater flow direction.	The consultant (Coffey 2008) installed four groundwater monitoring wells (CGBH3, CGBH8, CGBH9 and CGBH10) as part of a geotechnical investigation at the site and did not specifically target potential contamination sources. The auditor notes that additional groundwater assessment was recommended (JBS 2011), and notes the additional assessment conducted by (GPL 2012b). The consultant (GPL 2012b) installed three wells (MW1-MW3) targeting the former UST to the east of the Admin Building. The number and locations of monitoring wells installed (GPL 2012b) was sufficient to provide an assessment of groundwater conditions at the site, particularly noting the potential areas of concern (i.e, UST) and associated potential contaminants of concern.
Representa-tiveness	Groundwater well construction	Wells to be constructed in accordance with the current version of the Minimum Constructions Requirements for Water Bores in	The consultant (Coffey 2008) did not provide monitoring well construction logs, however, the auditor notes that the investigation was only preliminary in nature. During the subsequent assessment (GPL 2012b), the consultant provided relevant monitoring well construction logs and field screening notes. The screen interval in all monitoring wells was installed targeting

Parameter	DQIs	Requirement	Auditor Assessment
		Australia, and screened to target the likely contaminated portion of the water column.	the natural materials (shale). The bentonite 'plug' at the monitoring well locations was generally installed from 1.0 m bgs to ground level, thereby limiting the potential for surface water infiltration. Overall, the auditor considers that the monitoring wells were suitably constructed and developed to enable an assessment of groundwater quality at the site. The consultant reported that no groundwater or seepage water was encountered during installation of the monitoring wells, and the auditor notes that the monitoring well screens were installed at depths between 3 m and 15 m in each monitoring well. Due to the observations of no groundwater or seepage water and the encountered geology (shale), the auditor considers these screen lengths appropriate for the purposes of this investigation.
	Groundwater sampling methodology	Groundwater samples to be collected approximately 7 days after well installation and development. Groundwater samples to be collected using low flow methods (where it can be demonstrated that this is appropriate), or by purging at least 3 well volumes, until field parameters have adequately stabilised.	Following well installation, monitoring wells were developed, until water was visibly clean (GPL 2012b). Monitoring wells installed (GPL 2012b) were purged and sampled after 5 days using a low flow pump and disposable tubing. Field parameters, including pH, temperature, conductivity and dissolved oxygen were measured during purging using a water quality meter. Purging continued until the water quality parameters stabilised, whereupon samples were collected (GPL 2012b).The groundwater sampling methods (GPL 2012b) are considered appropriate given the geology encountered on-site. The majority of field parameters were within the 10% of each other upon sampling.
	Soil and groundwater sampling containers	Soil samples to be collected into laboratory supplied, clean unpreserved Teflon lined jars. Groundwater samples to be collected into laboratory supplied, clean and appropriately preserved sampling containers.	Soil samples were immediately placed in laboratory supplied samples jars which were sealed tight and placed on ice for transport to the analytical laboratories. Bulk soil samples (500 g) collected for analysis of asbestos during the GPL 2016b and GPL 2016c were collected in plastic zip-lock bags accordance with the WA DoH 2009 sampling protocols. Groundwater samples (GPL 2012b) were immediately placed into appropriately preserved containers provided by the laboratory. Samples for heavy metal analysis were field filtered using a disposable 0.45 µm filter.
Representa-tiveness	Soil and groundwater sampling equipment decontamination	Soil sampling equipment to be decontamination between sampling locations or between sampling depths; and monitoring well locations where significant contamination is encountered.	During soil investigations, the consultant (Coffey 2008) reported that sampling equipment decontaminated between each sample. Details regarding the decontamination of the solid stem auger were not provided. Dedicated acetate sample liners were used during the push tube sampling process (GPL 2012b and GPL 2016b) to minimise the possibility of cross contamination of samples from different horizons. At each sampling depth, two samples were recovered using a stainless steel liner cutter to make a lengthwise opening of the liner and a stainless steel knife to cut

Parameter	DQIs	Requirement	Auditor Assessment
			the recovered soil sample longitudinally into two halves. The knife was decontaminated prior to use to prevent cross contamination. Additionally, soil samples was recovered directly from the bulk excavator bucket sample (GPL 2012b and GPL 2016b), using a stainless steel trowel which was decontaminated prior to use and between locations to prevent cross contamination. Additionally, the stainless steel hand auger used at BH24 (GPL 2012b) was decontaminated prior to use to prevent cross contamination. The consultant (GPL 2016c) used a stainless steel trowel to collect the validation sample while a stainless steel hammer was used to recover shale core samples with all equipment decontaminated prior to and between use to prevent cross contamination. The consultants (GPL 2012b, 2016a and 2016b) reported that decontamination of the sampling equipment was undertaken by brushing off excess soil between sample locations. Where necessary the sampling equipment was decontaminated using potable water and Decon 90 solution (phosphate free detergent) followed by rinsing with distilled water. Rinsate samples were only obtained during all soil investigation and validation works. Groundwater sampling (Coffey 2008 and GPL 2012b).) was undertaken using disposable, single-use tubing, with the tubing disposed following each sampling event. As such, decontamination of sampling equipment was not required. The auditor considers the sampling methods employed by the consultants during the investigation and validation works are unlikely to have resulted in significant cross-contamination between sample locations and a review of the available analytical data does not indicate that this has occurred.
	Soil sample contamination screening	Soil samples to be screened for contamination via visual / olfactory observations and photo-ionisation detector (PID) measurement.	The consultants (Coffey 2008 and GPL 2012b) completed borehole/testpit logs detailing observations of material types; visual and olfactory observations; sample depths; and groundwater observations. The consultant (GPL 2016b) did not provide detailed test pit logs, however provided sample descriptions including material type; sample depths and any visual and olfactory observations if present. Soil samples were not screened in the field using a PID. However, based on the site history and the lack of significant volatile contamination in the investigation area (i.e. former building footprints), the absence of field VOC screening is not considered to affect the representativeness of the data.
	Sample storage and transport	Samples to be placed in an insulated container and chilled. Samples to be transported to laboratory under	Soil samples (Coffey 2008, GPL 2016b and GPL 2016c) were transported in ice-cooled chests, under chain of custody conditions, to laboratories that were NATA accredited for the analysis performed.

Parameter	DQIs	Requirement	Auditor Assessment
		chain of custody conditions.	Chain of custody documents provided by consultant (GPL 2012b) indicated sample batch SE106886 R1 was received by the laboratory at a temperature of 20°C. The consultant reported that the PID readings from the soil samples submitted as part of this laboratory batch were low (ranging between 0.0 ppm and 3.5 ppm), and there was not expected to be any significant volatile concentration detected. In addition, the consultant indicated that the corresponding trip spike sample (Trip Spike TS3) showed acceptable recovery with concentrations ranging between 91% and 96%, and as such it is considered that any loss of volatiles from the recovered samples that might have occurred at the elevated temperatures would not affect the outcome/conclusions of the report. The auditor accepts this explanation and considers this a minor non-conformance unlikely to affect the representativeness of the data, and the BTEX/TPH concentrations are considered representative of site conditions.
Representa-tiveness	Laboratory sample receipt advice	No damaged containers. No samples submitted in containers which have not been chilled. No samples to be submitted without sufficient times to comply with recommended holding times.	Laboratory sample receipt advice provided by the nominated laboratories confirmed that all samples were received in suitable condition, with completed chain of custody documentation provided in the reports.
	Holding times	Samples to be extracted and analysed within recommended holding times.	A review of the consultant's COC documentation and laboratory reports indicates that all samples were analysed within their holding times for all analyses undertaken.
	Analytical Method	Samples to be analysed using NATA accredited methodology.	Laboratories used included: SGS (primary laboratory); Envirolab Services (secondary for GPL 2012b, 2016a and GPL 2016c); and ALS Laboratories (secondary for Coffey 2008). Laboratory certificates were NATA accredited.
Complete-ness	Sampling, analysis and quality plan completeness	100 % of sampling, analysis and quality plan to be implemented.	A SAQP (GPL 2012a) was prepared and implemented for the investigation works (GPL 2012b) as part of the site audit. A RAP was prepared for the site (GPL 2012c) detailing the validation sampling, analytical and quality requirements was reviewed by the auditor with opinion provided that the site can be made suitable For residential/commercial/open space land use by implementation of the RAP (JBS 2012).
	Field documentation	All relevant field documentation to be collated including sampling logs and calibration records.	The consultants generally provided, field screening results, calibration records, groundwater purging data and relevant field notes in the report. The consultant (Coffey 2008) reported that the PID was calibrated by Coffey field staff before each day of field works, with calibration records provided.

Parameter	DQIs	Requirement	Auditor Assessment
			The consultant (GPL 2012b and 2016b) provided only one calibration record for the PID, with no records provided for soil sample dates of 26 and 27 March 2012 (GPL 2012b) and 1 March 2016 (GPL 2016c). The consultant stated that the PID was calibrated in-house at least once daily at the start of each sampling day with 100 ppm of isobutylene. The auditor notes that the PID results were consistent with the soil analytical data (i.e. no elevated volatile COPCs such as BTEX, TPH C_6-C_9 were reported at levels exceeding laboratory LORs). Based on these results, the auditor considers the lack of PID calibration records does not affect the suitability for assessing the environmental condition of the site.
	Laboratory documentation	All relevant laboratory documentation to be collated, including chain of custody records, sample receipt advice and analytical reports.	The consultant provided all relevant COC documentation; laboratory sample receipt advice; and full laboratory certificates in the reports.
	Critical sample validity	All critical sample data to be valid.	The auditor considers that the data is considered reliable, for the purpose of the soil investigation.
	Sampling, analysis and quality approach	Adequately comparable sampling, analysis and quality approach to be used throughout the project.	The auditor considers that the data is comparable, as consistent sampling methods were employed throughout the direction of the investigation and subsequent validation program and analysis was undertaken by NATA accredited laboratories. Furthermore, consistent field staff were employed by each consultant during each phase of investigation and validation works.
	Sampler	Samplers used throughout the project to have sufficient experience.	

5.2 Audit Findings

The quality assurance/quality control measures employed by the consultants (Coffey 2008, GPL 2012b, GPL 2016b and GPL 2016c) were checked and found, overall, to adequately comply with the requirements outlined in EPA 1997, EPA 2006 and NEPC 2013. The laboratory QA/QC results have been reviewed and the results indicate that the analytical laboratories were achieving adequate levels of precision and accuracy. As such, the sampling, analytical and quality protocols undertaken by the consultant were considered to be adequately reliable for the purpose of assessing the contamination status of the site; and is reliable and useable for the purpose of this audit.

6. Assessment Criteria

6.1 Soil Criteria

At the time the ESA fieldworks were conducted, the consultant (GPL 2012b) stated that the planned future use of the campus will consist of mixed residential, commercial and open space uses. Accordingly, the most stringent assessment criteria applicable at the time of the investigation were used to consider these potential uses. The soils criteria used by the consultant (GPL 2012b) for the investigation works at the site comprised:

- Health-based Investigation Levels (HILs) for 'residential with accessible soils' (Column 1, DEC 2006). Provisional phytotoxicity based criteria (PILs) (Column 5, DEC 2006).
- Guidelines for assessing Service Station Sites (NSW EPA 1994) which specify threshold concentrations for sensitive land uses – soils for TPH and other analytes (BTEX, phenols).

The auditor notes that the above guidelines referenced former NEPC 1999 guidelines and guidelines that have since been rescinded by the EPA (i.e. NSW EPA 1994). However, as part of the data gap assessment (GPL 2016b) and validation process (GPL 2016c), the consultants provided updated criteria taking into consideration guidelines that have been approved by the EPA, namely, revised NEPC 2013. Taking into consideration the proposed uses for the campus subdivision, previously identified contamination at the site and the extent of remedial works, the adopted site validation criteria included health-based investigation levels (HILs) and Health Screening Levels (HSLs) for 'Residential A' land uses documented in Schedule B-1 of NEPC 2013, including:

- HIL A - Residential with garden/ accessible soil (NEPC 2013);
- Health-based Screening Level (HSL) A for TPH fractions and Naphthalene via vapour inhalation and direct contact pathways for soil type clay (NEPC 2013);
- Ecological Screening Levels (ESLs) for selected petroleum hydrocarbon compounds applicable to urban residential and public open space land use (NEPC 2013);
- Ecological Investigation Levels (EILs) derived for the site for urban residential and public open space land use (NEPC 2013). In the absence of EILs (i.e., cadmium, mercury), the consultant adopted available Provisional Phytotoxicity based Investigation Levels (PILs) (DEC 2006); and
- Asbestos screening level of 0.01% w/w for bonded asbestos containing material (ACM), 0.001% w/w for friable asbestos (FA) and asbestos fines and no visible asbestos for surface soils within the site (NEPC 2013).

The consultant (GPL 2016a) also referenced NSW EPA (2014), "Waste Classification Guidelines Part 1: Classifying Waste" for assessing appropriate waste classification for fill materials for off-site disposal.

Table 6.1: Soil Criteria (mg/kg)

Substance	Health-Based Investigation Criteria (Residential) (HIL-A)[1]	Ecological Investigation Levels (EILs)[2]
Metals		
Arsenic	100	100
Cadmium	20	3[4]
Chromium (III+VI)	100	190
Copper	6000	120
Lead	300	1100
Mercury[3]	10	1[4]
Nickel	400	85
Zinc	7400	270
PAHs		

Substance	Health-Based Investigation Criteria (Residential) (HIL-A)[1]	Ecological Investigation Levels (EILs)[2]
Metals		
Benzo (a) pyrene (as TEQ)	3	-
Naphthalene	-	170[5]
Total PAHs	300	-
PCBs		
Total PCBs	1	-
Asbestos		
Bonded ACM	0.01%	
FA and AF	0.001%	
All forms of asbestos	No visible asbestos for surface soils	

Note 1: HIL for Residential with gardens and accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools (NEPC 2013).
Note 2: Validation consultant (GPL 2016c) reported that EILs were derived with lowest reported CEC 3.6 cmolc/kg and pH (5.7).
Note 3: methyl mercury.
Note 4: PIL based on DEC 2006.
Note 5: Generic EIL – urban residential

Table 6.2: Soil HSLs for Vapour Intrusion (mg/kg)

Substance	HSL A&B[1] – Sand[1]				HSL A&B – Clay[2]			
	0 to <1 m	1 to <2 m	2 to <4 m	>4 m	0 to <1 m	1 to <2 m	2 to <4 m	>4 m
Benzene	0.5	0.5	0.5	0.5	0.7	1	2	3
Toluene	160	220	310	540	480	NL[3]	NL[3]	NL[3]
Ethyl benzene	55	NL[3]	NL[3]	NL[3]	NL[3]	NL[3]	NL[3]	NL[3]
Xylenes	40	60	95	170	110	310	NL[3]	NL[3]
Naphthalene	3	NL[3]	NL[3]	NL[3]	5	NL	NL[3]	NL[3]
F1 (TRH C_6-C_{10} – BTEX)	45	70	110	200	50	90	150	290
F2 (TRH >C_{10}-C_{16} – naphthalene)	110	240	440	NL[3]	280	NL[3]	NL[3]	NL[3]

Note 1: HSLs for low-high density residential – Table 1A (3) – NEPC 2013. The consultant (GPL 2016b) adopted criteria for observed sandy fill material.

Note 2: HSLs for low-high density residential – Table 1A (3) – NEPC 2013. The consultant (GPL 2016b and 2016b) adopted criteria for natural silty clays observed at depth.

Note 3: NL – calculated HSL exceeds the solubility limit for the chemical of concern. To reach the maximum allowed breathable air concentrations, soil vapour source is required that is greater than is possible for a petroleum mixture.

Table 6.4: Ecological Screening Levels (mg/kg)

Substance	Urban Residential and Public Open Space (Coarse Soil)	Urban Residential and Public Open Space (Fine Soil)
Benzene	50	65
Toluene	85	105
Ethyl benzene	70	125
Xylenes	105	45
Benzo(a)pyrene	0.7	0.7
F1 (TRH C_6-C_{10})	180	180
F2 (TRH >C_{10}-C_{16})	120	120
F3 (TRH >C_{16}-C_{34})	300	1300
F4 (TRH >C_{34}-C_{40})	2800	5600

6.2 Groundwater Criteria

During investigation works, the consultant (GPL 2012b) adopted groundwater criteria based on the protection of 95% trigger values for fresh water aquatic ecosystems from ANZECC/ARMCANZ 2000 and the Australian Drinking Water Guidelines from NHMRC 2011.

The groundwater criteria used during the investigation were based on trigger values relating to the protection of *"slightly to moderately disturbed ecosystems"* (fresh water) based on 95% protection levels (ANZECC/ARMCANZ 2000) as presented in **Table 6.2**.

Table 6.2 Groundwater Criteria (GPL 2012b)

Substance	Trigger Values for protection of 95% of fresh water species (µg/L)[1]	Drinking Water Criteria (µg/L)[2]
Metals/metalloids		
Arsenic (total)[3]	24	10
Arsenic (V)	13	-
Cadmium	0.2	2
Chromium (total)[4]	3.3[5]	-
Chromium (VI)	1	50
Copper	1.4	200, 100[6]
Lead	3.4	10
Mercury	0.6	1
Nickel	11	20
Zinc	8	-, 3000[6]
Petroleum Hydrocarbons		
Benzene	950	1
Toluene	180[5]	800
Ethylbenzene	80[5]	300
p - Xylene	200[7]	600*, 20[6,7]
o - Xylene	350[7]	600*, 20[6,7]
m - Xylene	75[7]	600*, 20[6,7]
PAHs		
Naphthalene	16[5]	nsl
Benzo(a)pyrene	0.1[5]	0.01
Phenanthrene	0.6[5]	nsl
Anthracene	0.01[5]	nsl
Fluoranthene	1.0[5]	nsl
Other		
Hardness	-	Not necessary, 20 000[6]

Notes:
1. ANZECC/AMRCANZ (2000) 'Australian and New Zealand Guidelines for Fresh and Marine Water' – Protection of Fresh Water Species, 95% Protection Level
2. Australian Drinking Water Guidelines (NHMRC 2011)
3. The arsenic (III) value was used by the consultant (GPL 2012b)
4. The chromium (III) value was used by the consultant (GPL 2012b)
5. Low or Moderate Reliability Trigger Values were quoted (ANZECC 2000)
6. Australian Drinking Water Guidelines (NHMRC 2011) – Aesthetic Values
7. Value for total xylenes
nsl = no set limit

6.3 Audit Findings

The auditor notes that during the initial ESA as conducted at the site by Coffey (Coffey 2008), the consultant reported analytical results to the relevant phytotoxicity criterion, however, a different HIL was assessed. In particular, the soil assessment was conducted to HILs for 'residential with minimal access to soil including high-rise apartments and flats' (Column 2, DEC 2006). However, GPL (2012b) reviewed the analytical data from the Coffey 2008 investigation and incorporated this data into the supplementary ESA (GPL 2012b), and compared these results to more conservative HIL-A criteria (residential with accessible soil) and PIL criteria.

The soil criteria adopted during the supplementary investigation (GPL 2012b) have been checked against, and were generally consistent with, criteria endorsed by the EPA at the time of the investigation. Specifically, the consultant appropriately adopted the most conservative set of criteria relating to the mix of proposed future uses, consistent with guidance provided in DEC 2006. Additionally, the auditor notes that the previously adopted soil criteria (GPL 2012b) is generally lower than the current NEPC 2013 levels.

The consultant (GPL 2012b) adopted asbestos criteria of 'presence/absence', which the auditor considers to be conservative compared to current NEPC 2013 guidelines. The consultant (GPL 2012b) also took into consideration aesthetic issues (i.e., odours and discolouration) as part of the site assessment.

The soil criteria adopted by the consultant during data gap assessment (GPL 2016b) and validation works (GPL 2016c) have been checked against and were generally consistent with criteria endorsed by the EPA for the proposed land uses. However, the consultant has not considered direct contact exposure to site soils, and has made no reference to the NEPC 2013 TPH management limits. However consistent with the above, all detectable levels of impact have been removed from the site and no aesthetic indicators of contamination of site soils were reported at the completion of the works.

Groundwater criteria

The groundwater investigation criteria adopted by the consultant (GPL 2012b) have been checked against, and were sourced from relevant EPA endorsed guidelines, namely ANZECC/ARMCANZ 2000 and NHMRC 2011. The adopted criteria are considered appropriate for assessing the potential impacts to ecological receptors relevant to the site setting (i.e., fresh water and in an urban environment). The auditor notes that the adopted groundwater criteria based on the protection of 95% trigger values for fresh water aquatic ecosystems (ANZECC/ARMCANZ 2000) were adjusted by the consultant (GPL 2012b) to account for hardness (hardness modified trigger values (HMTV)) as outlined in Table 3.4.3 of ANZECC/ARMCANZ 2000. These values were reviewed by the auditor and have been correctly calculated based on a hardness value of 200 mg/L and are considered appropriate for the purposes of this investigation. The HMTV as adopted by the consultant are as follows:

- Cadmium – 1.1 µg/L.
- Chromium – 16 µg/L.
- Copper – 7 µg/L.
- Lead – 38 µg/L.
- Nickel – 55 µg/L.
- Zinc – 40 µg/L.

The groundwater investigation criteria adopted by the consultant (Coffey 2008) have been checked against, and were sourced from relevant EPA endorsed guidelines, namely ANZECC/ARMCANZ 2000. The auditor notes that the values for arsenic and chromium were presented as "not established", however values have been established in ANZECC/ARMCANZ 2000 (as referenced in **Table 6.2**). Remaining adopted criteria are considered appropriate for assessing the potential impacts to ecological receptors relevant to the site setting (i.e., fresh water and in an urban environment). The auditor notes that the adopted groundwater criteria based on the protection of 95% trigger values for fresh water aquatic ecosystems (ANZECC/ARMCANZ 2000) were adjusted by the consultant (Coffey 2008) to account for hardness (HMTV) as outlined in Table 3.4.3 of ANZECC/ARMCANZ 2000. These values were reviewed by the auditor and have been correctly calculated based on a hardness value of 430 mg/L and are considered appropriate for the purposes of this investigation. The HMTV as adopted by the consultant are as follows:

- Cadmium – 2.55 µg/L.
- Copper – 17 µg/L.
- Lead – 61 µg/L.
- Nickel – 134 µg/L.

- Zinc – 97 µg/L.

The consultant (GPL 2012b), following guidance provided by NEMC for assessment of a statistical distribution of contaminant concentrations taken from a data set of random samples, adopted the following criteria that must be fulfilled in order to establish that a site (or study area) is not contaminated, which are:

- The arithmetic mean of the data set must be less than the relevant threshold level (health based only); that is, it is acceptable for individuals to exceed the guideline, but the cumulative mean of the data set of soil sample results should not exceed the threshold level.
- The standard deviation of the data set should be less than 50% of the relevant threshold level (health based only).
- No individual sample result should be greater than 250% of the relevant threshold level (health based only).

Additionally, the consultant (GLPL 2012b) reported the following regarding the statistical approach taken during the supplementary ESA:

- Where applicable, this statistical approach was adopted for assessment of the laboratory data provided. However, as opposed to the arithmetic mean, the 95% Upper Confidence Limit (UCL) of the mean, as discussed in Section 5 of the NSW EPA "*Sampling Design Guidelines for Contaminated Sites*" – 1995, was adopted as the governing value.
- For discrete samples, where assessment of statistical distribution of test data sets was carried out, the individual concentrations of analytes were assessed against the HIL A and/or suggested levels in the EPA service station guidelines. For all discrete samples, whether statistical distribution was carried out or not, the individual concentrations of analytes were assessed against the available PIL.

Overall, the auditor considers that the soil (GPL 2016b and GPL 2016c) and groundwater criteria (GPL 2012b) adopted by the consultant were generally appropriate for the nature of the investigation.

7. Site Investigation Results

Site investigation results presented by the consultants (Coffey 2008, GPL 2012b and GPL 2016b) for the campus are discussed below. However, based on the proposed subdivision plan provided by the client (UWS Westmead Estate Major Works General Arrangement Plan, Drawing No. MMD-333625-C-DR-SC01-DA-0006 provided in **Appendix C**), the auditor notes that data points relevant to current site boundary (Lot 4 of proposed subdivision) include: EBH3, EBH5, EBH6, EBH8, EBH9, EBH15, EBH43, CGBH2 (Coffey 2008); TP1, TP2, TP3, TP10, TP11, TP16 (GPL 2012b); TP43, TP44, TP45 and TP46 (GPL 2016b).

7.1 Field Observations

Field observations made at the campus were summarised by the consultant (GPL 2012b), as follows:

- Topsoil, comprising medium plasticity silty/sandy clay with some roots, underlain by fill materials and/or natural low to high plasticity silty clay and/or medium grained clayey sand, was encountered at a number of test pit, borehole and monitoring well locations. Topsoil thickness ranged from approximately 0.1 m to 0.2 m.
- The following four types of fill were encountered:
  - Type 1: Silty Clay, medium plasticity, brown with traces of gravels, underlain by either natural silty clay or other type of fill in most of the test pits. Fibre-cement pieces were found in Type 1 fill at one sample location (TP2). Fill thickness ranged from about 0.1 m to about 1.85 m.
  - Type 2: Sandy Clay, low plasticity, dark brown, underlain by either natural silty clay or Type 1 fill. Fill thickness ranged from about 0.15 m to about 0.3 m.
  - Type 3: Silty Clay, medium plasticity, dark brown with traces of organic matter, underlain by natural silty clay. Fill thickness ranged from about 0.3 m to about 1.5 m.
  - Type 4: Sandy Clay, low plasticity, grey with some gravels and sandstone fragments, underlain by natural silty clay. Fibre cement pieces and building rubble were found in Type 4 fill at most of test pit locations. Fill thickness ranged from about 0.3 m to about 0.9 m.
- Based on the contents of the fill materials, the natural soil profiles and regional geological information, the consultant (GPL 2012b) concluded that Types 1, 2 and 3 fill materials might have resulted from cut and fill within the site. Type 4 fill material appears to have been imported to the site. In addition, it was observed that about 50 mm to 100 mm thick gravels were placed in the car park area, with 200 mm of asphaltic concrete encountered at sample location TP8 (located at a bitumen car park at the south western corner of the site).
- The soil profile encountered did not reveal any asbestos, visual (staining, dying) or olfactory indicators of potential contaminants, with the exception of fibrocement pieces in the fill profile at test pit locations TP2, TP4, TP6 and TP9, and a weak petroleum hydrocarbon odour in the deeper fill at TP13.
- Based on the test pits/borehole logs, the starting depth of natural soil in the site generally ranges from 0.5 m to 1.95 m. Based on the monitoring well logs and borehole logs, the depth of natural soil in the vicinity of the former UST area starts from 0.1 m and continues up to 0.9 m to 1.4 m bgl, underlain by weathered shale.
- Groundwater or seepage water was not encountered during soil sampling in the test pits/boreholes to a maximum depth of approximately 2.5 m bgl. During installation of the monitoring wells, no groundwater or seepage was encountered, however, standing water

levels in the monitoring wells ranged from 6.82 m to 9.36 m bgl (as measured approximately one week after installation).

- Soil samples were analysed in the field with a calibrated PID. Concentrations of VOCs as reported by the PID returned low results, from 0 to 3.5 ppm.
- No oily substances or petroleum hydrocarbon odour were observed in the groundwater during monitoring well development, purging and groundwater sampling.
- The inferred groundwater flow direction for groundwater present in the natural materials underlying the site was calculated in a northerly direction.
- Groundwater quality parameters during groundwater sampling were reported as follows:
  - pH ranged from 6.75 to 6.83.
  - Electrical conductivity ranged from 20.5 mS/cm to 27.5 mS/cm.
  - Dissolved oxygen ranged from 3.6 mg/L to 3.8 ppm.
  - Redox potential ranged from 231 mV to 248 mV.

General soil profile beneath the former buildings (GPL 2016b) comprised fill materials overlying residual clayey soils. The thickness of fill materials ranged from 300 mm to 2.0 m. The consultant reported that the soil profile encountered did not reveal any asbestos, visual indicators including staining/dying, or olfactory indicators of potential contaminants, with the exception of the fibro-cement fragments in the surface fill profile at TP40. The consultant (GPL 2016b) further reported that scattered asbestos cement pieces and two asbestos pipes were observed on the ground surface of contaminated Areas 2 and 3, identified in the RAP (GPL 2012c).

7.2 Soil Investigation Results

The consultants (Coffey 2008, GPL 2012b, GPL 2016b and GPL 2016c) provided summary tables (**Appendix F**) in addition to detailed laboratory reports and chain of custody documentation.

A summary of the analytical results, in comparison to the adopted soil criteria (as provided in Section 6.1) is provided in **Table 7.1**, as follows.

Table 7.1: Summary of Soil Analytical Results (mg/kg) (Coffey 2008, GPL 2012b and GPL 2016b)

Substance	Minimum concentration	Maximum concentration	Exceedance to SAC
Metals			
Arsenic	<3	26	PIL exceedance reported at EBH34 0.2-0.3 and TP5 0.1-0.4
Cadmium	<0.3	4.3	PIL exceedance reported at EBH24 0.5-0.6
Chromium (total)	3.5	71	Cr (VI) PIL – all samples Cr (III) PIL – no exceedances
Copper	9.5	350	PIL exceedances reported at EBH24 0.5-0.6, TP5 0.1-0.4 and TP6 0.1-0.4.
Lead	2	3400	HIL A exceedances reported in six samples at EBH16 0.2-0.3, EBH24 0.5-0.6, TP5 0.1-0.4, TP6 0-0.1, TP6 0.1-0.4 and TP18 0-0.1; and PIL exceedances reported in five samples at EBH16 0.2-0.3, EBH24 0.5-0.6, TP5 0.1-0.4, TP6 0-0.1 and TP6 0.1-0.4
Mercury	<0.05	0.9	No exceedance
Nickel	0.7	140	PIL exceedances reported at EBH13 0.2-0.3, EBH45 0.2-0.3 and EBH45 0.5-0.6
Zinc	2.8	1700	PIL exceedances reported in eight samples EBH24 0.5-0.6, TP4 0.7-1.0, TP5 0-0.1 and 0.1-0.4, TP6 0-0.1 and 0.1-0.4, TP9 0.7-1.0 and SS5.
TPH/BTEX			
Benzene	<0.1	-	No exceedance

Substance	Minimum concentration	Maximum concentration	Exceedance to SAC
Toluene	<0.1	-	No exceedance
Ethylbenzene	<0.3	-	No exceedance
Xylenes	<0.1	-	No exceedance
TPH C_6-C_9	<20	-	No exceedance
TPH C_{10}-C_{40}	<150	673	No exceedance
F1 C6-C10 less BTEX	<25	-	No exceedance
F2 C10-C16 less naphthalene	<25	50	No exceedance
F3 C16-C34	<90	120	No exceedance
F4 C34-C40	<120	-	No exceedance
PAHs			
B(a)P	<0.1	2.4	HIL A exceedances reported at BH34 0-0.1, EBH26 0.2-0.3, EBH41 0.2-0.3 and BH24 0-0.1.
B(a)P TEQ	<0.3	0.8	No exceedance
Total PAHs	<LOR	29	HIL A exceedance reported at BH24 0-0.1
Other			
OCP/OPP	<LOR	0.7	No exceedance
PCB	<0.1	-	No exceedance
Asbestos	Asbestos detected		Coffey 2008 Chrysotile asbestos detected above LOR at EBH9 0.2-0.3, EBH24 0.2-0.3, EBH24 0.5-0.6, EBH33 0.2-0.3 and 0.5-0.6, CGBH3 0.5-0.6, CGBH10 0.2-0.3 and 0.4-0.5, CGBH11 0.2-0.3, 0.4-0.5, SS1, SS2, SS4, SS5, SS6, SS7 and SS8; GPL 2012b Amosite, chrysotile and crocidolite asbestos detected above LOR at TP6 0.1-0.4 and TP25 0-0.1; ACM (fibro cement fragments) encountered at TP2, TP4, TP6 and TP9. GPL 2016b Bonded chrysotile asbestos detected at TP40 0-0.1

7.3 Groundwater Investigation Results

The consultant (GPL 2012b) provided summary tables (**Appendix F**) in addition to detailed laboratory reports and chain of custody documentation.

A summary of the groundwater analytical results collected in 2008 and 2012 in comparison to the adopted groundwater investigation levels (as provided in **Section 6.2**) is provided below in **Table 7.2.**

Table 7.2: Summary of groundwater analytical results (µg/L)

Substance	Coffey (2008)		GPL (2012b)		Exceedance to GAC
	Minimum concentration	Maximum concentration	Minimum Concentration	Maximum concentration	
Metals					
Arsenic	<1	9.9	3	5	No exceedance
Cadmium	<0.1	0.63	<0.1	0.3	MW1, MW2 (GPL 2012b)
Chromium (total)	4	11	<1		No exceedance
Copper	4.1	9.8	2	3	MW1, MW2, MW3 (GPL 2012)
Lead	<0.1	104	<1	-	CGBH9 (Coffey 2008)
Mercury	<0.1	-	<0.1		No exceedance
Nickel	12	73	12	86	MW1, MW2, MW3 (GPL 2012)
Zinc	2.2	180	1	46	CGBH3, CGBH9 (Coffey 2008) MW1 (GPL 2012b)
TPH/BTEX					
Benzene	<1	-	<0.5	-	No exceedance
Toluene	<1	-	<0.5	-	No exceedance
Ethylbenzene	<1	-	<0.5	-	No exceedance
Xylenes	<3	-	<1.5	-	No exceedance
TPH C_6-C_9	<40	90	<40	-	No exceedance
TPH C_6-C_{35}	<LOR	1530	<700	-	No exceedance
Other					

Substance	Coffey (2008)		GPL (2012b)		Exceedance to GAC
	Minimum concentration	Maximum concentration	Minimum Concentration	Maximum concentration	
Total PAHs	-	-	<LOR	-	No exceedance

7.4 Waste Classification Results

The consultant (GPL 2016a) completed an in-situ waste classification of fill materials within Remediation Areas 1-6 and 8 as identified in the RAP (GPL 2012c), designated for excavation.

TCLP concentrations reported by the consultants (Coffey 2008, GPL 2012b and GPL 2016a) within these areas are as follows:

- All concentrations of arsenic, cadmium, chromium and mercury were reported at concentrations less than the LOR.
- Concentrations of lead ranged from less than the LOR to 18 mg/L at EBH15 (0.2- 0.3 m bgl).
- Concentrations of nickel were reported less than the LOR.
- Benzo(a)pyrene results were all reported at concentrations less than the LOR.

The consultant (GPL 2016a) additionally reported asbestos detected at TP2 (Area 1); TP4, TP6, TP9 and TP40 (Area 2); SS1-SS4 (Area 3); EBH9 (Area 4); CGBH10, CGBH11, SS7, SS8, TP25 (Area 5); and EBH33 (Area 6) exceeding adopted site assessment criteria.

The consultant reported that soils with high total and leachable lead concentrations in Area 1 is pre-classified as General Solid Waste as per guidance provided in NSW EPA (2014) regarding waste contaminated with lead (including lead paint waste) from residential premises/ educational or child care institutions. As such, soils in Areas 1 to 6 were classified as General Solid Waste (non-putrescible) – Special Waste (asbestos waste) and soils in Area 8 was classified as General Solid Waste (non-putrescible).

7.5 Consultant's Interpretations and Conclusions

7.5.1 Soil

The consultant (GPL 2012b) concluded the following in relation to soil contamination at the site as part of the initial ESA (Coffey 2008) and supplementary ESA (GPL 2012b):

Metals

- Additional metals testing was conducted by GPL 2012b at a location (sample location EBH15) in which elevated lead was reported by Coffey 2008. The metals test results for the discrete judgmental soil samples collected in the vicinity of location EBH15 were below the adopted PIL and the HIL-A criteria with the exception of a previous sample location EBH15 (Coffey 2008), reported at 3400 mg/kg, which might impact on the growth of certain plant species and presents a risk of harm to human health.
- Additional metals testing was conducted by GPL 2012b at a location (sample location EBH24) in which elevated lead was reported by Coffey 2008. The metals test results for the discrete judgmental soil samples collected in the vicinity of sample location EBH24 were below the adopted PIL and the HIL-A, with the exception of arsenic, cadmium, copper, lead and zinc. The lead concentrations (ranging from 740 mg/kg to 1900 mg/kg) exceed the adopted PIL and HIL-A and might impact on the growth of certain plant species and present a risk of harm to human health. The arsenic, cadmium, copper and zinc concentrations exceed the adopted PIL and might impact on the growth of certain plant species, but would not present a risk of harm to human health.

- Additional metals testing was conducted by GPL 2012b at the former UST location. All metals concentrations relating to samples collected from the former UST location were below the adopted PIL and HIL-A.
- The metals test results for the discrete systematic fill soil samples as collected by Coffey 2008 and GPL 2012b indicate the following:
  - All concentration of metals, with the exception of some arsenic, nickel and zinc, were reported above the adopted PIL but were below the HIL-A. The arsenic, nickel and zinc concentrations might impact on the growth of certain plant species but would not present a risk of harm to human health.
  - The 95% Upper Confidence Limits (UCL) of mean concentrations were calculated for the results of all discrete systematic fill soil samples, topsoil samples and natural soil samples, with the 95% UCL of mean concentrations of all metals below the adopted HIL-A. In addition, the Standard Deviations of all metals were below 50% of the adopted HIL-A, and no single concentration of metals exceeded 250% of the adopted HILA.
- Elevated arsenic and nickel concentrations were reported at sample locations EBH13, EBH34 and EBH45 should not impact on the growth of certain plant species for the following reasons:
  - The arsenic and nickel concentrations only marginally exceeded the adopted PIL.
  - The adopted PIL are assumed to apply to sandy loam soil, whilst the soils in the sample locations consist of silty clay, low plasticity or roadbase material. Therefore, bioavailability of metals to plants will be restricted compared to sandy loam soil.
  - Due to inclusions of gravel the soils may not be suitable for landscaping purposes, in which case the adopted PIL will no longer be the appropriate threshold levels. Moreover, marginally elevated nickel concentrations at sample locations EBH13 and EBH45 could be due to the presence of gravel in the soil profile.
- The 95% UCL of mean concentrations was calculated by the consultant (GPL 2012b) for all lead soil sample results obtained from entire site (excluding the two hotspot locations at EBH15 and EBH24), which includes the discrete judgmental and systematic fill soil samples, topsoil samples and natural soil samples recovered during the ESA (Coffey 2008) and supplementary ESA (GPL 2012b). The 95% UCL of all mean metals concentrations as calculated by the consultant (GPL 2012b) were below the adopted HIL-A, the standard deviations of all metals were below 50% of the adopted HIL-A, no single concentration of metals exceeded 250% of the adopted HIL-A, and no concentration of lead exceeded the adopted PIL. Therefore, other than the two referenced lead hotspot locations (EBH15 and EBH24), lead is not considered a concern at the site.

<u>TPH/BTEX</u>

- Concentrations of TPH and BTEX test results for the discrete judgmental soil samples collected from the vicinity of previous sample locations EBH15, EBH24 and the removed UST were below the adopted EPA 1994 guideline criteria, with all BTEX and TPH concentrations less than the laboratory LORs.
- Concentrations of TPH and BTEX test results for the discrete systematic fill soil samples, topsoil samples and natural soil samples were below the adopted EPA 1994 guideline criteria, with all BTEX and TPH concentrations less than the laboratory LORs.

<u>PAHs</u>

- Additional PAH analysis was conducted by GPL 2012b at two discrete judgemental locations (sample locations EBH15 and EBH24) and at the former UST location. The results of all benzo(a)pyrene and total PAH analyses, with the exception of one reported benzo(a)pyrene concentration, were below the adopted HIL-A. The benzo(a)pyrene exceedance was reported for a soil sample collected from topsoil at the former UST location.
- The 95% UCL of mean concentrations of benzo(a)pyrene and total PAH was conducted for all discrete judgemental topsoil samples, with results less than the adopted HIL-A, the standard deviations were less than 50% of the adopted HIL-A, and no concentrations of benzo(a)pyrene and total PAH exceeded 250% of the applicable HIL-A. Based on these results, the consultant (GPL 2012b) reported that PAHs are not a concern for the topsoil at the former UST location.
- The 95% UCL of mean concentrations was calculated by the consultant (GPL 2012b) on all PAH soil sample results collected from entire site, which includes the discrete systematic fill soil samples, topsoil samples and natural soil samples recovered during the ESA (Coffey 2008) and supplementary ESA (GPL 2012b). The 95% UCL of all mean concentrations of benzo(a)pyrene and total PAHs as calculated by the consultant (GPL 2012b) were below the adopted HIL-A, the standard deviation of benzo(a)pyrene and total PAHs were all below 50% of the adopted HIL-A (with one exception for benzo(a)pyrene, discussed below) and no single concentration benzo(a)pyrene or total PAH concentration exceeded 250% of the adopted HIL-A.
- The standard deviation of benzo(a)pyrene as calculated for discrete systematic topsoil samples was more than 50% of the adopted HIL-A, likely attributable to elevated benzo(a)pyrene concentration as reported for a topsoil sample at BH24. This elevated PAH concentration exceeded the adopted HIL-A, which presents a risk of harm to human health.
- The 95% UCL of mean concentrations of benzo(a)pyrene and total PAH (excluding the test results of the topsoil sample at BH24) were recalculated for all discrete systematic topsoil samples to determine the overall PAH contamination status of the topsoil. The 95% UCL of mean concentrations of benzo(a)pyrene and total PAH were less than the adopted HIL-A, the standard deviations were less than 50% of the adopted HIL-A and no concentrations of benzo(a)pyrene and total PAH exceeded 250% of the adopted HIL-A.
- In order to determine the impact of benzo(a)pyrene on the entire site, the 95% UCL of the mean concentrations of benzo(a)pyrene and total PAH analytical results obtained for the discrete judgemental and systematic fill soil samples, topsoil samples and natural soil samples collected during the ESA and supplementary ESA (excluding the hotspot concentrations),were calculated by the consultant (GPL 2012b). The 95% UCL of mean concentrations of benzo(a)pyrene and total PAH were less than the adopted HIL-A, the standard deviations were less than 50% of the adopted HIL-A and no concentrations of benzo(a)pyrene and total PAH exceeded 250% of the adopted HIL-A. Therefore, other than the hotspot location BH24, PAH is not considered a concern for the site.

<u>OCP and PCB</u>

- The analytical results of the discrete systematic fill soil samples, topsoil samples and natural soil samples collected during the supplementary ESA and analysed for OCPs and PCBs were all reported at concentrations below the laboratory LORs and the adopted HIL-A.
- The analytical results of the discrete judgemental soil samples collected during the supplementary ESA in the vicinity of previous locations EBH15 and EBH24 and analysed for OCPs and PCBs were all reported at concentrations below the laboratory LORs and the adopted HIL-A.

Asbestos

- The asbestos test results from samples collected from discrete fill and topsoil locations during the ESA and supplementary ESA reported chrysotile asbestos in fill/topsoil samples at sample locations EBH9, EBH24, EBH33, CGBH3, CGBH10 and CGBH11, and at surface samples locations SS1, SS2 and SS4 to SS8.
- Amosite, chrysotile and crocidolite asbestos were reported in topsoil/fill samples TP6 and TP25.
- The fibro-cement pieces found in the fill profiles at TP2, TP4, TP6 and TP9 during the supplementary ESA were analysed for asbestos, with the fibro-cement pieces containing chrysotile asbestos and/or crocidolite asbestos.

The consultant (GPL 2012b) reported the following conclusions in relation to the soil results (consisting of the supplementary ESA investigation (GPL 2012b) and the previous ESA investigation (Coffey 2008)):

- In general, soils beneath the site do not appear to have been significantly impacted by past or present activities and the presence of fill materials and former UST, with the exception of soils at a number of locations in which elevated lead and PAH concentrations present a potential risk of harm to human health.
- Asbestos and asbestos-cement pieces also present a potential risk of harm to human health. Elevated metals concentrations could potentially impact on the growth of certain plant species but would not present a risk of harm to human health. Therefore, remediation is required.
- The site is unlikely to be "Significantly Contaminated Land" as defined by the Contaminated Land Management Act 1997. As a precaution, for any migration of lead contamination into the neighbouring property, a silt fence should be installed along part of the western boundary (near EBH15, EBH24, TP5 and TP6) as soon as possible.
- Based on the contaminant concentrations and locations identified from the ESA and supplementary ESA, eight remediation areas (Areas 1 to 8) were developed (as discussed in **Section 8**).
- Preliminary waste classification was provided for the identified remediation areas. Additional sampling and testing will be required during remediation works to confirm the waste classification of contaminated soils in remediation Areas 1, 2 and 8, and to determine whether asbestos waste in remediation Areas 3 to 7 is mixed with other waste.
- Further contamination assessment of shale bedrock at the former UST area of the site will be required as part of remediation/validation of the site.

The consultant (GPL 2016a) reported that waste classification was undertaken for materials within Areas1-6 and 8 as Area 7 was already excavated as part of road construction, and sampling and testing of soil for the waste classification of Area 7 was not possible.

During the subsequent data gap assessment undertaken within building footprints, the consultant (GPL 2016b) reported that soils beneath the former buildings did not appear to have been significantly impacted by past activities and the presence of fill materials, with the exception of fibro-cement pieces in the surface fill profile at TP40 (located within Area 2) and scattered asbestos-cement pieces and two asbestos pipes observed within Areas 2 and 3, where remediation was required. However, the consultant (GPL 2016b) noted that Areas 2 and 3 have already been identified for asbestos contamination, and will be addressed by the site remediation and validation works proposed in the RAP (GPL 2012c).

7.5.2 Groundwater

The consultant (Coffey 2008) reported the following in relation to the preliminary groundwater investigation:

- Concentrations of lighter range fractions (TPH C_6-C_9) were reported at CGBH10 on the southern site boundary (up-gradient) and at CGBH8 located in the central southern site area approximately 20m to the north (down gradient) of the former UST.
- Mid-range hydrocarbon fractions (TPH C_{10}-C_{28}) were reported at CGHB3, CGBH8 and CGBH9. No heavier range fractions were reported in the groundwater sampled. No phase separated hydrocarbons were detected in the wells.
- The total TPH conversations (C_{10}-C_{36}) in the groundwater sampled ranged from 0.6 mg/L to 1.5 mg/L.
- BTEX compounds (toluene, ethylbenzene and xylenes) were reported in CGBH8 located down gradient of the former UST at concentrations below the adopted groundwater criteria.

The consultant (GPL 2012b) reported the following in relation to the the groundwater investigation undertaken in the vicinity of the former UST:

- The hardness of the groundwater samples was generally more than 200mg/L, with the exception of the hardness of groundwater sample MW3-1, which was 59mg/L. However, the hardness of the corresponding split sample was 200mg/L. Therefore, the representative hardness for the groundwater samples to compute harness modified trigger values was taken as 200mg/L.
- The concentrations of all metals, with the exception of nickel and zinc, were either below the laboratory LOR and/or below the applicable groundwater criteria. The nickel and zinc concentrations exceeded the relevant harness modified trigger value for aquatic ecosystems (fresh water) at protection of 95% species.
- The concentrations of all metals were below the relevant health level and/or aesthetic values for drinking water in the Australian Drinking Water Guidelines 2011.
- The concentrations of all TPH and BTEX results were less than laboratory LOR, and BTEX was reported below the relevant trigger values for aquatic ecosystems (fresh water) at a protection of 95% species, and the relevant health level and aesthetic values for drinking water in the Australian Drinking Water Guidelines 2011.
- The concentrations of PAHs were all less than the laboratory LOR, and PAH concentrations were below the relevant trigger values for aquatic ecosystems (fresh water) at protection of 95% species and the relevant health level for drinking water in the Australian Drinking Water Guidelines 2011.

The consultant (Coffey 2008) presented the following conclusions in relation to the initial groundwater investigation conducted at the site:

- During the site investigations no visual or olfactory evidence of hydrocarbon contamination was noted in the soil or groundwater across the site. In addition soil analysis results did not indicate significant hydrocarbon impact. Given the observations and soil results it is considered that the TPH concentrations detected in groundwater could be associated with natural hydrocarbons present within the underlying shale bedrock noting groundwater at most locations was observed to be present within the shale bedrock.
- It is possible that the TPH and BTEX detected in CGBH8 could be partially associated with the former UST located approximately 20m to the south (upgradient) of this borehole. It is

possible a localised groundwater plume associated with the UST could be present in this area. This should be assessed following remediation in the UST area.

- Concentrations of heavy metals (zinc, lead, copper, nickel) were reported above the ANZECC (2000) aquatic ecosystem trigger levels in groundwater at the site. Of these zinc and lead exceeded the hardness modified trigger values. Given widespread heavy metal contamination was not detected in soil at the site, it is considered that the heavy metals are unlikely to be attributable to contamination at the site, possibility attributable to leaching from metals in the shale. The samples were not field filtered which could potentially have resulted in overestimation of the heavy metal concentrations.
- Based on the preliminary groundwater monitoring, it is considered that, with the potential exception of around the UST, groundwater is unlikely to require remediation or management unless it is disturbed. However, the heavy metal and petroleum concentrations in the groundwater would mean the groundwater would be unlikely to be suitable to dispose to stormwater in the event dewatering was required during or post basement construction.

The consultant (GPL 2012b) reported that the groundwater assessment has been carried out in the vicinity of the former UST area. The residual (natural) silty clay beneath the site is relatively impermeable. As such, leaching of any contaminants into the groundwater regime is unlikely due to the relatively impermeable residual (natural) silty clay beneath the site. As such the consultant reported that the elevated nickel and zinc concentrations are unlikely to have resulted from the former 5000L mineral spirit UST in the southern portion of the site.

7.6 Audit Findings

The consultant (GPL 2012b) incorporated analytical results from the preliminary ESA (Coffey 2008) into the supplementary ESA and provided tables that were generally accurate and complete, with the following exceptions:

- Tables G2 and G5, the value for lead for sample TP18 (0-0.1) should be bolded to indicate an exceedance of the HIL-A.
- Table G3, sample CGBH6 is labelled as "GBH6" in the corresponding laboratory report.
- Table I2, the value for TPH C_6-C_9 for sample TP10 (0-0.1) should be reported as <200 mg/kg (rather than <20 mg/kg).
- Tables J1 and K5, the value for benzo(a)pyrene for sample BH34 (0-0.1) should be bolded to indicate an exceedance of the HIL-A.
- Table K1, the value for benzo(a)pyrene for sample EBH38 (0.2-0.3) should be reported as 0.05 mg/kg (rather than <0.05 mg/kg).
- Tables K1 and K4, the values for benzo(a)pyrene for samples EBH26 (0.2-0.3) and EBH41 (0.2-0.3) should be bolded to indicate exceedances of the HIL-A.
- Table K2, the values for benzo(a)pyrene and total TPH for sample BH24 (0-0.1) should be bolded to indicate exceedances of the HIL-A.

As outlined above, the value for TPH C_6-C_9 for sample TP10 (0-0.1) should be reported as <200 mg/kg. The auditor notes that the corresponding BTEX analytical results for this sample also report elevated LORs, however, these LORs are below the EPA 1994 criteria adopted by the consultant. In addition, no observations of hydrocarbon odours or staining were reported at this sample location by the consultant (GPL 2012b), and the elevated LOR reported for TPH C_6-C_9 at this sample location is not considered to affect the outcome of the investigation.

The auditor reviewed the soil analytical results from Coffey (2008) investigation as presented in GPL (2012b), and initial groundwater analytical summary tables as presented by the consultant (Coffey 2008), and the following inaccuracies were noted:

- The water blank samples ("WB" samples) as presented on Table LR3 are presented as soil results, however these are water samples. The results should be presented as µg/L rather than mg/kg, and the soil waste classification criteria as presented on this table are not relevant for these samples.
- The auditor notes that the consultant analysed ten soil samples for OPPs during the initial ESA (Coffey 2008). The results of these analysed soil samples were not reported or discussed by the consultant, however, no analysed OPPs were reported at levels above laboratory LORs.

The consultant (GPL 2016b) provided tables which adequately summarised the laboratory results that were generally accurate and complete with some minor exceptions as noted below:

- Analytical results for VOCs were not summarised by the consultant, however, the auditor notes that all concentrations were reported below laboratory LOR.
- Based on the laboratory analytical reports provided by the consultant, the auditor notes that 0.003 g of chrysotile asbestos was detected in sample TP50 0-0.1 which was omitted from the summary tables, with reported concentration below site assessment criteria.
- The auditor notes lab report SE148334 was reissued due to amended sample ID, however, the auditor has reviewed the superseded report SE148334R0, and considers the incorrect sample nomenclature to have no impact on the findings.

The site plans provided by the consultants (Coffey 2008 and GPL 2012b) were to scale and adequately identified the sampling locations relevant to the main site features such as boundaries and street frontage, and have been produced to scale. Site plans are included in **Appendix D**.

The consultants (Coffey 2008 and GPL 2012b) addressed both the potential and actual migration of the identified contaminates of concern through an assessment of groundwater. The auditor notes that the consultant (GPL) did not incorporate the results of the initial groundwater investigation as presented in Coffey 2008 into the supplementary investigation (GPL 2012b). As referenced in Coffey 2008, the initial groundwater investigation was undertaken as a preliminary investigation and did not target specific areas such as the former UST area. The initial groundwater investigation reported low level TPH and BTEX with some elevated metals in groundwater samples, and these results were attributable to natural soil conditions with the possible exception of impact from the former UST. The supplementary ESA investigation was conducted to address the former UST area of the site and provides additional detail on potential impact to groundwater from on-site sources. As such, the initial groundwater investigation as conducted by Coffey 2008 is considered indicative only, and the supplementary groundwater investigation as conducted by GPL 2012b is considered representative for the purposes of investigating potential groundwater impact arising from historic on-site sources.

Groundwater was present at the site within the natural clay/shale formation, with no indication of significant groundwater contamination by the contaminants identified in the fill material. The auditor that no groundwater contamination issue was identified within the site due to the past presence of a 5000L mineral spirit UST in the southern portion of the site.

The laboratory procedures were generally appropriate for the identified potential contaminants of concern and the adopted site assessment criteria against which the results were compared.

The consultants (Coffey 2008 and GPL 2012b) provided a detailed assessment of aesthetic conditions of fill materials at the site. The assessment of these materials did not reveal any asbestos or any visual or olfactory indicators of potential contaminants, with the exception of fibro cement pieces in

the fill profiles at some test pit locations, and detection of weak petroleum hydrocarbon odour in the deeper fill at one location. These observations were taken into consideration in the development of the proposed remediation strategy for the campus (GPL 2012c).

The consultant (GPL 2012b) reported that the analysed fill and topsoil contained concentrations of metals, asbestos, TPHs and/or PAHs above the adopted soil criteria. These results were incorporated into the proposed remedial strategy for the campus (GPL 2012c).

Soil waste classifications were conducted by the consultant (GPL 2012b) on soils at the identified eight remediation areas, however, based on auditor requirements, further in-situ waste classification was undertaken (GPL 2016a) prior to remediation and validation works on site. The waste classifications of fill materials designated for off-site disposal provided by the consultant (GPL 2016a) was appropriate and consistent with the data provided.

Overall, the consultant reports (Coffey 2008, GPL 2012b and GPL 2016b) are considered to have obtained and reported results in a manner which enables conclusions to be drawn regarding the need for remediation (as discussed in **Section 8**) relevant to the site (data points including: EBH3, EBH5, EBH6, EBH8, EBH9, EBH15, EBH43, CGBH2 (Coffey 2008); TP1, TP2, TP3, TP10, TP11, TP16 (GPL 2012b); TP43, TP44, TP45 and TP46 (GPL 2016b)), and therefore meets the requirements of the site audit.

8. Remediation and Validation

8.1 Remediation Objective

The consultant (GPL 2012c) reported that the site is to be redeveloped for residential, commercial and open space land uses, and a RAP was prepared for the remedial works required at the site. The defined objectives of the RAP (GPL 2012c) are:

- Review and summarise previous environmental investigations (Coffey 2008, GPL 2012b) conducted at the site.
- Provide a method(s) of remediation that can be implemented and validated so that a statement can be made declaring the site is environmentally suitable for the proposed land uses.
- Present the optimal remedial method(s) for proposed land uses.
- To ensure all remedial works are carried out with due regard for the environment and in a responsible manner, presenting no unacceptable harm to the public or to workers at the site.
- To ensure implementation of an adequate occupational health and safety plan during remediation works, and to ensure all remediation works comply with current regulations and guidelines.
- To provide a specification for the remediation works to be adopted by the appointed contractor(s).
- To provide details of the validation processes to be adopted during and at completion of remediation.

8.2 Remediation Options and Preferred Approach

The consultant (GPL 2012c) reported that, in accordance with NSW DEC 2006, the preferred options for remediation and/or management of contaminated land are summarised as follows, in order of preference:

1. Avoiding contamination of a site.
2. On-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level.
3. Off-site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level.
4. Removal of contaminated soil to an appropriate site or facility, followed where necessary by replacement with clean fill.
5. Consolidation and isolation of the soil on-site by containment within a properly designed barrier.

The consultant (GPL 2012c) identified that the most viable option for remediation of the site is excavation and landfill disposal of the identified contaminated soils.

8.3 Remediation Activities and Validation Works Completed

The consultants (GPL 2016c and PCA 2016) reported that remediation works were completed by Wade Civil Pty Ltd, a Class B licenced asbestos removal contractor. Inspections and sampling related to remediation of chemical and asbestos contamination were completed by GPL (GPL 2016c) and PCA (PCA 2016) respectively.

The consultant (GPL 2016c) reported that all site buildings were demolished and removed prior to commencement of site remediation works, with the exception of two heritage buildings at the south eastern corner of the site.

8.3.1 Approvals and Licences

The consultant (PCA 2016) reported that a notification for works associated with the handling of asbestos impacted material was submitted to WorkCover by the remediation contractor Wade Civil, however, a copy of the WorkCover notification was not provided in the consultant's report (PCA 2016).

8.3.2 Site Establishment and Pre-remediation Works

The consultant (PCA 2016) reported the following site establishment procedures were followed, prior undertaking to asbestos remediation and validation works:

- Barricades were erected around the asbestos removal work area with asbestos removal warning signs placed on the fence;
- Decontamination and a change area was established at the entry of each of the asbestos removal areas at the site.
- Water used for dust suppression during excavation and loading out of asbestos contaminated waste.

8.3.3 Excavation and Removal of Impacted Fill

Site validation was conducted in each remediation area identified in the RAP (GPL 2012c). The auditor notes that remediation extent required within the current site boundary comprised Area 1 and Area 4. Remediation areas are outlined in the consultant's figures provided in **Appendix D**.

Area 1

Remediation required (GPL 2012c) comprised excavation and off-site disposal of material impacted with lead and asbestos with proposed remediation extent comprised an area of 282 m^2 extending to a depth of 0.5 m.

Validation samples (V101-V115) collected by the consultant (GPL 2016c) reported lead concentrations below site validation criteria, with 95% UCL of mean concentrations for lead reported below criteria and standard deviation reported less than 50 % of criteria.

Area 4

Remediation required comprised excavation and off-site disposal of material impacted with friable asbestos. This excavation extended to a depth of 0.5 m and comprised an area of 100 m^2.

Asbestos Validation

Remediation and validation of asbestos impacted fill was undertaken (PCA 2016) and soil within each area was over excavated around the perimeter of the area such that no 'walls' along the edges remained. The auditor notes that the exact volume of material that originated from the over excavations was not provided by the consultant.

The consultant (PCA 2016) undertook visual inspections of exposed natural soils in Areas 1 and 4 following excavation of surface /fill material to verify that no fragments of visible ACM or other anthropogenic material were present. Validation samples were reportedly collected in conjunction with these inspections. The samples were collected in general accordance with the RAP, however, the consultant (PCA 2016) reported that the sampling density was reduced with composite samples being collected over the asbestos remediation areas. Each sample area was reported to have comprised an area of 100 m^2, with four sub samples taken from the exposed soil. The northern and

southern sides of the Area 5 excavation area, was sampled at 20 metre intervals using composite sampling of four sub samples per sample (1 sub sample per 5 lineal metres).

The consultant (PCA 2016) reported that all soil samples from the site were found to be free of asbestos. Asbestos was detected in samples collected from Area 3 – grids 7; and 9 and Area 5 grids 3, 11, 14 and 17, outside the current site boundary. Further excavations were undertaken in these grids to a depth of 100-150 mm and visual inspections confirming no visible asbestos containing material to be present. The consultant (PCA 2016) reported that no asbestos was detected in the additional validation samples collected from these locations.

8.3.4 Shale Bedrock Characterisation

The consultant (GPL 2016c) carried out shale bedrock core sampling from five judgemental borehole locations (BH31-BH35) within the former UST area (understood to be located within proposed Lot 5) in accordance with audit requirements (JBS 2012). Samples collected were field screened for volatiles with a calibrated PID. Concentrations of F1 (TPH C6-C10 less BTEX), F2 (TPH > C10-C16 less Naphthalene), F3 (TPH>C16-C34), F4 (TPH>C34-C40) and BTEX were The TPH and BTEX results for all analysed shale bedrock samples were reported below the laboratory LOR. As such, the consultant (GPL 2016c) reported that TPH/BTEX contamination are not of concern for the shale bedrock within the former UST area.

8.3.5 Off-site Disposal of Excess Soils

The consultants (GPL 2016a and PCA 2016) conducted waste classification of material required to be disposed from across the campus as part of the remediation works.

- A waste classification assessment completed (GPL 2016a), for in-situ fill materials in Area 1-6 and 8. Soil in Areas 1-6 was classified General Solid Waste – Special Waste (asbestos) and soil in Area 8 was classified General Solid Waste.
- Letter detailing visual inspection of soil in test pits in Area 7, prepared by PCA, dated 9 September 2015. Four observational testpits were completed following demolition of former building P and prior to commencement of road construction. The consultant reported the in-situ soil to be free of visible asbestos containing material and other anthropogenic material. Soil at the location was reportedly removed from the site as part of road construction prior to commencement of asbestos validation works (PCA 2016).
- The consultant (PCA 2016) reported that waste classification was completed for asbestos impacted material excavated from the pit located to the north of former Building K, however, no additional information including laboratory analytical reports were provided. The material was reportedly removed from site on 17 February 2016 as General solid waste – Special Waste (asbestos).

The consultants (GPL 2016c and PCA 2016) reported that following remedial excavations across the campus, asbestos contaminated soil from Areas 1-7 and the centre south pit was transported to a landfill facility licenced by the NSW EPA to accept General Solid Waste - Special Waste (asbestos), while PAH impacted fill from Area 8 was disposed of as General Solid Waste at an EPA licenced Landfill.

Review of waste disposal documentation made available by the client identified excavated material disposed at the SITA Australia Waste Management Centre located at Elizabeth Drive, Kemps Creek NSW as follows:

- General Solid Waste – Special Waste (asbestos) - Approximately 3800.06 tonnes
- General Solid Waste – Approximately 52.52 tonnes

8.3.6 Validation Inspection and Findings

Following completion of asbestos contaminated soils from each of the remediation areas, the consultant (PCA 2016) completed a visual inspection in accordance with the *Code of Practice How to Safely Remove Asbestos* (Safe Work Australia 2011). No visible fragments of asbestos containing material were sighted on the exposed sandy clay soil and shale remaining following completion of excavation of asbestos impacted fill in Areas 1-6. Additionally, the consultant (PCA 2016) reported that no unexpected finds of asbestos containing material were encountered during soil excavation and loading out.

8.3.7 Occupational Monitoring

The RAP (GPL 2012c) specified asbestos management requirements as part of the site remediation works, including the requirement to undertake air monitoring during asbestos remediation works. During the excavation and stockpiling and/or loading out of asbestos contaminated soil from the site between 25 November 2015 and 7 March 2016, the consultant (PCA 2016) undertook monitoring for airborne asbestos fibres in accordance with the National Occupational Health and Safety Commission Code of Practice for the Safe Removal of Asbestos.

No measurable human health risk from airborne asbestos fibres posed by the excavation/loading out of asbestos impacted soil was identified with all results reported below LOR (<0.01 fibres/ml).

The consultant (PCA 2016) provided daily air monitoring reports and relevant NATA accredited laboratory certificates.

8.4 Deviations from the RAP

The remedial action plan (GPL 2012c) was developed based on the nature of contamination identified during site investigations (Coffey 2008 and GPL 2012b).

As discussed in **Section 7.5.1**, the subsequent data gap assessment undertaken within former building footprints (GPL 2016b), did not identify the soils to have been significantly impacted by past activities and the presence of fill materials, with the exception of fibro-cement pieces in the surface fill profile at TP40 (located within Area 2) and scattered asbestos-cement pieces and two asbestos pipes observed within Areas 2 and 3, where remediation was required. However, as Areas 2 and 3 have already been identified for asbestos contamination in the RAP, the remediation extent required remained unchanged.

Validation (GPL 2016c) was carried out after completion of remediation, generally, in accordance with the recommendations provided in the RAP. During the waste classification of contaminated soils in Areas 1 to 6 and 8 (GPL 2016a), mercury and PAH contamination were also identified in Areas 3 and 6. Therefore, these additional contaminants were also targeted during testing of validation samples from these areas.

The consultant (PCA 2016) reported that asbestos validation samples were collected generally in accordance with section 12 of the Geotechnique RAP. However, it was noted that the sampling density was reduced with composite samples being collected over the asbestos remediation areas given that soil sampling was undertaken mostly in natural clay soils and shale. For the purpose of soil sample collection each remediation area was divided into sampling grids of approximately 100 square metres with four sub samples collected from each of these areas (1 sub sample per 25 square metres). The northern and southern sides of the Area 5 excavation area, was sampled at 20 metre intervals using composite sampling of four sub samples per sample (1 sub sample per 5 lineal metres). Each soil sample comprised approximately 500 ml of soil collected from the remaining exposed soil in the grid / sidewall area.

8.5 Audit Findings

RAP

The consultant's nominated remediation objectives as reported in GPL (2012c) were appropriate and consistent with the proposed site land use.

The consultant considered a range of remediation/management options and adopted excavation and off-site disposal of metal, PAH and asbestos impacted fill as the preferred remediation approach for the site. With consideration to the nature and extent of the identified soil contamination, the auditor accepts the preferred/adopted approach to be appropriate and consistent with relevant NSW EPA guidance.

The adopted remediation approach was checked by the auditor and found to be:

- Technically feasible.
- Environmentally justifiable given the nature and extent of the identified contamination.
- Consistent with relevant laws, policies and guidelines, since the works were undertaken in a manner which did not appear to result in any relevant regulatory measures being breached.

Extent of Remediation Works

Remediation works, including the removal of impacted fill materials was undertaken by Wade Civil under the direction and guidance of the consultants (GPL 2016c and PCA 2016).

The RAP (GPL 2012c) detailed relevant regulatory requirements relating to the remediation works. As noted above, the consultant (PCA 2016) reported that a notification for works associated with the handling of asbestos impacted material was submitted to WorkCover by the remediation contractor Wade Civil, however, a copy of the WorkCover notification was not provided.

An inspection completed by the consultant (PCA 2016) reported no visible fragments of asbestos containing material were sighted on the exposed sandy clay soil and shale remaining following completion of excavation of asbestos impacted fill in Areas 1-6.

The consultants (GPL 2016c and PCA 2016) reported that works were generally conducted in accordance with the RAP (GPL 2012c) prepared for the site, with deviations to the RAP reported above in **Section 8.4**. Deviations to the RAP were generally reported in the validation sampling approach, with the overall remediation objective, i.e, to render the site suitable for residential with land use. The auditor notes the reduced sampling density and composite sampling approach adopted for asbestos validation works (PCA 2016). However, as the samples were collected from natural clay soils and shale, notes that this finding does not affect the suitability of the site for the proposed use.

The remediation works described by the consultant were also consistent with observations made by the site auditor during audit inspections undertaken nearing the completion of remediation works as outlined in **Section 1.5**.

Validation Works

The consultant (GPL 2016c) provided tables which adequately summarised the soil laboratory results. The site plans provided by the consultant were also prepared to scale and generally identified the sampling locations, relevant to the main site features, boundaries and street frontage.

The concentrations of contaminants reported by the consultant (GPL 2016c) were checked against and were found to be generally accurate and complete with some minor exception. For completeness, the auditor has reviewed the data and notes that relevant laboratory results are below any inaccurate concentrations reported in the consultant's summary tables. The laboratory procedures were also appropriate for the identified contaminants of concern and the adopted site validation criteria against which the results were compared.

Asbestos validation sampling undertaken by the consultant (PCA 2016) comprised both a visual inspection and confirmatory sampling and provided photographic documentation in the validation

report. The auditor is satisfied that the methodologies for validating asbestos were undertaken in a manner consistent with relevant guidance in NEPC 2013 / DoH 2009.

Summary tables provided by the consultant were checked against the detailed laboratory reports and found to be generally consistent with some minor exceptions as noted below:

- Sample 3-9 (laboratory reference 145651-6) was incorrectly referred to as 309 in the laboratory report; and
- Laboratory report 141794 containing validation results of the pit located to the north of former Building K was incorrectly referred to as 141974 by the consultant.

The auditor notes that asbestos was detected in initial validation samples from Area 3 – grids 7; and 9 and Area 5 – grids 3, 11, 14 and 17 which resulted in additional excavation to depth 100-150 mm at these grid locations. The consultant (PCA 2016) reported that no asbestos was detected in further validation samples collected. However, based on the detailed laboratory reports provided by the consultant, the auditor notes that sample 145654-6 from location 3-9 reported chrysotile asbestos (0.0003 g) below the laboratory reporting limit of 0.01% (w/w).

The auditor notes that the reported concentrations of asbestos remaining on-site are below 0.01% (w/w) and as such, does not affect the suitability of the site for the proposed use. It is noted that the consultant did not explicitly nominate the relevant NEPC 2013 /DoH 2009 criteria for asbestos, instead comparing the results presented by the laboratory to the adopted detection limits.

Waste Classification and Removal

Excavated materials generated during the excavation works were classified in accordance with the current waste guidelines (NSW EPA 2014) for offsite disposal to SITA Australia Waste Management Centre located at Elizabeth Drive, Kemps Creek NSW. A review of the waste documentation indicates that the excavated materials consisted of the following:

- General Solid Waste – Special Waste (asbestos) - Approximately 3800.06 tonnes
- General Solid Waste – Approximately 52.52 tonnes

Waste disposal documentation was provided by the client upon request, confirming the quantities taken to licenced facilities between 25 November 2015 and 7 March 2016. Based on the remediation approach outlined in the RAP (GPL 2012c) and additional excavations noted relating to the pit located to the north of former Building K, approximately 1560 m^3 of General Solid Waste (asbestos) and 75 m^3 of General Solid Waste required removal from the campus.

As such, the auditor notes that a significantly larger amount of material was removed from the campus as asbestos impacted soils than the quantities anticipated in the RAP (GPL 2012c). However, the auditor notes the over excavations around the perimeter of remediation areas undertaken by the consultant (PCA 2016) which may have contributed to these volumes. The auditor further notes that visual inspections of exposed natural soils following excavation of surface /fill material identified no fragments of visible ACM or other anthropogenic material.

Overall Conclusions

Overall, the conclusions reached by the consultant (GPL 2016c and PCA 2016) in relation to the validation of the remediation works undertaken to render the site suitable for the proposed residential landuse with minimal access to soil are considered appropriate and meet the requirements of the site audit.

9. Evaluation of Landuse Suitability

In assessing the suitability of a site for an existing or proposed landuse in an urban context, the decision process for assessing urban redevelopment sites should be followed (Page 50 and 51, EPA 2006), as discussed in the following sections. This audit was undertaken with the objective of independently reviewing the site investigation reports (Coffey 2008, GPL 2012b and GPL 2016b); RAP (GPL 2012c) and subsequent validation report (GPL 2016c and PCA 2016) to determine if the land is suitable for residential use with minimal access to soil.

9.1 Reporting in accordance with EPA requirements

The documents provided by the consultant have been checked against, and meet the requirements of, OEH 2011. As such, the reporting of the site investigation process and the proposed remediation and validation process is considered to be appropriate and meets the requirements of this audit.

9.2 Aesthetic issues have been adequately addressed

As part of the investigation works, the consultants (Coffey 2008, GPL 2012b and GPL 2016b) completed an assessment of contaminant odours, soil discolouration, anthropogenic material and/or presence of asbestos during soil sampling.

Following removal of the asbestos impacted fill materials, the consultant (PCA 2016) reported that no fragments of visible ACM or other anthropogenic material were present within the remediation excavations.

9.3 Soils have been assessed against the appropriate investigation levels

The criteria adopted by the consultant for the site assessment process have been checked against, and are consistent with, appropriate criteria endorsed by the EPA for the proposed residential landuse.

The remediation and validation works were generally conducted in general accordance with the RAP (GPL 2012c) and criteria endorsed by the EPA.

9.4 Background soil concentrations have been adequately addressed

During the site investigation works, the consultant sampled in natural formations, providing a clear indication and representation of local natural soil profiles. As such, background soil concentrations are considered to have been adequately addressed.

9.5 All impacts of chemical mixtures have been assessed

No issues relating to chemical mixtures in relation to the identified contaminants of concern were identified by the consultant. Hence, there was no requirement to give any further consideration to the impact of chemical mixtures.

9.6 Site Management Strategy is appropriate

Based on the remediation works undertaken at the site, long term site management is not required at the site.

9.7 Contamination migration (actual or potential) has been addressed

The consultant addressed both the potential and actual migration of the identified contaminants of concern through an assessment of soil and groundwater at the site. Based on the removal of the UST and the absence of impacted fill, it is considered that the potential for groundwater contamination to occur beneath the site is low, with the potential for off-site contamination migration is considered to be low. As such, the requirements of the site audit in relation to consideration of contaminant migration have been met.

10. Audit Summary Opinion

On the basis of the findings of the site audit, and subject to the limitations in **Section 11**, the following summary opinions are provided.

- The site assessment activities and remediation and validation works are considered to have met the requirements of the *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (2nd Edition) (DEC 2006).
- Additional soil and groundwater investigations in former building footprints and in the vicinity of the former UST were undertaken by the consultant (GPL 2016b and GPL 2016c) in accordance with auditor requirements (JBS&G 2012), with no further contamination identified.
- The soil contamination, primarily identified as heavy metal, PAH and asbestos during the investigation works, was appropriately remediated in accordance with the RAP (GPL 2012c). The validation reports (GPL 2016c and PCA 2016) detail the validation results and findings from the site inspections confirming the effectiveness of the remediation works.
- Remediation works completed at the site included excavation and off-site disposal of impacted fill in remediation Areas 1 and 4. The excavations were validated with no residual concentration of contaminants exceeding relevant criteria.
- There is no evidence of migration of contaminants from the site which is likely to result in any unacceptable risks to surrounding human or ecological receptors.
- The site (Lot 4 in PPN DP 1202362) is considered suitable for the proposed landuse (i.e., residential with minimal access to soils) as defined in Section 3 of Schedule B7 NEPC 2013.
- The landuse suitability is not subject to any ongoing monitoring or management requirements.

11. Limitations

This audit was conducted with a reasonable level of scrutiny, care and diligence on behalf of the client for the purposes outlined in the Contaminated Land Management Act 1997. The data used to support the conclusions reached in this audit were obtained by other consultants and the limitations which apply to the consultant's report(s) apply equally to this audit report.

Every reasonable effort has been made to identify and obtain all relevant data, reports and other information that provide evidence about the condition of the site, and those that were held by the client and the client's consultants, or that were readily available. No liability can be accepted for unreported omissions, alterations or errors in the data collected and presented by other consultants. Accordingly, the data and information presented by others are taken and interpreted in good faith.

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 reviewed, 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 audit 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 and the Site Auditor reserve the right to review the report in the context of the additional information, subject to meeting relevant guideline requirements imposed by the EPA.

Appendix A Guidelines made or approved by the EPA

Guidelines made or approved by the EPA (s.105 CLM Act 1997)

Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Paper No 4, 2000 (ANZECC/ARMCANZ 2000)

Australian Drinking Water Guidelines, National Health and Medical Research Council and Agriculture and Resource Management Council of Australia and New Zealand, 2011 (NHMRC/NRMMC 2011)

Composite Sampling, Lock, W. H., National Environmental Health Forum Monographs, Soil Series No.3, 1996, SA Health Commission, (NEHF 1996)

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

Contaminated Sites: Guidelines for the Vertical Mixing of Soil on Former Broad-Acre Agricultural Land, NSW EPA, 1995 (EPA 1995b)

Contaminated Sites: Guidelines for the Assessment and Clean Up of Cattle Tick Dip Sites for Residential Purposes, NSW Agriculture and CMPS&F Environmental, February 1996 (NSW Agr. 1996)

Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, NSW EPA, 1997 (EPA 1997, reprinted and updated 2011)

Contaminated Sites: Guidelines for Assessing Banana Plantation Sites, NSW EPA, 1997 (EPA 1997b)

Contaminated Sites: Guidelines for Assessing Former Orchards and Market Gardens, NSW EPA, 2005 (EPA 2005)

Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition), NSW EPA, 2006 (EPA2006)

Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination, NSW EPA, March 2007 (EPA 2007)

Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, NSW EPA, June 2009 (EPA 2009)

Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards, Department of Health and Ageing and EnHealth Council, Commonwealth of Australia, June 2002 (EnHealth 2002)

National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013, National Environment Protection Council (NEPC 2013)

Appendix B Audit Correspondence

Sahani Gunatunge

From: Andrew Wheeler <A.Wheeler@westernsydney.edu.au>
Sent: Wednesday, 18 November 2015 5:54 PM
To: Andrew Lau
Subject: Site Audit Report

Andrew

As discussed could we please get a proposal to obtain site audit reports for the confirmation that the works as detailed in Site Audit Report 0503-1107 have been carried out.

Please provide the option for both a single site Audit Statement for the whole site, and an option for Statements for each Lot of the 5 Lot subdivision.

Regards

Andrew Wheeler
0414 454 553

Sahani Gunatunge

From: Andrew Lau
Sent: Tuesday, 5 April 2016 4:33 PM
To: Andrew Wheeler
Cc: Sahani Gunatunge; Andrew Lau
Subject: Audit comments - Additional Assessment Report and Validation Report

Hi Andrew,

I have reviewed the two reports provided and have the following comments that Geotechnique will need to address:

Additional Contamination Assessment Report

- The borelogs are inadequate and do not provide the required detail under relevant guidelines. Please revise.
- The laboratory reports contain considerable additional soil data for samples for which there are no locations shown on the figures. Are these data from the site or from another project? If from the site, the report will require substantial revision (new text, figure amendments, results tables and discussion, along with adjustments to the findings). If not from the site, this should be clearly discussed in the report.
- Please provide the superseded laboratory report so I'm able to assess what if any impact the incorrect sample nomenclature has on the findings.
- Please discuss the reported asbestos found in 'sample #22' noted on the laboratory report. Is this from TP50?

Validation Report

- Site suitability conclusions can't be conditioned on additional remediation works or validation results. The report conclusions are conditional on the asbestos validation. This will need to be reworded and the report finalised once I've reviewed and accepted the asbestos validation report.
- The report conclusions make reference to imported fill validation requirements and I understand that some topsoil reuse and/or imported soil may be contemplated at the site. If this is to occur, then I will need to review the data on the topsoil material or any imported materials.
- The report needs to provide an explanation why remediation areas 4,5 or 7 do not form part of the scope of the validation report, since they were part of the remediation works required under the RAP.
- There is no mention of the deep excavation observed during the site inspection. Please confirm that this is being dealt with in the asbestos validation report.
- The recommendation relating to unexpected finds detracts from the robustness of the conclusions. If there is such uncertainty then I don't accept the site suitability conclusions.
- Please provide the superseded lab report so I'm able to assess whether the original result has any impact on data interpretation and the conclusions presented.
- Please confirm that the higher of any duplicate results have been used in the data assessment and UCL calculations, as per EPA guidance.
- Please provide disposal documentation and material tracking records to demonstrate that the materials were transported off site to appropriately licensed facilities. In collating this information, please reconcile the quantities (m3) anticipated from the excavations against the tonnages provided for the removed materials to ensure that there is an alignment.

Happy to discuss if you have any queries or if anything's unclear.

Regards,
Andrew

Andrew Lau | Managing Director, Accredited Auditor | JBS&G
Sydney | Melbourne | Adelaide | Perth | Brisbane
Level 1, 50 Margaret Street Sydney NSW 2000
T: 02 8245 0300 | M: 0412 512 614 | www.jbsg.com.au
Contaminated Land | Groundwater Remediation | Auditing and Compliance | Assessments and Approvals | Occupational Hygiene and Monitoring

Sahani Gunatunge

From: Sahani Gunatunge
Sent: Friday, 8 April 2016 9:08 AM
To: nswauditors@epa.nsw.gov.au
Cc: Andrew Lau
Subject: Site Audit Notifications - Western Sydney University Westmead Campus
Attachments: L02 (SAN 0503-1607 Rev 0).pdf; L03 (SAN 0503-1608 Rev 0).pdf; L04 (SAN 0503-1609 Rev 0).pdf; L05 (SAN 0503-1610 Rev 0).pdf; L01 (SAN 0503-1606 Rev 0).pdf

Good Morning,

Please find attached the Site Audit Notifications (0503-1606 to 0503-1610) relating to five lots of the proposed subdivision of Western Sydney University Westmead Campus lands (lot 7 and part lot 8 in DP 1077852) located corner of Hawkesbury and Darcy Roads, Westmead, which are being audited by Andrew Lau (Accreditation no. 0503).
Please note that whilst the audit was commissioned in November 2015, Andrew became aware of the statutory nature of the audit upon receipt of Parramatta Council conditions of consent relating to the remediation of the site, which was provided by the client on 5 April 2016.
Please do not hesitate to contact me for any queries.

Kind Regards,

Sahani Gunatunge | Environmental Engineer / Auditor Assistant | JBS&G
Sydney | Melbourne | Adelaide | Perth | Brisbane
Level 1, 50 Margaret Street Sydney NSW 2000
T: 02 8245 0300 | M: 0410 240 607 | www.jbsg.com.au
Contaminated Land | Groundwater Remediation | Auditing and Compliance | Assessments and Approvals | Occupational Hygiene and Monitoring

NSW Site Auditor Scheme
SITE AUDIT NOTIFICATION

Section 53C of the Contaminated Land Management Act 1997 requires auditors to notify the EPA of statutory site audits within seven days of their being commissioned.

Proposed site audit details

Site audit no. 0503-1609

This proposed site audit is a **statutory audit/~~non-statutory audit~~*** within the meaning of the *Contaminated Land Management Act 1997 (see s.47)*.

Site auditor details (as accredited under the *Contaminated Land Management Act 1997*)

Name	**Andrew Lau**		Company	**JBS&G**	
Address	**Level 1, 50 Margaret Street**				
	SYDNEY	**NSW**		Postcode	**2000**
Phone	**02 8245 0300**		Fax	**02 8245 0399**	

Site details

Address	**158-164 Hawkesbury Road and 2A Darcy Road**				
	WESTMEAD	**NSW**		Postcode	**2145**

Property description *(attach a list if several properties are included in the site audit)*

Lot 4 in proposed subdivision of lot 7 and part lot 8 in DP 1077852 (Refer attached UWS Westmead Estate Major Works General Arrangement Plan, Drawing no. MMD-333625-C-DR-SC01-DA-0006)

Local Government Area	**Parramatta**		
Area of Site (eg. hectares)	**TBA**	Current zoning	**SP2 (Educational Establishment)**

To the best of my knowledge, the site **~~is~~/is not*** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

Declaration/Order/Proposal/Agreement/Notice* no(s) **N/A**

** Strike out as appropriate*

Site audit commissioned by

Name	**Andrew Wheeler**		Company	**Western Sydney University**	
Address	**Locked Bag 1797**				
	PENRITH	**NSW**		Postcode	**2751**
Phone	**0414 454 553**		Fax	**NA**	

Name and phone number of contact person (if different from above)

.....

.....

Purpose of site audit

☑ A. To determine land use suitability *(please specify intended use(s), if known)*

Residential

OR

☐ ~~B. (I) To determine the nature and extent of contamination, and/or~~

☐ ~~B. (II) To determine the appropriateness of an investigation/remedial action/management plan*, and/or~~

☐ ~~B. (III) To determine if the land can be made suitable for a particular use or uses by implementation of a specified remedial action plan/management plan* (please specify intended use(s))~~

Nature of statutory requirement(s) (not applicable for non-statutory audits)

☐ Requirement(s) under the *Contaminated Land Management Act 1997* (e.g. ~~remediation order) (please specify, including date of issue)~~

.....

.....

☐ ~~Requirement(s) imposed by an environmental planning instrument (please specify, including date of issue)~~

.....

☑ Development consent requirement(s) under the *Environmental Planning and Assessment Act 1979* (please specify consent authority and date of issue)

Parramatta Council DA No. DA/571/2014, 26 February 2015

☐ ~~Requirement(s) under other legislation (please specify, including date of issue)~~

.....

.....

* ***Strike out as appropriate***

Overall comments

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Auditor's declaration

I certify that the information supplied in this form and any attached pages is to the best of my knowledge true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Andrew Lau
7 April 2016

Please send completed forms to:

EPA (NSW)
Contaminated Sites Section
PO Box A290, SYDNEY SOUTH NSW 1232
nswauditors@epa.nsw.gov.au

Plan
1:500

1:500 25m 50m

Notes

Consultants

Architect

Cox Richardson

Landscape Architect

Mott MacDonald

Level 2, 60 Pacific Highway
St Leonards, NSW 2065
Australia
PO Box 151, St Leonards
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T +61 (0)2 9439 2633
F +61 (0)2 9438 4505
W www.mottmac.com.au

Client

University of Western Sydney
Bringing knowledge to life

University of Western Sydney
Commercial and Estate Development
Locked Bag 1797
Penrith NSW 2751

Title

UWS Westmead Estate Major Works General Arrangement Plan

Revision History

Rev	Date	Drawn	Description	Ch'k'd	App'd
E	28.01.15	IS	Preliminary Tender Drawings	DB	CB
D	21.08.14	IS	Issued for Development Application	DB	CB
C	16.04.14	IS	Issued for Development Application	DB	CB
B	11.04.14	IS	Issued for Review	DB	CB
A	04.04.14	IS	Issued for Review	DB	CB

Designed	DB	.	Des Check	DC	.
Drawn	IS	.	Co-ordination	CB	.
Dwg check	DC	.	Approved	CB	.
Scale at A1 1:500		Status PRE		Rev E	

Drawing Number
MMD-333625-C-DR-SC01-DA-0006

\\aupamdc01\projects\St Leonards\Projects\333xxx\333625\06 CAD\6_4 Working drawings\Civil\Autocad\Drawings\Development_Application\MMD-333625-C-DR-SC01-DA-GA-PLAN.dwg Jan 28, 2015 - 9:38AM pac55913

Sahani Gunatunge

From: Rose Cocks <Rose.Cocks@epa.nsw.gov.au> on behalf of EPA HIEH NSW Auditors Mailbox <nswauditors@epa.nsw.gov.au>
Sent: Monday, 11 April 2016 1:26 PM
To: Sahani Gunatunge
Cc: Andrew Lau; EPA HIEH NSW Auditors Mailbox
Subject: RE: Site Audit Notifications - Western Sydney University Westmead Campus

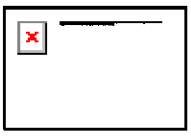
Hi Sahani

Comments noted. Below refer to EPA reference to each Site Audit Notification(SAN):

SAN 0503-1606 – DOC16/176861
SAN 0503-1607 – DOC16/176870
SAN 0503-1608 – DOC16/176877
SAN 0503-1609 – DOC16/176882
SAN 0503-1610 – DOC16/176891

Kind regards,

Rose Cocks
Audit Officer – Contaminated Sites
Hazardous Incidents and Environmental Health, NSW Environment Protection Authority
+61 2 9995 5647
rose.cocks@epa.nsw.gov.au www.epa.nsw.gov.au @EPA_NSW
Report pollution and environmental incidents 131 555 (NSW only) or +61 2 9995 5555



From: Sahani Gunatunge [mailto:SGunatunge@jbsg.com.au]
Sent: Friday, 8 April 2016 9:08 AM
To: EPA HIEH NSW Auditors Mailbox
Cc: Andrew Lau
Subject: Site Audit Notifications - Western Sydney University Westmead Campus

Good Morning,

Please find attached the Site Audit Notifications (0503-1606 to 0503-1610) relating to five lots of the proposed subdivision of Western Sydney University Westmead Campus lands (lot 7 and part lot 8 in DP 1077852) located corner of Hawkesbury and Darcy Roads, Westmead, which are being audited by Andrew Lau (Accreditation no. 0503).
Please note that whilst the audit was commissioned in November 2015, Andrew became aware of the statutory nature of the audit upon receipt of Parramatta Council conditions of consent relating to the remediation of the site, which was provided by the client on 5 April 2016.
Please do not hesitate to contact me for any queries.

Kind Regards,

Sahani Gunatunge | Environmental Engineer / Auditor Assistant | JBS&G
Sydney | Melbourne | Adelaide | Perth | Brisbane
Level 1, 50 Margaret Street Sydney NSW 2000
T: 02 8245 0300 | M: 0410 240 607 | www.jbsg.com.au
Contaminated Land | Groundwater Remediation | Auditing and Compliance | Assessments and Approvals | Occupational Hygiene and Monitoring

Sahani Gunatunge

From: Andrew Wheeler <A.Wheeler@westernsydney.edu.au>
Sent: Wednesday, 1 June 2016 4:08 PM
To: Andrew Lau
Cc: Sahani Gunatunge
Subject: FW: Audit comments - Additional Assessment Report and Validation Report
Attachments: 12619-2 LOGS BH#36to39.pdf; SE148334_COMBINED.pdf; 12619-3 LOGS BH# 31to35.pdf; SE149392_COMBINED.pdf

Sahani

Attached response from Consultants regarding your questions

Regards

Andrew

From: Anwar Barbhuyia [mailto:Anwar@geotech.com.au]
Sent: Monday, 16 May 2016 4:16 PM
To: Andrew Wheeler
Subject: RE: Audit comments - Additional Assessment Report and Validation Report

Hi Andrew,
Please see the response in blue.

If you have any questions, please contact us.

If this response are found satisfactory by the Site Auditor, we can revised the report accordingly.

Regards,
Anwar Barbhuyia
Associate

GEOTECHNIQUE® PTY LTD

PO BOX 880
Penrith NSW 2751
Tel: 02 4722 2700
Fax: 02 4722 2777

www.geotech.com.au

From: Andrew Wheeler [mailto:A.Wheeler@westernsydney.edu.au]
Sent: Thursday, 14 April 2016 8:49 AM

To: Anwar Barbhuyia
Subject: FW: Audit comments - Additional Assessment Report and Validation Report

Anwar

Please see the response from Andrew Lau, could you please provide feed back

Andrew

From: Andrew Lau [mailto:ALau@jbsg.com.au]
Sent: Tuesday, 5 April 2016 4:33 PM
To: Andrew Wheeler
Cc: Sahani Gunatunge; Andrew Lau
Subject: Audit comments - Additional Assessment Report and Validation Report

Hi Andrew,

I have reviewed the two reports provided and have the following comments that Geotechnique will need to address:

Additional Contamination Assessment Report

- The borelogs are inadequate and do not provide the required detail under relevant guidelines. Please revise. Please see the engineering borehole logs for BH31 to BH35.
- The laboratory reports contain considerable additional soil data for samples for which there are no locations shown on the figures. Are these data from the site or from another project? If from the site, the report will require substantial revision (new text, figure amendments, results tables and discussion, along with adjustments to the findings). If not from the site, this should be clearly discussed in the report. The additional soil data are for the test pits (C101 to C103 for Area 1, C201 to C205 for Area 2, C301 to C306 for Area 3, C401 & C402 for Area 4, C501 to C506 for Area 5, C601 & C602 for Area 6 and C801 & C802 for Area 8) for waste classification of contaminated soils in Areas 1 to 6 and 8. The results are detailed in our Waste Classification Report (Ref: 12619/2-L1 dated 10 February 2016. Please advise if this report is sufficient for the requested information. Otherwise we can include the relevant information into Additional Contamination Assessment Report (126119/2-AA).
- Please provide the superseded laboratory report so I'm able to assess what if any impact the incorrect sample nomenclature has on the findings. Superseded Report (SE148334R0) is attached.
- Please discuss the reported asbestos found in `sample #22' noted on the laboratory report. Is this from TP50? 0.003g of Chrysotile Asbestos was found in 593g of soil in TP50 (0-0.1m), which corresponds about 0.0005% of Asbestos, far below the assessment criteria 0.001%. Therefore, it is not concern for the site.

Validation Report

- Site suitability conclusions can't be conditioned on additional remediation works or validation results. The report conclusions are conditional on the asbestos validation. This will need to be reworded and the report finalised once I've reviewed and accepted the asbestos validation report. Please advise once the asbestos validation report, to be prepared by the asbestos assessor, is accepted by the site auditor. So that we can include this acceptance and reword our report accordingly.
- The report conclusions make reference to imported fill validation requirements and I understand that some topsoil reuse and/or imported soil may be contemplated at the site. If this is to occur, then I will need to review the data on the topsoil material or any imported materials. Noted
- The report needs to provide an explanation why remediation areas 4,5 or 7 do not form part of the scope of the validation report, since they were part of the remediation works required under the RAP. Areas 4, 5 and 7 were only contaminated with asbestos. Hence validation of these areas will be covered by client's appointed asbestos assessor in the Asbestos Validation Report. Therefore, Geotechniue did not include any validation assessments of those three areas (Areas 4, 5 & 7). Although Areas 3 and 6 were initially identified as only contaminated with asbestos, lead contamination was also identified in those two areas during waste classification (Report Ref: 12619/2-L1). Hence Areas 3 and 6 are included in Geotechnique Validation Report with other three areas (Areas, 1, 2 and 8) where chemical contaminations were identified.

- There is no mention of the deep excavation observed during the site inspection. Please confirm that this is being dealt with in the asbestos validation report. Deep excavation for sewer trench was observed on the southern adjoining area of Area 3. It is understood that proposed asbestos validation report, to be prepared by the client's appointed asbestos assessor, will deal this issue.
- The recommendation relating to unexpected finds detracts from the robustness of the conclusions. If there is such uncertainty then I don't accept the site suitability conclusions. We will move the relevant paragraph from 'Conclusions & Recommendations' section to 'Limitation' Section.
- Please provide the superseded lab report so I'm able to assess whether the original result has any impact on data interpretation and the conclusions presented. Superseded Report (SE149392R0) is attached.
- Please confirm that the higher of any duplicate results have been used in the data assessment and UCL calculations, as per EPA guidance. Yes, higher of any duplicate or split results have been used in the data assessment and UCL calculations.
- Please provide disposal documentation and material tracking records to demonstrate that the materials were transported off site to appropriately licensed facilities. In collating this information, please reconcile the quantities (m3) anticipated from the excavations against the tonnages provided for the removed materials to ensure that there is an alignment. Further to my earlier dated 21 April, I haven't received disposal documentation and material tracking records to response this comment.

Happy to discuss if you have any queries or if anything's unclear.

Regards,
Andrew

Andrew Lau | Managing Director, Accredited Auditor | JBS&G
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Contaminated Land | Groundwater Remediation | Auditing and Compliance | Assessments and Approvals | Occupational Hygiene and Monitoring

---

Appendix C Site Plans

Plan
1:500

1:500 25m 50m

Notes

Consultants

Architect

Cox Richardson

Landscape Architect

Mott MacDonald

Level 2, 60 Pacific Highway
St Leonards, NSW 2065
Australia
PO Box 151, St Leonards
NSW 1590, Australia
T +61 (0)2 9439 2633
F +61 (0)2 9438 4505
W www.mottmac.com.au

Client

University of Western Sydney
Bringing knowledge to life

University of Western Sydney
Commercial and Estate Development
Locked Bag 1797
Penrith NSW 2751

Title

UWS Westmead Estate Major Works General Arrangement Plan

Revision History

Rev	Date	Drawn	Description	Ch'k'd	App'd
E	28.01.15	IS	Preliminary Tender Drawings	DB	CB
D	21.08.14	IS	Issued for Development Application	DB	CB
C	16.04.14	IS	Issued for Development Application	DB	CB
B	11.04.14	IS	Issued for Review	DB	CB
A	04.04.14	IS	Issued for Review	DB	CB

Designed	DB	.	Des Check	DC	.
Drawn	IS	.	Co-ordination	CB	.
Dwg check	DC	.	Approved	CB	.
Scale at A1 1:500		Status PRE		Rev E	

Drawing Number
MMD-333625-C-DR-SC01-DA-0006

\\aupamdc01\projects\St Leonards\Projects\333xxx\333625\06 CAD\6_4 Working drawings\Civil\Autocad\Drawings\Development_Application\MMD-333625-C-DR-SC01-DA-GA-PLAN.dwg Jan 28, 2015 - 9:38AM pac55913

PT LOT 8
DP 1077852
'MARIST BROTHERS SCHOOL'

9
DP 1077852

MGA

(A) PROPOSED RIGHT OF ACCESS VARIABLE WIDTH (DP 1211982)
(B) PROPOSED PEDESTRIAN ACCESS 4.5 WIDE
(C) EASEMENT FOR ELECTRICITY PURPOSES (M994944)
(D) PROPOSED RIGHT OF ACCESS 6 WIDE
(BL) PROPOSED MARIST BOUNDARY 20 WIDE BUILDING RESTRICTION ZONE (1211982)
(L) PROPOSED PLANTING RESTRICTION ZONE 6 WIDE (DP 1211982)

LOT 5
9389m²

LOT 4
6588m²

LOT 3
2635m²

LOT 1
7829m²

LOT 2
5693m²

PROPOSED PUBLIC RESERVE
1671m²

PROPOSED PUBLIC RESERVE
1524m²

PROPOSED PUBLIC ROAD (20 WIDE & VARIABLE)

PROPOSED PUBLIC ROAD (16.5 WIDE & VARIABLE)

MAIN WESTERN RAILWAY

ROAD

DARCY ROAD

HAWKESBURY ROAD

POINT	EASTING	NORTHING
1	313,618.04	6,257,604.36
2	313,631.81	6,257,588.30
3	313,657.50	6,257,555.88
4	313,658.33	6,257,548.04
5	313,649.29	6,257,529.63
6	313,645.45	6,257,520.13
7	313,644.07	6,257,515.20
8	313,631.68	6,257,463.92
9	313,626.40	6,257,459.65
10	313,539.81	6,257,464.78
11	313,564.04	6,257,512.28
12	313,594.10	6,257,563.53
13	313,626.95	6,257,399.49
14	313,601.56	6,257,326.76
15	313,557.96	6,257,333.06
16	313,511.27	6,257,338.21
17	313,508.22	6,257,361.73
18	313,502.40	6,257,400.65
19	313,525.28	6,257,418.53
20	313,533.61	6,257,436.52
21	313,535.97	6,257,441.63
22	313,594.15	6,257,461.56
23	313,593.78	6,257,455.35
24	313,586.56	6,257,422.24
25	313,584.26	6,257,416.43
26	313,630.65	6,257,398.02
27	313,643.80	6,257,431.18
28	313,654.76	6,257,435.97
29	313,694.39	6,257,420.72
30	313,707.30	6,257,413.67
31	313,708.67	6,257,405.30
32	313,698.91	6,257,389.11
33	313,699.93	6,257,385.00
34	313,693.82	6,257,374.87
35	313,674.82	6,257,324.18
36	313,670.44	6,257,316.81
37	313,676.94	6,257,527.71
38	313,686.53	6,257,524.17
39	313,698.03	6,257,509.17
40	313,718.02	6,257,492.87
41	313,734.72	6,257,483.67
42	313,737.82	6,257,478.97
43	313,746.32	6,257,471.26
44	313,748.32	6,257,458.57
45	313,727.98	6,257,430.94
46	313,721.38	6,257,428.01
47	313,658.30	6,257,452.29
48	313,652.38	6,257,464.45
49	313,663.81	6,257,511.73
50	313,671.91	6,257,525.88
51	313,581.04	6,257,433.63
52	313,594.24	6,257,451.26
53	313,619.25	6,257,449.77
54	313,633.92	6,257,426.78
55	313,632.49	6,257,423.14
56	313,614.97	6,257,415.53
57	313,588.31	6,257,426.05

NOTES
- COODINATES LISTED ARE GROUND COORDINATRES BASED ON MAP GRID OF AUSTRALIA (MGA)
- SOURCE OF COORDINATES USED IS SSM46849 WITH CO-ORDINATES OF
  E 313669.623
  N 6257290.068
- SCALE FACTOR USED IN GROUND CONVERSION 1.000019

THE DIMENSIONS, AREAS AND ARE APPROXIMATE ONLY AND ARE SUBJECT TO CONFIRMATION BY FINAL SURVEY AND REGISTRATION

Surveyor: MATTHEW RUSSELL STANLEY Date of Survey: 05.2016 Surveyor's Ref: PR123658-DP3	PLAN OF SUBDIVISION OF LOT 7 IN DP 1077852 and LOT 2 IN DP 1211982	L.G.A.: PARRAMATTA Locality: WESTMEAD Subdivision No: Lengths are in metres. Reduction Ratio 1: 1500	Registered:	D.P. PPN DP 1202362 DRAFT 07.06.2016

10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | Table of mm (Cad Ref: PR123658-DP3-001c.dwg)

Appendix D Consultant's Figures

Image © 2012 Sinclair Knight Merz

Sample	Easting	Northing
TP2	[illegible]	[illegible]
TP4	[illegible]	[illegible]
TP5	[illegible]	[illegible]
TP6	[illegible]	[illegible]
TP9	[illegible]	[illegible]
BH24	[illegible]	[illegible]
TP26	[illegible]	[illegible]

LEGEND

- Test Pit (Geotechnique)
- Borehole (Geotechnique)
- Site Boundary
- Approx. Location of Boreholes (Coffey)
- Approx. Location of Enviro Boreholes (Coffey)
- Surface Sample - Chrysotile Asbestos Fibres Detected (Coffey)

Sample Location	Depth (m)	Contaminant	Concentration (mg/kg)	Limit (mg/kg)	
				PPSSL	HIL 'A'
Sampling by Geotechnique in 2012 during Supplementary ESA					
TP2	[illegible]	Asbestos cement pieces	NA		
TP4	[illegible]	Asbestos cement pieces	NA		
TP4	[illegible]	Zn	[illegible]	[illegible]	[illegible]
TP4	[illegible]	Zn	[illegible]		
TP5	[illegible]	As, Cu, Pb, Zn	[illegible]	[illegible]	[illegible]
TP5	[illegible]	Pb, Zn	[illegible]	[illegible]	[illegible]
TP6	[illegible]	Amosite, Chrysotile & Crocidolite Asbestos and Asbestos cement pieces	NA	[illegible]	[illegible]
TP6	[illegible]	Cu, Pb, Zn	[illegible]		
TP9	[illegible]	Asbestos cement pieces	NA		
TP9	[illegible]	Zn	[illegible]		
BH24	[illegible]	Benzo(a)Pyrene (BaP), Total PAH	[illegible]	-	[illegible]
TP26	[illegible]	Amosite, Chrysotile & Crocidolite Asbestos	NA	-	[illegible]

Notes: [illegible]

Sample Location	Depth (m)	Contaminant	Concentration (mg/kg)	Limit (mg/kg)	
				PPSSL	HIL 'A'
Sampling by Coffey in 2007 during ESA					
[illegible]	[illegible]	Chrysotile Asbestos	NA		
[illegible]	[illegible]	Lead (Pb)	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Chrysotile Asbestos	NA		
[illegible]	[illegible]	Cadmium (Cd), Copper (Cu), Pb, Zinc (Zn)	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Chrysotile Asbestos	NA	[illegible]	[illegible]
[illegible]	[illegible]	Chrysotile Asbestos	NA	[illegible]	[illegible]
[illegible]	[illegible]	Chrysotile Asbestos	NA		
[illegible]	[illegible]	Chrysotile Asbestos	NA		
[illegible]	[illegible]	Chrysotile Asbestos	NA		
[illegible]	[illegible]	Chrysotile Asbestos	NA		
[illegible]	[illegible]	Chrysotile Asbestos	NA		
[illegible]	[illegible]	Chrysotile Asbestos	NA		
SS1	-	Chrysotile Asbestos	NA		
SS2	-	Chrysotile Asbestos	NA		
SS4	-	Chrysotile Asbestos	NA		
SS5	-	Zinc (Zn)	[illegible]		
SS5	-	Chrysotile Asbestos	NA		
SS6	-	Chrysotile Asbestos	NA		
SS7	-	Chrysotile Asbestos	NA		
SS8	-	Chrysotile Asbestos	NA		

0 10 20 30 40 50m

Scale 1:1000

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www.geotech.com.au

APP Corporation Pty Ltd
UWS Westmead Campus Redevelopment
Cnr Darcy & Hawkesbury Roads
Westmead

Locations of Concern

Drawing No: 12619/1-AA7
Job No: 12619/1
Drawn By: MH
Date: 20 June 2012
Checked By: AB

File Ref: 12619-1
Layers: 0, AA7

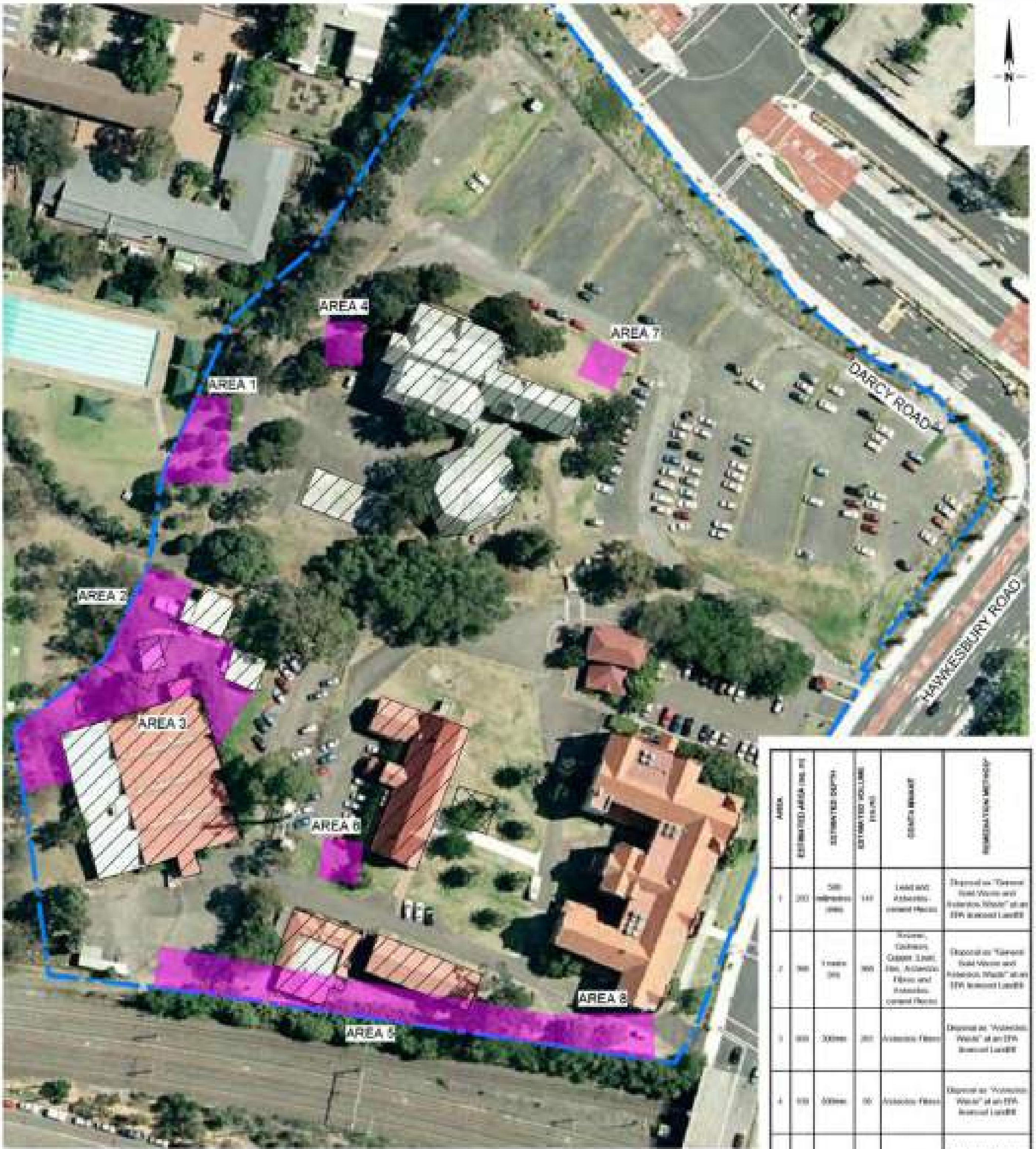

Image © 2012 Sinclair Knight Merz

AREA	ESTIMATED AREA (sq. m)	ESTIMATED DEPTH	ESTIMATED VOLUME (cu.m)	CONTAMINANT	REMEDIATION METHOD*
1	280	500 millimetres (max)	140	Lead and Asbestos-cement Pieces	Disposal as "General Solid Waste and Asbestos Waste" at an EPA licensed Landfill
2	560	1 metre (m)	560	Xylenes, Dieldrin, Copper, Lead, Zinc, Asbestos Fibres and Asbestos-cement Pieces	Disposal as "General Solid Waste and Asbestos Waste" at an EPA licensed Landfill
3	600	300mm	200	Asbestos Fibres	Disposal as "Asbestos Waste" at an EPA licensed Landfill
4	100	300mm	30	Asbestos Fibres	Disposal as "Asbestos Waste" at an EPA licensed Landfill
5	1200	500mm	600	Asbestos Fibres	Disposal as "Asbestos Waste" at an EPA licensed Landfill
6	100	1m	100	Asbestos Fibres	Disposal as "Asbestos Waste" at an EPA licensed Landfill
7	100	1m	100	Asbestos Fibres	Disposal as "Asbestos Waste" at an EPA licensed Landfill
8	250	300mm	75	Benzo(a)Pyrene and Total PAH	Disposal as "General Solid Waste" at an EPA licensed Landfill

* Classification of the waste needs to be confirmed by additional sampling and testing as detailed in section 8.1 of Report 12619/1-AB

LEGEND

- Site Boundary
- Area to be Remediated
- Area yet to be investigated
- Area will require further contamination assessment of shale bedrock

0 10 20 30 40 50m

Scale 1:1000

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APP Corporation Pty Ltd
UWS Westmead Campus Redevelopment
Cnr Darcy & Hawkesbury Roads
Westmead

Indicative Areas to be Remediated

Drawing No: 12619/1-AA8R
Job No: 12619/1
Drawn By: MH
Date: 21 September 2012
Checked By: AB

File Ref: 12619-1
Layers: 0, AA8

Imagery ©2016 NearMap.com

LEGEND

- Borehole
- Test Pit
- Site Boundary

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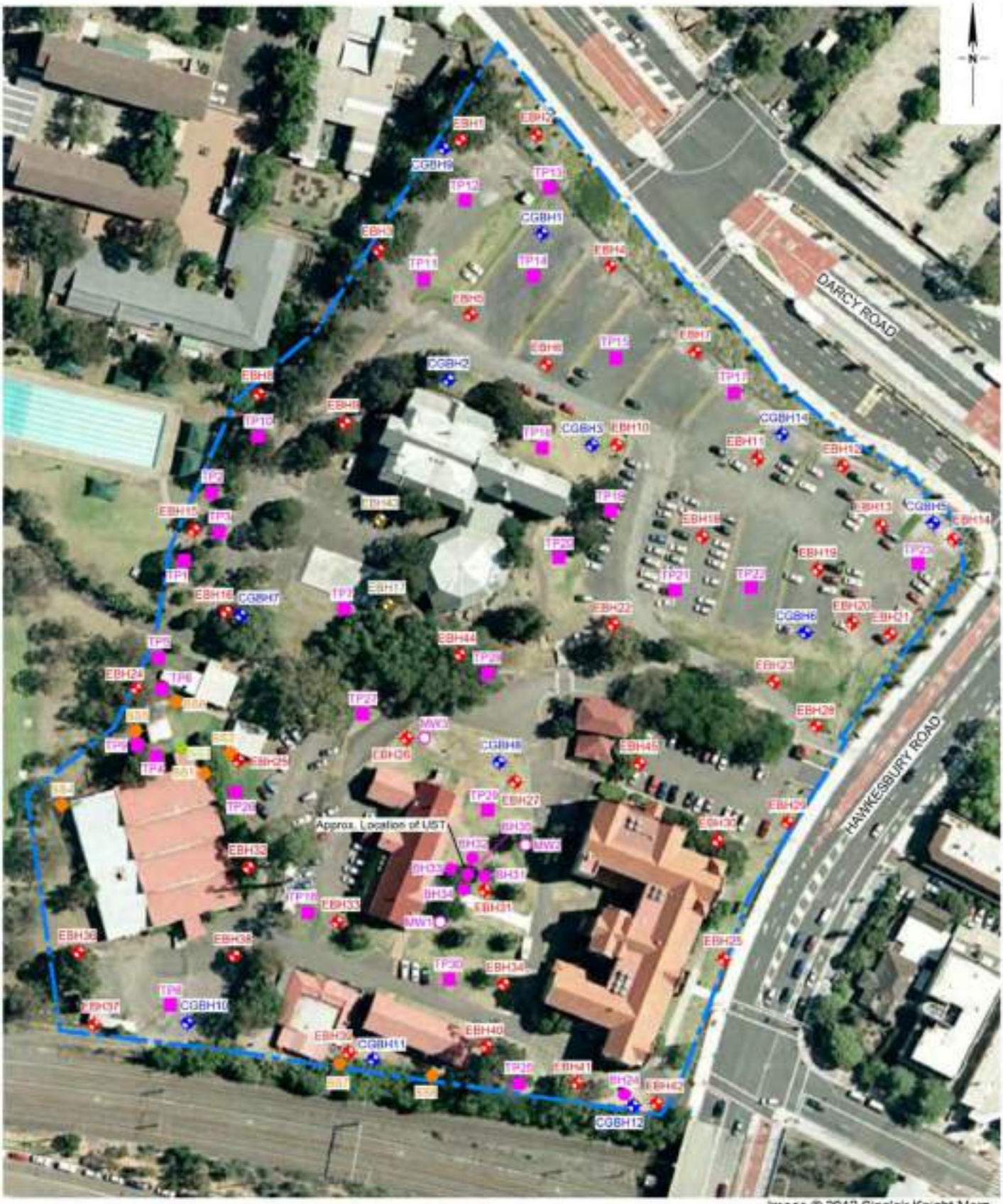
www.geotech.com.au

WSU Westmead Campus Redevelopment
Cnr Darcy Road & Hawkesbury Road
Westmead

Borehole and Test Pit Locations

Drawing No: 12619/2-AA1
Job No: 12619/2
Drawn By: MH
Date: 2 March 2016
Checked By: AB

File Ref: 12619-2
Layers: 0, AA1



LEGEND

- Borehole (Geotechnique)
- Test Pit (Geotechnique)
- Monitoring Well (Geotechnique)
- Site Boundary
- Approx. Location of Boreholes (Coffey)
- Approx. Location of Enviro Boreholes (Coffey)
- Boreholes Not Advanced Due to Access Constraints (Coffey)
- Surface Sample - Chrysotile Asbestos Fibres Detected (Coffey)
- Surface Sample - Chrysotile Asbestos Fibres Not Detected (Coffey)

0 10 20 30 40 50m

Scale 1:1000

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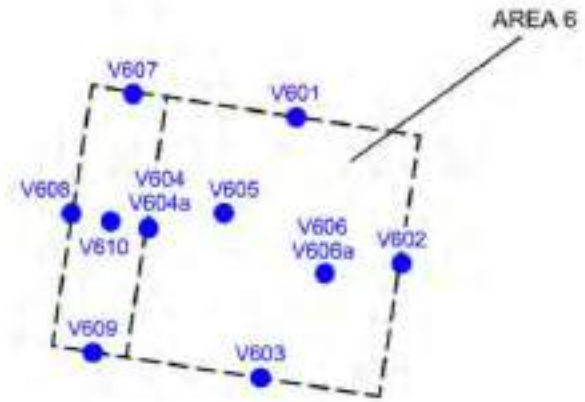
APP Corporation Pty Ltd
UWS Westmead Campus Redevelopment
Cnr Darcy & Hawkesbury Roads
Westmead

Borehole, Test Pit & Monitoring Well Locations

Drawing No: 12619/1-AA2
Job No: 12619/1
Drawn By: MH
Date: 19 June 2012
Checked By: AB

File Ref: 12619-1
Layers: 0, AA2



N

LEGEND

Sample

0 3 6 9 12 15m

Scale 1:300

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Penrith NSW 2750
Tel: 02 4722 2700
Fax: 02 4722 2777
e-mail:info@geotech.com.au
www.geotech.com.au

NOTES

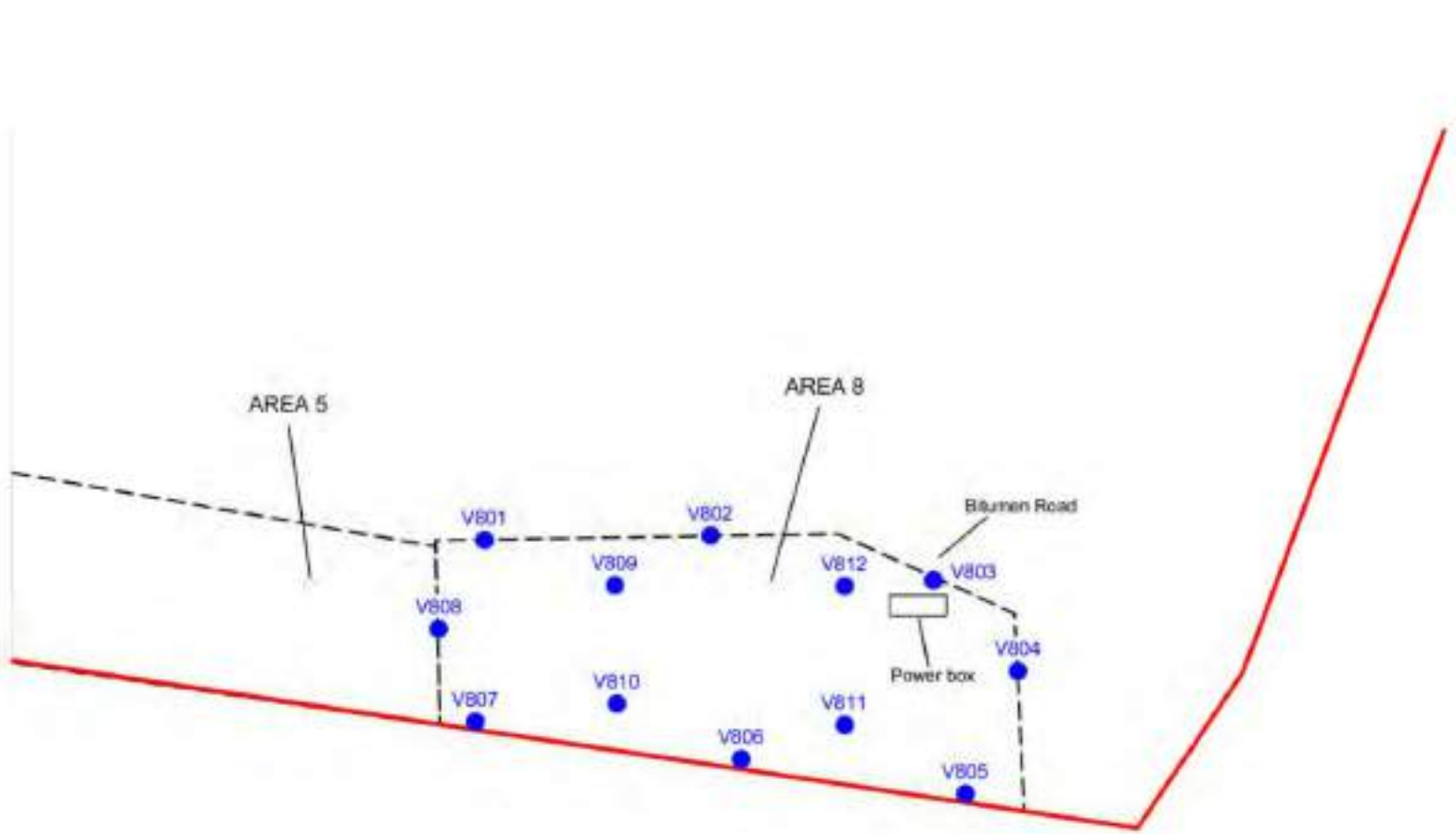
1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing.

WSU Westmead Campus Redevelopment
cnr Darcy & Hawkesbury Roads
Westmead

Validation Sample Locations in Area 6

Drawing No: 12619/3-AA3
Job No: 12619/3
Drawn By: MH
Date: 23 March 2016
Checked By: AB

File No: 12619-3
Layers: 0, AA3



LEGEND

- Sample
- Site Boundary

0 3 6 9 12 15m

Scale 1:300

GEOTECHNIQUE PTY LTD

PO Box 880
Penrith NSW 2750
Tel: 02 4722 2700
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NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

APP Corporation Pty Ltd
UWS Westmead Campus Redevelopment
cnr Darcy & Hawkesbury Roads
Westmead

Validation Sample Locations in Area 8

Drawing No: 12619/3-AA4
Job No: 12619/3
Drawn By: MH
Date: 19 February 2016
Checked By: AB

File No: 12619-3
Layers: 0, AA4

LEGEND

- Borehole
- Site Boundary

Imagery ©2016 NearMap.com

0 10 20 30 40 50m

Scale 1:1000

GEOTECHNIQUE PTY LTD

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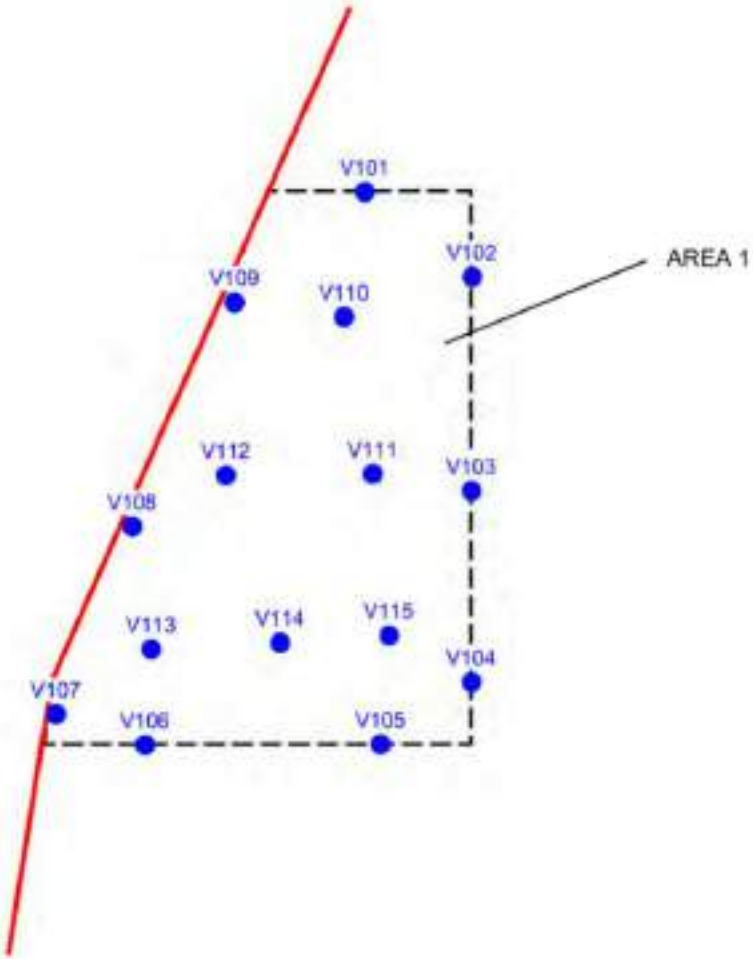
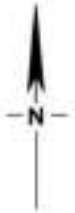
WSU Westmead Campus Redevelopment
cnr Darcy & Hawkesbury Roads
Westmead

Borehole Locations

Drawing No: 12619/3-AA5
Job No: 12619/3
Drawn By: MH
Date: 23 March 2016
Checked By: AB

File No: 12619-3
Layers: 0, AA5





LEGEND

- Sample
- Site Boundary

Scale 1:300

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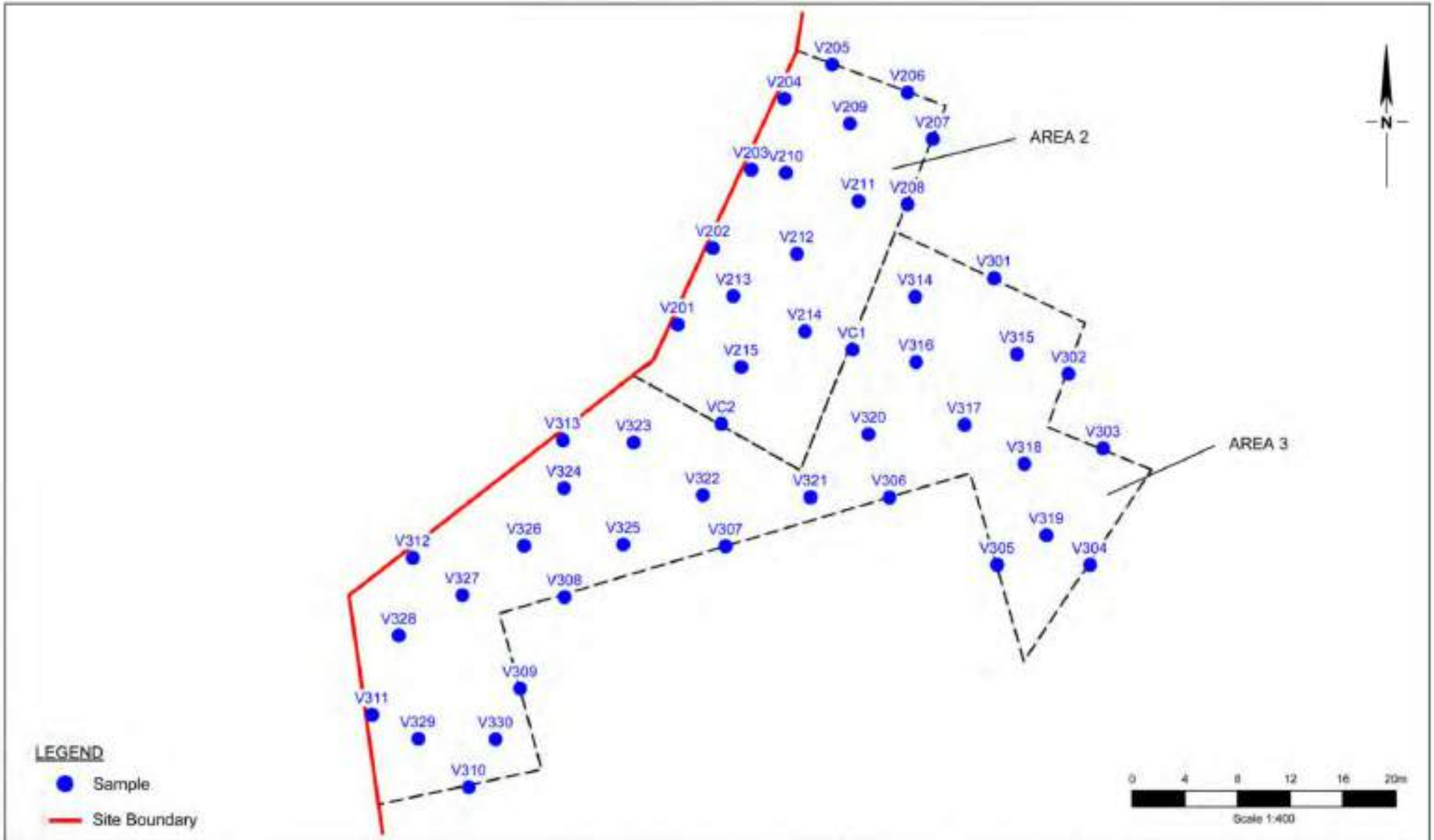
APP Corporation Pty Ltd
UWS Westmead Campus Redevelopment
cnr Darcy & Hawkesbury Roads
Westmead

Validation Sample Locations in Area 1

Drawing No: 12619/3-AA1
Job No: 12619/3
Drawn By: MH
Date: 19 February 2016
Checked By: AB

File No: 12619-3
Layers: 0, AA1



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NOTES

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cnr Darcy & Hawkesbury Roads
Westmead

Validation Sample Locations in Areas 2 & 3

Drawing No: 12619/3-AA2
Job No: 12619/3
Drawn By: MH
Date: 19 February 2016
Checked By: AB

File No: 12619-3
Layers: 0, AA2

Imagery ©2016 NearMap.com

LEGEND

- Test Pit
- Site Boundary

0 10 20 30 40 50m

Scale 1:1000

GEOTECHNIQUE PTY LTD
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WSU Westmead Campus Redevelopment
Cnr Darcy Road & Hawkesbury Road
Westmead

Additional Test Pit Locations

Drawing No: 12619/2-AA2
Job No: 12619/2
Drawn By: MH
Date: 27 January 2016
Checked By: AB

File Ref: 12619-2
Layers: 0, AA2

Appendix E Consultant's Summary Tables

GEOTECHNIQUE PTY LTD

TABLE CC1
METALS TEST TESULTS
TOPSOIL & FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
Previous Investigations									
EBH15	0.2-0.3	6	<0.3	11	37	3400	<0.05	5.6	170
TP1	0-0.1	4	0.4	11	24	190	<0.05	11	180
TP1	0.1-0.4	5	0.3	11	23	33	<0.05	3.8	72
TP2	0-0.1	3	<0.3	7.3	23	23	<0.05	7.4	31
TP2	0.1-0.2	4	<0.3	9.6	14	20	<0.05	4.5	27
TP2	0.2-0.4	5	0.3	10	24	36	<0.05	4.1	43
TP3	0-0.1	<3	<0.3	6	11	13	<0.05	5.8	20
TP3	0.1-0.4	<3	<0.3	8.4	15	15	<0.05	14	26
Recent Investigation									
C101	0-0.1	3	<0.3	7.9	14	29	0.03	8.9	72
C101	0.1-0.4	4	<0.3	13	18	26	0.03	2.2	17
C102	0-0.1	4	<0.3	7.6	19	27	0.01	2.2	17
C103	0-0.1	<3	<0.3	6.0	20	22	0.01	3.1	14
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01/0.05	0.5	0.5

TABLE CC2
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD

(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	TPH (mg/kg)					BTEX (mg/kg)			
		C6-C9	C10-C14	C15-C28	C29-C40	C10-C40 [a]	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
Previous Investigations										
TP1	0-0.1	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP1	0.1-0.4	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP2	0-0.1	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP2	0.1-0.2	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP2	0.2-0.4	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP3	0-0.1	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP3	0.1-0.4	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
Recent Investigation										
C101	0-0.1	<20	<20	120	170	290	<0.1	<0.1	<0.1	<0.3
C101	0.1-0.4	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C102	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C103	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
Limits of Reporting (LOR)		20	20	50	150	NA	0.1	0.1	0.1	0.3

Notes a: C10-C40 = (C10-C14) + (C15-C28) + (C29-C40); concentrations less than LOR are assumed equal to LOR.
NA: Not Applicable

TABLE CC3
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) AND POLYCHLORINATED BIPHENYLS (PCB) TEST RESULTS TOPSOIL & FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	PAH (mg/kg) BENZO(a)PYRENE	PAH (mg/kg) TOTAL PAH	TOTAL PCB (mg/kg)
Previous Investigations				
EBH15	0.2-0.3	0.09	<1.8	<0.90
TP1	0-0.1	<0.1	<1.8	<1
TP1	0.1-0.4	<0.1	<1.8	<1
TP2	0-0.1	<0.1	<1.8	<1
TP2	0.1-0.2	<0.1	<1.8	<1
TP2	0.2-0.4	0.2	<2.5	<1
TP3	0-0.1	<0.1	<1.8	<1
TP3	0.1-0.4	<0.1	<1.8	<1
Recent Investigation				
C101	0-0.1	<0.1	<0.8	<1
C101	0.1-0.4	<0.1	<0.8	<1
C102	0-0.1	<0.1	<0.8	<1
C103	0-0.1	<0.1	<0.8	<1
Limits of Reporting (LOR)		0.1	NA	1

NA: Not Applicable

TABLE CC4

ORGANOCHLORINE PESTICIDES (OCP) TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	Organochlorine Pesticides (mg/kg)												Scheduled Chemical Waste[a] (mg/kg)	Total Endosulfan[b] (mg/kg)
		HCB	ALPHA, BETA, DELTA - BHC	GAMMA BHC (LINDANE)	HEPTACHLOR EPOXIDE	HEPTACHLOR	ALDRIN	DIELDRIN	ENDRIN	DDD	DDE	DDT	CHLORDANE (alpha & gamma)		
Previous Investigations															
TP1	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP1	0.1-0.4	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP2	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP2	0.1-0.2	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP2	0.2-0.4	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP3	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP3	0.1-0.4	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
Recent Investigation															
C101	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C101	0.1-0.4	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C102	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C103	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
Limits of Reporting (LOR)		0.1	0.3	0.1	0.1	0.1	0.1	0.05	0.2	0.2	0.2	0.2	0.2	NA	NA

Notes a: Refer to Note 17 in Table 2 of the "Waste Classification Guidelines Part 1: Classifying Waste", NSW DECC 2008, for the list of chemicals regulated under the Scheduled Chemical Waste Chemical Order 1994.

b: Includes alpha, beta Endosulfan and Endosulfan Sulphate

NA: Not Applicable

TABLE CC5
TCLP TEST RESULT OF LEAD
TOPSOIL & FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	LEAD (mg/L)
Previous Investigations		
EBH15	0.2-0.3	18
Limit of Reporting (LOR)		0.02

TABLE CC6

ASBESTOS TEST RESULTS

TOPSOIL & FILL MATERIALS IN AREA 1 (LANDFILL DISPOSAL)

LOT 7 & PART LOT 8 IN DP1077852

CNR HAWKESBURY AND DARCY ROADS, WESTMEAD

(Ref No: 12619/2-L1)

Sample ID / Location	Depth (m)	ASBESTOS
Previous Investigations		
Soil sample		
EBH15	0.2-0.3	No Asbestos Detected
EBH15	0.5-0.6	No Asbestos Detected
Fibro-cement piece		
TP2	0.2-0.4	**Chrysotile Asbestos Detected**

TABLE CC7
CLASSIFICATION OF TOPSOIL & FILL MATERIALS IN AREA 1

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Asbestos	**Bonded Asbestos Containing Material (ACM)**	-	-	-	-	-	-	-	**Special Waste-Asbestos Waste**
Metals									
Arsenic	6	100	400	500	2000	ND	5	20	General Solid
Cadmium	0.4	20	80	100	400	ND	1	4	General Solid
Chromium (VI)	11 *	100	400	1900	7600	ND	5	20	General Solid
Lead	3400	100	400	1500	6000	18	5	20	General Solid **
Mercury	<0.05	4	16	50	200	ND	0.2	0.8	General Solid
Nickel	14	40	160	1050	4200	ND	2	8	General Solid
Total Petroleum Hydrocarbons									
C6-C9	<20	NA	NA	650	2600	NA	NA	NA	General Solid
C10-C40	290	NA	NA	10000	40000	NA	NA	NA	General Solid
BTEX									
Benzene	<0.1	10	40	18	72	ND	0.5	2	General Solid
Toluene	<0.1	288	1152	518	2073	ND	14.4	57.6	General Solid
Ethyl Benzene	<0.1	600	2400	1080	4320	ND	30	120	General Solid
Xylene	<0.3	1000	4000	1800	7200	ND	50	200	General Solid
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	0.2	0.8	3.2	10	23	ND	0.04	0.16	General Solid
Total PAH	<2.5	NA	NA	200	800	NA	NA	NA	General Solid
Organochlorine Pesticides									
Total Endosulfan [1]	<0.5	60	240	108	432	ND	3	12	General Solid
Polychlorinated Biphenyls (PCB)	<1	NA	NA	<50	<50	ND	NA	NA	General Solid
Scheduled Chemicals	<1.9[2]	NA	NA	<50	<50	NA	NA	NA	General Solid

NOTES:

ND: Not Determined
NA: Not Applicable
TCLP: Toxicity Characteristic Leaching Procedure
1: Includes alpha, beta Endosulfan and Endosulfan Sulphate
2: Includes only Aldrin, Alpha BHC, Beta BHC, gamma BHC (Lindane), delta BHC, Chlordane, DDD, DDE, DDT, Deldrin, Endrin, Heptachlor, Heptachlor Epoxide & HCB
CT1: Contaminant concentration for defining General Solid Waste (without TCLP)
CT2: Contaminant concentration for defining Restricted Solid Waste (without TCLP)
SCC1: Contaminant concentration for defining General Solid Waste when combined with TCLP
SCC2: Contaminant concentration for defining Restricted Solid Waste when combined with TCLP
TCLP1: Leachable concentration for defining General Solid Waste when combined with SCC1
TCLP2: Leachable concentration for defining Restricted Solid Waste when combined with SCC2
*: Reported as Total Chromium
**: Waste contaminated with lead (including lead paint waste) from educational institute is pre-classified as General Solid Waste, as detailed in "Waste Classification Guidelines Part 1: Classifying Waste" - NSW EPA (November

ATTACHMENT D

WASTE CLASSIFICATION OF TOPSOIL & FILL MATERIALS IN AREA 2

TABLE DD1
METALS TEST TESULTS
TOPSOIL & FILL MATERIALS IN AREA 2 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
Previous Investigations									
EBH24	0.5-0.6	9	4.3	71	250	1800	0.39	20	1700
TP4	0-0.1	4	0.3	11	32	140	0.09	5.4	130
TP4	0.2-0.5	6	0.6	17	46	190	0.11	6.2	140
TP4	0.7-1.0	8	0.7	21	65	240	0.15	9.6	240
TP5	0-0.1	6	0.6	17	96	280	0.26	25	250
TP5	0.1-0.4	22	3.0	44	350	1900	0.9	43	1000
TP6	0-0.1	7	1.1	62	79	740	0.48	12	700
TP6	0.1-0.4	10	1.7	34	210	850	1.0	33	820
TP9	0-0.1	5	0.4	18	29	93	0.08	20	120
TP9	0.2-0.5	5	0.5	21	42	140	0.11	22	190
TP9	0.7-1.0	9	0.8	22	88	270	0.13	9.7	240
SS5	-	5	0.5	13	31	180	0.11	5.8	210
Recent Investigation									
TP40	0-0.1	4	0.3	9.4	29	100	0.09	5.6	130
TP40	0.5-0.8	7	0.5	24	30	110	0.06	13	96
C201	0-0.1	6	0.5	17	53	120	0.1	34	240
C201	0.1-0.4	9	1.9	45	220	1400	1.1	23	850
C201	0.5-0.8	8	0.5	18	44	170	0.16	7.4	120
C202	0-0.1	8	0.6	20	38	190	0.15	6.8	180
C202	0.5-0.8	8	0.5	18	64	150	0.18	6.1	110
C203	0-0.1	7	0.5	17	42	220	0.17	6.4	170
C203	0.5-0.8	8	0.5	16	100	310	0.16	5.7	260
C204	0-0.1	8	0.8	18	57	250	0.22	6.7	250
C204	0.5-0.8	8	0.4	17	25	80	0.1	5.5	130
C205	0-0.1	8	0.5	19	33	110	0.14	6.1	100
C205	0.5-0.8	8	0.6	19	88	180	0.18	7.5	200
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01/0.05	0.5	0.5

TABLE DD2
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 2 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD

(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	TPH (mg/kg) C6-C9	TPH (mg/kg) C10-C14	TPH (mg/kg) C15-C28	TPH (mg/kg) C29-C40	TPH (mg/kg) C10-C40 [a]	BTEX (mg/kg) BENZENE	BTEX (mg/kg) TOLUENE	BTEX (mg/kg) ETHYL BENZENE	BTEX (mg/kg) TOTAL XYLENES
Previous Investigations										
EBH24	0.5-0.6	<20	<20	<50	<50	120	-	-	-	-
TP4	0-0.1	<20	150	250	<150	550	<0.1	<0.1	<0.1	<0.3
TP4	0.2-0.5	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP4	0.7-1.0	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP5	0-0.1	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP5	0.1-0.4	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP6	0-0.1	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP6	0.1-0.4	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP9	0-0.1	<20	<20	95	<150	265	<0.1	<0.1	<0.1	<0.3
TP9	0.2-0.5	<20	36	200	<150	386	<0.1	<0.1	<0.1	<0.3
TP9	0.7-1.0	<20	<20	130	<150	300	<0.1	<0.1	<0.1	<0.3
Recent Investigation										
TP40	0-0.1	<20	<20	110	164	210	<0.1	<0.1	<0.1	<0.3
TP40	0.5-0.8	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C201	0-0.1	<20	<20	55	149	210	<0.1	<0.1	<0.1	<0.3
C201	0.1-0.4	<20	<20	51	155	210	<0.1	<0.1	<0.1	<0.3
C201	0.5-0.8	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C202	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C202	0.5-0.8	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C203	0-0.1	<20	<20	120	152	210	<0.1	<0.1	<0.1	<0.3
C203	0.5-0.8	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C204	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C204	0.5-0.8	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C205	0-0.1	<20	<20	48	<145	210	<0.1	<0.1	<0.1	<0.3
C205	0.5-0.8	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
Limits of Reporting (LOR)		20	20	50	150	NA	0.1	0.1	0.1	0.3

Notes a: C10-C40 = (C10-C14) + (C15-C28) + (C29-C40); concentrations less than LOR are assumed equal to LOR.
NA: Not Applicable

TABLE DD3
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) AND POLYCHLORINATED BIPHENYLS (PCB) TEST RESULTS TOPSOIL & FILL MATERIALS IN AREA 2 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	PAH (mg/kg) BENZO(a)PYRENE	PAH (mg/kg) TOTAL PAH	TOTAL PCB (mg/kg)
Previous Investigations				
EBH24	0.2-0.3	0.14	<1.8	-
TP4	0-0.1	0.2	<2.0	<1
TP4	0.2-0.5	0.2	<2.1	<1
TP4	0.7-1.0	0.5	<4.5	<1
TP5	0-0.1	0.3	<3.4	<1
TP5	0.1-0.4	0.3	<3.4	<1
TP6	0-0.1	0.2	<2.3	<1
TP6	0.1-0.4	0.2	<2.2	<1
TP9	0-0.1	<0.1	<1.8	<1
TP9	0.2-0.5	0.1	<2.0	<1
TP9	0.7-1.0	0.5	<4.7	<1
Recent Investigation				
TP40	0-0.1	<0.1	<0.8	<1
TP40	0.5-0.8	<0.1	<0.8	<1
C201	0-0.1	0.6	7.1	<1
C201	0.1-0.4	0.3	3.5	<1
C201	0.5-0.8	0.6	5.0	<1
C202	0-0.1	0.1	1.2	<1
C202	0.5-0.8	0.6	6.0	<1
C203	0-0.1	0.3	2.6	<1
C203	0.5-0.8	0.7	7.5	<1
C204	0-0.1	0.1	1.6	<1
C204	0.5-0.8	<0.1	<0.8	<1
C205	0-0.1	1.0	17	<1
C205	0.5-0.8	0.3	3.1	<1
Limits of Reporting (LOR)		0.1	NA	1

NA: Not Applicable

TABLE DD4
ORGANOCHLORINE PESTICIDES (OCP) TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 2 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	Organochlorine Pesticides (mg/kg)												Scheduled Chemical Waste[a] (mg/kg)	Total Endosulfan[b] (mg/kg)
		HCB	ALPHA, BETA, DELTA - BHC	GAMMA BHC (LINDANE)	HEPTACHLOR EPOXIDE	HEPTACHLOR	ALDRIN	DIELDRIN	ENDRIN	DDD	DDE	DDT	CHLORDANE (alpha & gamma)		
Previous Investigations															
TP4	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP4	0.2-0.5	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP4	0.7-1.0	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP5	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP5	0.1-0.4	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP6	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP6	0.1-0.4	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP9	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP9	0.2-0.5	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP9	0.7-1.0	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
Recent Investigation															
TP40	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
TP40	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C201	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C201	0.1-0.4	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C201	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C202	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C202	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C203	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C203	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C204	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C204	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C205	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C205	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
Limits of Reporting (LOR)		0.1	0.3	0.1	0.1	0.1	0.1	0.05	0.2	0.2	0.2	0.2	0.2	NA	NA

Notes
a: Refer to Note 17 in Table 2 of the "Waste Classification Guidelines Part 1: Classifying Waste", NSW DECC 2008, for the list of chemicals regulated under the Scheduled Chemical Waste Chemical Order 1994.
b: Includes alpha, beta Endosulfan and Endosulfan Sulphate
NA: Not Applicable

TABLE DD5
TCLP TEST RESULTS OF LEAD & BENZO(a)PYRENE
TOPSOIL & FILL MATERIALS IN AREA 2 (LANDFILL DISPOSAL)

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	LEAD (mg/L)	Benzo(a)Pyrene (mg/L)
Previous Investigations			
EBH24	0.2-0.3	0.46	-
TP5	0.1-0.4	0.94	-
TP6	0-0.1	0.19	-
TP6	0.1-0.4	0.33	-
Recent Investigation			
TP40	0-0.1	<0.02	-
C201	0-0.1	0.03	-
C201	0.1-0.4	0.53	-
C203	0.5-0.8	<0.02	-
C205	0-0.1	-	<0.0001
Limit of Reporting (LOR)		0.02	0.0001

TABLE DD6

ASBESTOS TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 2 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Sample ID / Location	Depth (m)	ASBESTOS
Previous Investigations		
Soil sample		
TP4	0-0.1	No Asbestos Found
TP4	0.2-0.5	No Asbestos Found
TP4	0.7-1.0	No Asbestos Found
TP5	0-0.1	No Asbestos Found
TP5	0.1-0.4	No Asbestos Found
TP6	0-0.1	No Asbestos Found
TP6	0.1-0.4	**Amosite, Chrysotile & Crociodolite Asbestos Found**
TP9	0-0.1	No Asbestos Found
TP9	0.2-0.5	No Asbestos Found
TP9	0.7-1.0	No Asbestos Found
Recent Investigation		
Soil sample		
TP40	0-0.1	No Asbestos Found
TP40	0.5-0.8	No Asbestos Found
Previous Investigations		
Fibro-cement piece		
TP4	0.2-1.0	**Chrysotile & Crociodolite Asbestos Detected**
TP6	0.1-0.4	**Chrysotile Asbestos Detected**
TP9	0.2-1.0	**Chrysotile & Crociodolite Asbestos Detected**
Recent Investigation		
Fibro-cement piece		
TP40	0-0.1	**Chrysotile Asbestos Detected**

TABLE DD7
CLASSIFICATION OF TOPSOIL & FILL MATERIALS IN AREA 2

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Asbestos	**Bonded Asbestos Containing Material (ACM) & Asbestos in Soil**	-	-	-	-	-	-	-	**Special Waste- Asbestos Waste**
Metals									
Arsenic	22	100	400	500	2000	ND	5	20	General Solid
Cadmium	4.3	20	80	100	400	ND	1	4	General Solid
Chromium (VI)	71 *	100	400	1900	7600	ND	5	20	General Solid
Lead	1900	100	400	1500	6000	0.94	5	20	General Solid **
Mercury	1.1	4	16	50	200	ND	0.2	0.8	General Solid
Nickel	34	40	160	1050	4200	ND	2	8	General Solid
Total Petroleum Hydrocarbons									
C6-C9	<20	NA	NA	650	2600	NA	NA	NA	General Solid
C10-C40	550	NA	NA	10000	40000	NA	NA	NA	General Solid
BTEX									
Benzene	<0.1	10	40	18	72	ND	0.5	2	General Solid
Toluene	<0.1	288	1152	518	2073	ND	14.4	57.6	General Solid
Ethyl Benzene	<0.1	600	2400	1080	4320	ND	30	120	General Solid
Xylene	<0.3	1000	4000	1800	7200	ND	50	200	General Solid
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	1.0	0.8	3.2	10	23	<0.0001	0.04	0.16	General Solid
Total PAH	17	NA	NA	200	800	NA	NA	NA	General Solid
Organochlorine Pesticides									
Total Endosulfan [1]	<0.5	60	240	108	432	ND	3	12	General Solid
Polychlorinated Biphenyls (PCB)	<1	NA	NA	<50	<50	ND	NA	NA	General Solid
Scheduled Chemicals	<1.9[2]	NA	NA	<50	<50	NA	NA	NA	General Solid

NOTES:

ND: Not Determined
NA: Not Applicable
TCLP: Toxicity Characteristic Leaching Procedure
1: Includes alpha, beta Endosulfan and Endosulfan Sulphate
2: Includes only Aldrin, Alpha BHC, Beta BHC, gamma BHC (Lindane), delta BHC, Chlordane, DDD, DDE, DDT, Deldrin, Endrin, Heptachlor, Heptachlor Epoxide & HCB
CT1: Contaminant concentration for defining General Solid Waste (without TCLP)
CT2: Contaminant concentration for defining Restricted Solid Waste (without TCLP)
SCC1: Contaminant concentration for defining General Solid Waste when combined with TCLP
SCC2: Contaminant concentration for defining Restricted Solid Waste when combined with TCLP
TCLP1: Leachable concentration for defining General Solid Waste when combined with SCC1
TCLP2: Leachable concentration for defining Restricted Solid Waste when combined with SCC2
*: Reported as Total Chromium
**: Waste contaminated with lead (including lead paint waste) from educational institute is pre-classified as General Solid Waste, as detailed in "Waste Classification Guidelines Part 1: Classifying Waste" - NSW EPA (November

ATTACHMENT E

WASTE CLASSIFICATION OF FILL MATERIALS IN AREA 3

TABLE EE1
METALS TEST TESULTS
FILL MATERIALS IN AREA3 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
Recent Investigation									
C301	0-0.1	9	0.6	16	44	460	0.13	7.3	170
C302	0-0.1	5	0.5	9.4	24	160	0.13	8.9	120
C303	0-0.1	9	0.7	19	45	150	0.13	6.1	160
C304	0-0.1	<3	<0.3	6.5	9.9	29	0.02	3.3	260
C305	0-0.1	<3	<0.3	7.4	8.4	19	0.02	3.9	170
C306	0-0.1	4	0.4	9	24	30	0.04	10	74
C306	0.5-0.8	6	0.4	12	28	51	0.06	11	93
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01	0.5	0.5

TABLE EE2
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
FILL MATERIALS IN AREA3 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD

(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	TPH (mg/kg) C6-C9	C10-C14	C15-C28	C29-C40	C10-C40 [a]	BTEX (mg/kg) BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
Recent Investigation										
C301	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C302	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C303	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C304	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C305	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C306	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C306	0.5-0.8	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
Limits of Reporting (LOR)		20	20	45	145	NA	0.1	0.1	0.1	0.3

Notes a: C10-C40 = (C10-C14) + (C15-C28) + (C29-C40); concentrations less than LOR are assumed equal to LOR.
NA: Not Applicable

TABLE EE3
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) AND POLYCHLORINATED BIPHENYLS (PCB) TEST RESULTS

FILL MATERIALS IN AREA3 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	PAH (mg/kg) BENZO(a)PYRENE	PAH (mg/kg) TOTAL PAH	TOTAL PCB (mg/kg)
Recent Investigation				
C301	0-0.1	0.1	1.3	<1
C302	0-0.1	0.1	<0.8	<1
C303	0-0.1	0.5	4.3	<1
C304	0-0.1	<0.1	<0.8	<1
C305	0-0.1	<0.1	<0.8	<1
C306	0-0.1	<0.1	<0.8	<1
C306	0.5-0.8	<0.1	<0.8	<1
Limits of Reporting (LOR)		0.1	NA	1

NA: Not Applicable

TABLE EE4
ORGANOCHLORINE PESTICIDES (OCP) TEST RESULTS
FILL MATERIALS IN AREA3 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	Organochlorine Pesticides (mg/kg)												Scheduled Chemical Waste[a] (mg/kg)	Total Endosulfan[b] (mg/kg)
		HCB	ALPHA, BETA, DELTA - BHC	GAMMA BHC (LINDANE)	HEPTACHLOR EPOXIDE	HEPTACHLOR	ALDRIN	DIELDRIN	ENDRIN	DDD	DDE	DDT	CHLORDANE (alpha & gamma)		
Recent Investigation															
C301	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C302	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C303	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C304	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C305	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C306	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C306	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
Limits of Reporting (LOR)		0.1	0.3	0.1	0.1	0.1	0.1	0.05	0.2	0.2	0.2	0.2	0.2	NA	NA

Notes a: Refer to Note 17 in Table 2 of the "Waste Classification Guidelines Part 1: Classifying Waste", NSW DECC 2008, for the list of chemicals regulated under the Scheduled Chemical Waste Chemical Order 1994.

b: Includes alpha, beta Endosulfan and Endosulfan Sulphate

NA: Not Applicable

TABLE EE5
TCLP TEST RESULTS OF LEAD
FILL MATERIALS IN AREA3 (LANDFILL DISPOSAL)

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	LEAD (mg/L)
Recent Investigation		
C301	0-0.1	0.06
C302	0-0.1	0.09
Limit of Reporting (LOR)		0.02

TABLE EE6

ASBESTOS TEST RESULTS
FILL MATERIALS IN AREA3 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Sample ID / Location	Depth (m)	ASBESTOS
Previous Investigations		
Soil sample		
SS1	-	**Chrysotile Asbestos Detected**
SS2	-	**Chrysotile Asbestos Detected**
SS3	-	No Asbestos Detected
SS4	-	**Chrysotile Asbestos Detected**

TABLE EE7
CLASSIFICATION OF FILL MATERIALS IN AREA 3

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Asbestos	**Asbestos in Soil**	-	-	-	-	-	-	-	**Special Waste-Asbestos Waste**
Metals									
Arsenic	9	100	400	500	2000	ND	5	20	General Solid
Cadmium	0.7	20	80	100	400	ND	1	4	General Solid
Chromium (VI)	19 *	100	400	1900	7600	ND	5	20	General Solid
Lead	480	100	400	1500	6000	0.09	5	20	General Solid
Mercury	0.13	4	16	50	200	ND	0.2	0.8	General Solid
Nickel	11	40	160	1050	4200	ND	2	8	General Solid
Total Petroleum Hydrocarbons									
C6-C9	<20	NA	NA	650	2600	NA	NA	NA	General Solid
C10-C40	210	NA	NA	10000	40000	NA	NA	NA	General Solid
BTEX									
Benzene	<0.1	10	40	18	72	ND	0.5	2	General Solid
Toluene	<0.1	288	1152	518	2073	ND	14.4	57.6	General Solid
Ethyl Benzene	<0.1	600	2400	1080	4320	ND	30	120	General Solid
Xylene	<0.3	1000	4000	1800	7200	ND	50	200	General Solid
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	0.5	0.8	3.2	10	23	ND	0.04	0.16	General Solid
Total PAH	4.3	NA	NA	200	800	NA	NA	NA	General Solid
Organochlorine Pesticides									
Total Endosulfan [1]	<0.5	60	240	108	432	ND	3	12	General Solid
Polychlorinated Biphenyls (PCB)	<1	NA	NA	<50	<50	ND	NA	NA	General Solid
Scheduled Chemicals	<1.9[2]	NA	NA	<50	<50	NA	NA	NA	General Solid

NOTES:
ND: Not Determined
NA: Not Applicable
TCLP: Toxicity Characteristic Leaching Procedure
1: Includes alpha, beta Endosulfan and Endosulfan Sulphate
2: Includes only Aldrin, Alpha BHC, Beta BHC, gamma BHC (Lindane), delta BHC, Chlordane, DDD, DDE, DDT, Deldrin, Endrin, Heptachlor, Heptachlor Epoxide & HCB
CT1: Contaminant concentration for defining General Solid Waste (without TCLP)
CT2: Contaminant concentration for defining Restricted Solid Waste (without TCLP)
SCC1: Contaminant concentration for defining General Solid Waste when combined with TCLP
SCC2: Contaminant concentration for defining Restricted Solid Waste when combined with TCLP
TCLP1: Leachable concentration for defining General Solid Waste when combined with SCC1
TCLP2: Leachable concentration for defining Restricted Solid Waste when combined with SCC2
*: Reported as Total Chromium

ATTACHMENT F

WASTE CLASSIFICATION OF FILL MATERIALS IN AREA 4

TABLE FF1
METALS TEST TESULTS
FILL MATERIALS IN AREA 4 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
Previous Investigations									
EBH9	0.2-0.3	6	0.5	16	21	46	0.05	6.6	44
Recent Investigation									
C401	0-0.1	6	<0.3	13	17	24	0.01	2.8	16
C402	0-0.1	6	<0.3	14	18	28	0.02	5.0	26
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01/0.05	0.5	0.5

TABLE FF2
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
FILL MATERIALS IN AREA 4 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD

(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	TPH (mg/kg)					BTEX (mg/kg)			
		C6-C9	C10-C14	C15-C28	C29-C40	C10-C40*	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
Recent Investigation										
C401	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C402	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
Limits of Reporting (LOR)		20	20	45	145	NA	0.1	0.1	0.1	0.3

Notes a: C10-C40 = (C10-C14) + (C15-C28) + (C29-C40); concentrations less than LOR are assumed equal to LOR.
NA: Not Applicable

TABLE FF3
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) AND POLYCHLORINATED BIPHENYLS (PCB) TEST RESULTS

FILL MATERIALS IN AREA 4 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	PAH (mg/kg) BENZO(a)PYRENE	PAH (mg/kg) TOTAL PAH	TOTAL PCB (mg/kg)
Previous Investigations				
EBH9	0.2-0.3	0.51	<7.5	<0.90
Recent Investigation				
C401	0-0.1	<0.1	<0.8	<1
C402	0-0.1	<0.1	<0.8	<1
Limits of Reporting (LOR)		0.1	NA	1

NA: Not Applicable

TABLE FF4

ORGANOCHLORINE PESTICIDES (OCP) TEST RESULTS
FILL MATERIALS IN AREA 4 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	Organochlorine Pesticides (mg/kg)												Scheduled Chemical Waste[a] (mg/kg)	Total Endosulfan[b] (mg/kg)
		HCB	ALPHA, BETA, DELTA - BHC	GAMMA BHC (LINDANE)	HEPTACHLOR EPOXIDE	HEPTACHLOR	ALDRIN	DIELDRIN	ENDRIN	DDD	DDE	DDT	CHLORDANE (alpha & gamma)		
Recent Investigation															
C401	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C402	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
Limits of Reporting (LOR)		0.1	0.3	0.1	0.1	0.1	0.1	0.05	0.2	0.2	0.2	0.2	0.2	NA	NA

Notes
a: Refer to Note 17 in Table 2 of the "Waste Classification Guidelines Part 1: Classifying Waste", NSW DECC 2008, for the list of chemicals regulated under the Scheduled Chemical Waste Chemical Order 1994.
b: Includes alpha, beta Endosulfan and Endosulfan Sulphate
NA: Not Applicable

TABLE FF5

ASBESTOS TEST RESULTS
FILL MATERIALS IN AREA 4 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Sample ID / Location	Depth (m)	ASBESTOS
Previous Investigations		
Soil sample		
EBH9	0.2-0.3	**Chrysotile Asbestos Detected**
EBH9	0.5-0.6	No Asbestos Detected

TABLE FF6
CLASSIFICATION OF FILL MATERIALS IN AREA 4

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Asbestos	**Asbestos in Soil**	-	-	-	-	-	-	-	**Special Waste-Asbestos Waste**
Metals									
Arsenic	6	100	400	500	2000	ND	5	20	General Solid
Cadmium	0.5	20	80	100	400	ND	1	4	General Solid
Chromium (VI)	16 *	100	400	1900	7600	ND	5	20	General Solid
Lead	46	100	400	1500	6000	ND	5	20	General Solid
Mercury	0.05	4	16	50	200	ND	0.2	0.8	General Solid
Nickel	6.6	40	160	1050	4200	ND	2	8	General Solid
Total Petroleum Hydrocarbons									
C6-C9	<20	NA	NA	650	2600	NA	NA	NA	General Solid
C10-C40	210	NA	NA	10000	40000	NA	NA	NA	General Solid
BTEX									
Benzene	<0.1	10	40	18	72	ND	0.5	2	General Solid
Toluene	<0.1	288	1152	518	2073	ND	14.4	57.6	General Solid
Ethyl Benzene	<0.1	600	2400	1080	4320	ND	30	120	General Solid
Xylene	<0.3	1000	4000	1800	7200	ND	50	200	General Solid
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	0.51	0.8	3.2	10	23	ND	0.04	0.16	General Solid
Total PAH	<7.5	NA	NA	200	800	NA	NA	NA	General Solid
Organochlorine Pesticides									
Total Endosulfan [1]	<0.5	60	240	108	432	ND	3	12	General Solid
Polychlorinated Biphenyls (PCB)	<1	NA	NA	<50	<50	ND	NA	NA	General Solid
Scheduled Chemicals	<1.9[2]	NA	NA	<50	<50	NA	NA	NA	General Solid

NOTES:

ND:	Not Determined
NA:	Not Applicable
TCLP:	Toxicity Characteristic Leaching Procedure
1:	Includes alpha, beta Endosulfan and Endosulfan Sulphate
2:	Includes only Aldrin, Alpha BHC, Beta BHC, gamma BHC (Lindane), delta BHC, Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Heptachlor, Heptachlor Epoxide & HCB
CT1:	Contaminant concentration for defining General Solid Waste (without TCLP)
CT2:	Contaminant concentration for defining Restricted Solid Waste (without TCLP)
SCC1:	Contaminant concentration for defining General Solid Waste when combined with TCLP
SCC2:	Contaminant concentration for defining Restricted Solid Waste when combined with TCLP
TCLP1:	Leachable concentration for defining General Solid Waste when combined with SCC1
TCLP2:	Leachable concentration for defining Restricted Solid Waste when combined with SCC2
*	Reported as Total Chromium

ATTACHMENT G

WASTE CLASSIFICATION OF TOPSOIL & FILL MATERIALS IN AREA 5

TABLE GG1
METALS TEST TESULTS
TOPSOIL & FILL MATERIALS IN AREA 5 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
Previous Investigations									
CGBH10	0.2-0.3	<3	0.5	4.6	70	4	<0.05	28	34
CGBH11	0.4-0.5	9	0.5	15	40	63	0.06	6.6	94
TP25	0-0.1	7	0.4	14	32	100	0.08	9.5	78
TP25	0.1-0.4	10	0.4	18	24	20	<0.05	8.2	37
Recent Investigation									
C501	0-0.1	4	<0.3	7.9	19	53	0.03	5.1	150
C501	0.5-0.8	4	<0.3	7.1	24	55	0.03	5.0	170
C502	0-0.1	5	<0.3	11	20	64	0.03	5.9	160
C502	0.5-0.8	4	<0.3	10	17	42	0.03	7.4	110
C503	0-0.1	4	0.3	12	41	21	0.02	8.9	72
C504	0-0.1	6	<0.3	13	33	24	0.02	13	80
C505	0-0.1	8	0.4	12	56	51	0.06	10	84
C506	0-0.1	8	0.4	14	38	57	0.06	7.7	84
C507	0-0.1	8	0.3	14	30	93	0.06	6.2	65
C508	0-0.1	8	0.4	14	30	94	0.07	6.6	63
C509	0-0.1	7	0.3	13	29	94	0.06	5.8	59
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01/0.05	0.5	0.5

TABLE GG2
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 5 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD

(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	TPH (mg/kg)					BTEX (mg/kg)			
		C6-C9	C10-C14	C15-C28	C29-C40	C10-C40"	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
Previous Investigations										
OGBH10	0.2-0.3	<20	<20	<50	58	128	-	-	-	-
OGBH11	0.4-0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<1.5
TP25	0-0.1	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
TP25	0.1-0.4	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
SS8	-	-	-	-	-	-	<0.5	<0.5	<0.5	<1.5
Recent Investigation										
C501	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C501	0.5-0.8	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C502	0-0.1	<20	<20	<45	<145	210	<0.1	0.6	<0.1	<0.3
C502	0.5-0.8	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C503	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C504	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C505	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C506	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	0.8
C507	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C508	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
C509	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
Limits of Reporting (LOR)		20	20	50	50	NA	0.1	0.1	0.1	0.3

Notes a: C10-C40 = (C10-C14) + (C15-C28) + (C29-C40); concentrations less than LOR are assumed equal to LOR.
NA: Not Applicable

TABLE GG3
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) AND POLYCHLORINATED BIPHENYLS (PCB) TEST RESULTS TOPSOIL & FILL MATERIALS IN AREA 5 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	PAH (mg/kg) BENZO(a)PYRENE	PAH (mg/kg) TOTAL PAH	TOTAL PCB (mg/kg)
Previous Investigations				
CGBH10	0.2-0.3	<0.05	<1.6	<0.90
CGBH11	0.2-0.3	<0.05	<1.6	-
TP25	0-0.1	<0.1	<2.0	<1
TP25	0.1-0.4	<0.1	<1.8	<1
Recent Investigation				
C501	0-0.1	<0.1	<0.8	<1
C501	0.5-0.8	<0.1	<0.8	<1
C502	0-0.1	<0.1	<0.8	<1
C502	0.5-0.8	0.2	2.1	<1
C503	0-0.1	<0.1	<0.8	<1
C504	0-0.1	<0.1	<0.8	<1
C505	0-0.1	<0.1	<0.8	<1
C506	0-0.1	<0.1	0.9	<1
C507	0-0.1	0.4	7.4	<1
C508	0-0.1	<0.1	<0.8	<1
C509	0-0.1	<0.1	<0.8	<1
Limits of Reporting (LOR)		0.1	NA	1

NA: Not Applicable

TABLE GG4
ORGANOCHLORINE PESTICIDES (OCP) TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 5 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	Organochlorine Pesticides (mg/kg)												Scheduled Chemical Waste[a] (mg/kg)	Total Endosulfan[b] (mg/kg)
		HCB	ALPHA, BETA, DELTA - BHC	GAMMA BHC (LINDANE)	HEPTACHLOR EPOXIDE	HEPTACHLOR	ALDRIN	DIELDRIN	ENDRIN	DDD	DDE	DDT	CHLORDANE (alpha & gamma)		
Previous Investigations															
TP25	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
TP25	0.1-0.4	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2.1	<0.5
Recent Investigation															
C501	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C501	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C502	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C502	0.5-0.8	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C503	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C504	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C505	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C506	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C507	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C508	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C509	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
Limits of Reporting (LOR)		0.1	0.3	0.1	0.1	0.1	0.1	0.05	0.2	0.2	0.2	0.2	0.2	NA	NA

Notes
a: Refer to Note 17 in Table 2 of the "Waste Classification Guidelines Part 1: Classifying Waste", NSW DECC 2008, for the list of chemicals regulated under the Scheduled Chemical Waste Chemical Order 1994.
b: Includes alpha, beta Endosulfan and Endosulfan Sulphate
NA: Not Applicable

TABLE GG5

ASBESTOS TEST RESULTS

TOPSOIL & FILL MATERIALS IN AREA 5 (LANDFILL DISPOSAL)

LOT 7 & PART LOT 8 IN DP1077852

CNR HAWKESBURY AND DARCY ROADS, WESTMEAD

(Ref No: 12619/2-L1)

Sample ID / Location	Depth (m)	ASBESTOS
Previous Investigations		
Soil sample		
CGBH10	0.2-0.3	**Chrysotile Asbestos Detected**
CGBH10	0.4-0.5	**Chrysotile Asbestos Detected**
CGBH11	0.2-0.3	**Chrysotile Asbestos Detected**
CGBH11	0.4-0.5	**Chrysotile Asbestos Detected**
SS7	-	**Chrysotile Asbestos Detected**
SS8	-	**Chrysotile Asbestos Detected**
TP25	0-0.1	**Amosite, Chrysotile & Crociodolite Asbestos Found**
TP25	0.1-0.4	No Asbestos Found

TABLE GG6
CLASSIFICATION OF TOPSOIL & FILL MATERIALS IN AREA 5

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Asbestos	**Asbestos in Soil**	-	-	-	-	-	-	-	**Special Waste-Asbestos Waste**
Metals									
Arsenic	10	100	400	500	2000	ND	5	20	General Solid
Cadmium	0.7	20	80	100	400	ND	1	4	General Solid
Chromium (VI)	18 *	100	400	1900	7600	ND	5	20	General Solid
Lead	100	100	400	1500	6000	ND	5	20	General Solid
Mercury	0.08	4	16	50	200	ND	0.2	0.8	General Solid
Nickel	28	40	160	1050	4200	ND	2	8	General Solid
Total Petroleum Hydrocarbons									
C6-C9	<20	NA	NA	650	2600	NA	NA	NA	General Solid
C10-C40	220	NA	NA	10000	40000	NA	NA	NA	General Solid
BTEX									
Benzene	<0.5	10	40	18	72	ND	0.5	2	General Solid
Toluene	0.6	288	1152	518	2073	ND	14.4	57.6	General Solid
Ethyl Benzene	<0.5	600	2400	1080	4320	ND	30	120	General Solid
Xylene	<1.5	1000	4000	1800	7200	ND	50	200	General Solid
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	0.4	0.8	3.2	10	23	ND	0.04	0.16	General Solid
Total PAH	7.4	NA	NA	200	800	NA	NA	NA	General Solid
Organochlorine Pesticides									
Total Endosulfan [1]	<0.5	60	240	108	432	ND	3	12	General Solid
Polychlorinated Biphenyls (PCB)	<1	NA	NA	<50	<50	ND	NA	NA	General Solid
Scheduled Chemicals	<2.1[2]	NA	NA	<50	<50	NA	NA	NA	General Solid

NOTES:

ND: Not Determined
NA: Not Applicable
TCLP: Toxicity Characteristic Leaching Procedure
1: Includes alpha, beta Endosulfan and Endosulfan Sulphate
2: Includes only Aldrin, Alpha BHC, Beta BHC, gamma BHC (Lindane), delta BHC, Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Heptachlor, Heptachlor Epoxide & HCB
CT1: Contaminant concentration for defining General Solid Waste (without TCLP)
CT2: Contaminant concentration for defining Restricted Solid Waste (without TCLP)
SCC1: Contaminant concentration for defining General Solid Waste when combined with TCLP
SCC2: Contaminant concentration for defining Restricted Solid Waste when combined with TCLP
TCLP1: Leachable concentration for defining General Solid Waste when combined with SCC1
TCLP2: Leachable concentration for defining Restricted Solid Waste when combined with SCC2
*: Reported as Total Chromium

ATTACHMENT H

WASTE CLASSIFICATION OF TOPSOIL & FILL MATERIALS IN AREA 6

TABLE HH1
METALS TEST TESULTS
TOPSOIL & FILL MATERIALS IN AREA 6 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
Previous Investigations									
EBH33	0.5-0.6	9	0.7	18	26	120	<0.05	5.2	54
Recent Investigation									
C601	0-0.1	11	0.8	22	62	6800	0.13	11	260
C602	0-0.1	10	0.8	24	49	2200	0.13	12	240
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01/0.05	0.5	0.5

TABLE HH2
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 6 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD

(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	TPH (mg/kg)					BTEX (mg/kg)			
		C6-C9	C10-C14	C15-C28	C29-C40	C10-C40*	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
Recent Investigation										
O601	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
O602	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
Limits of Reporting (LOR)		20	20	45	145	NA	0.1	0.1	0.1	0.3

Notes a: C10-C40 = (C10-C14) + (C15-C28) + (C29-C40); concentrations less than LOR are assumed equal to LOR.
NA: Not Applicable

TABLE HH3
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) AND POLYCHLORINATED BIPHENYLS (PCB) TEST RESULTS TOPSOIL & FILL MATERIALS IN AREA 6 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Sample Location	Depth (m)	PAH (mg/kg) BENZO(a)PYRENE	PAH (mg/kg) TOTAL PAH	TOTAL PCB (mg/kg)
Previous Investigations				
EBH33	0.5-0.6	<0.05	<1.6	-
Recent Investigation				
C601	0-0.1	<0.1	<0.8	<1
C602	0-0.1	0.2	1.7	<1
Limits of Reporting (LOR)		0.1	NA	1

NA: Not Applicable

TABLE HH4

ORGANOCHLORINE PESTICIDES (OCP) TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 6 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	Organochlorine Pesticides (mg/kg)												Scheduled Chemical Waste* (mg/kg)	Total Endosulfan b (mg/kg)
		HCB	ALPHA, BETA, DELTA - BHC	GAMMA BHC (LINDANE)	HEPTACHLOR EPOXIDE	HEPTACHLOR	ALDRIN	DIELDRIN	ENDRIN	DDD	DDE	DDT	CHLORDANE (alpha & gamma)		
Recent Investigation															
C601	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C602	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
Limits of Reporting (LOR)		0.1	0.3	0.1	0.1	0.1	0.1	0.05	0.2	0.2	0.2	0.2	0.2	NA	NA

Notes a: Refer to Note 17 in Table 2 of the "Waste Classification Guidelines Part 1: Classifying Waste", NSW DECC 2008, for the list of chemicals regulated under the Scheduled Chemical Waste Chemical Order 1994.

b: Includes alpha, beta Endosulfan and Endosulfan Sulphate

NA: Not Applicable

TABLE HH5
TCLP TEST RESULT OF LEAD
TOPSOIL & FILL MATERIALS IN AREA 6 (LANDFILL DISPOSAL)

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	LEAD (mg/L)
Recent Investigation		
O601	0-0.1	19
O602	0-0.1	3.9
Limit of Reporting (LOR)		0.02

TABLE HH6

ASBESTOS TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 6 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Sample ID / Location	Depth (m)	ASBESTOS
Previous Investigations		
Soil sample		
EBH33	0.2-0.3	**Chrysotile Asbestos Detected**
EBH33	0.5-0.6	**Chrysotile Asbestos Detected**

TABLE HH7
CLASSIFICATION OF TOPSOIL & FILL MATERIALS IN AREA 6

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Asbestos	**Asbestos in Soil**	-	-	-	-	-	-	-	**Special Waste-Asbestos Waste**
Metals									
Arsenic	11	100	400	500	2000	ND	5	20	General Solid
Cadmium	0.8	20	80	100	400	ND	1	4	General Solid
Chromium (VI)	24 *	100	400	1900	7600	ND	5	20	General Solid
Lead	6800	100	400	1500	6000	19	5	20	General Solid **
Mercury	0.13	4	16	50	200	ND	0.2	0.8	General Solid
Nickel	12	40	160	1050	4200	ND	2	8	General Solid
Total Petroleum Hydrocarbons									
C6-C9	<20	NA	NA	650	2600	NA	NA	NA	General Solid
C10-C40	210	NA	NA	10000	40000	NA	NA	NA	General Solid
BTEX									
Benzene	<0.1	10	40	18	72	ND	0.5	2	General Solid
Toluene	<0.1	288	1152	518	2073	ND	14.4	57.6	General Solid
Ethyl Benzene	<0.1	600	2400	1080	4320	ND	30	120	General Solid
Xylene	<0.3	1000	4000	1800	7200	ND	50	200	General Solid
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	0.2	0.8	3.2	10	23	ND	0.04	0.16	General Solid
Total PAH	1.7	NA	NA	200	800	NA	NA	NA	General Solid
Organochlorine Pesticides									
Total Endosulfan [1]	<0.5	60	240	108	432	ND	3	12	General Solid
Polychlorinated Biphenyls (PCB)	<1	NA	NA	<50	<50	ND	NA	NA	General Solid
Scheduled Chemicals	<1.9[2]	NA	NA	<50	<50	NA	NA	NA	General Solid

NOTES:

ND: Not Determined
NA: Not Applicable
TCLP: Toxicity Characteristic Leaching Procedure
1: Includes alpha, beta Endosulfan and Endosulfan Sulphate
2: Includes only Aldrin, Alpha BHC, Beta BHC, gamma BHC (Lindane), delta BHC, Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Heptachlor, Heptachlor Epoxide & HCB
CT1: Contaminant concentration for defining General Solid Waste (without TCLP)
CT2: Contaminant concentration for defining Restricted Solid Waste (without TCLP)
SCC1: Contaminant concentration for defining General Solid Waste when combined with TCLP
SCC2: Contaminant concentration for defining Restricted Solid Waste when combined with TCLP
TCLP1: Leachable concentration for defining General Solid Waste when combined with SCC1
TCLP2: Leachable concentration for defining Restricted Solid Waste when combined with SCC2
*: Reported as Total Chromium
**: Waste contaminated with lead (including lead paint waste) from educational institute is pre-classified as General Solid Waste, as detailed in "Waste Classification Guidelines Part 1: Classifying Waste" - NSW EPA (November 2014)

ATTACHMENT I

WASTE CLASSIFICATION OF TOPSOIL & FILL MATERIALS IN AREA 8

TABLE II1
METALS TEST TESULTS
TOPSOIL & FILL MATERIALS IN AREA 8 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
Previous Investigations									
EBH41	0.2-0.3	8	0.6	14	31	96	<0.05	6.5	88
BH24	0-0.1	7	0.7	15	30	110	0.06	8.0	130
Recent Investigation									
C801	0-0.1	6	0.3	11	26	56	0.05	6.4	67
C802	0-0.1	7	0.3	12	28	51	0.06	6.0	58
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01/0.05	0.5	0.5

TABLE II2
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 8 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD

(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	TPH (mg/kg)					BTEX (mg/kg)			
		C6-C9	C10-C14	C15-C28	C29-C40	C10-C40 [a]	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
Previous Investigations										
BH24	0-0.1	<20	<20	190	<150	360	<0.1	<0.1	<0.1	<0.3
Recent Investigation										
C801	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	0.6
C802	0-0.1	<20	<20	<45	<145	210	<0.1	<0.1	<0.1	<0.3
Limits of Reporting (LOR)		20	20	50	150	NA	0.1	0.1	0.1	0.3

Notes a: C10-C40 = (C10-C14) + (C15-C28) + (C29-C40); concentrations less than LOR are assumed equal to LOR.
NA: Not Applicable

TABLE II3
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) AND POLYCHLORINATED BIPHENYLS (PCB) TEST RESULTS TOPSOIL & FILL MATERIALS IN AREA 8 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	PAH (mg/kg) BENZO(a)PYRENE	PAH (mg/kg) TOTAL PAH	TOTAL PCB (mg/kg)
Previous Investigations				
EBH41	0.2-0.3	1.5	<19	-
BH24	0-0.1	2.4	29	<1
Recent Investigation				
C801	0-0.1	0.3	3.2	<1
C802	0-0.1	0.3	4.0	<1
Limits of Reporting (LOR)		0.1	NA	1

NA: Not Applicable

TABLE II4

ORGANOCHLORINE PESTICIDES (OCP) TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 8 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	Organochlorine Pesticides (mg/kg)												Scheduled Chemical Waste[a] (mg/kg)	Total Endosulfan [b] (mg/kg)
		HCB	ALPHA, BETA, DELTA - BHC	GAMMA BHC (LINDANE)	HEPTACHLOR EPOXIDE	HEPTACHLOR	ALDRIN	DIELDRIN	ENDRIN	DDD	DDE	DDT	CHLORDANE (alpha & gamma)		
Previous Investigations															
BH24	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
Recent Investigation															
C801	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
C802	0-0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<1.9	<0.5
Limits of Reporting (LOR)		0.1	0.3	0.1	0.1	0.1	0.1	0.05	0.2	0.2	0.2	0.2	0.2	NA	NA

Notes a: Refer to Note 17 in Table 2 of the "Waste Classification Guidelines Part 1: Classifying Waste", NSW DECC 2008, for the list of chemicals regulated under the Scheduled Chemical Waste Chemical Order 1994.

b: Includes alpha, beta Endosulfan and Endosulfan Sulphate

NA: Not Applicable

TABLE II5
TCLP TEST RESULTS OF LEAD & BENZO(a)PYRENE
TOPSOIL & FILL MATERIALS IN AREA 8 (LANDFILL DISPOSAL)

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte / Sample Location	Depth (m)	LEAD (mg/L)	Benzo(a)Pyrene (mg/L)
Previous Investigations			
EBH41	0.2-0.3	0.02	<0.0005
BH24	0-0.1	-	<0.0001
LimitS of Reporting (LOR)		0.02	0.0001/0.0005

TABLE II6

ASBESTOS TEST RESULTS
TOPSOIL & FILL MATERIALS IN AREA 8 (LANDFILL DISPOSAL)
LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Sample ID / Location	Depth (m)	ASBESTOS
Previous Investigations		
Soil sample		
EBH41	0.2-0.3	No Asbestos Detected
EBH41	0.5-0.6	No Asbestos Detected
BH24	0-0.1	No Asbestos Found
Recent Investigation		
Soil sample		
C801	0-0.1	No Asbestos Found
C802	0-0.1	No Asbestos Found

TABLE II7
CLASSIFICATION OF TOPSOIL & FILL MATERIALS IN AREA 8

LOT 7 & PART LOT 8 IN DP1077852
CNR HAWKESBURY AND DARCY ROADS, WESTMEAD
(Ref No: 12619/2-L1)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Metals									
Arsenic	8	100	400	500	2000	ND	5	20	General Solid
Cadmium	0.7	20	80	100	400	ND	1	4	General Solid
Chromium (VI)	15 *	100	400	1900	7600	ND	5	20	General Solid
Lead	110	100	400	1500	6000	0.02	5	20	General Solid
Mercury	0.06	4	16	50	200	ND	0.2	0.8	General Solid
Nickel	8.0	40	160	1050	4200	ND	2	8	General Solid
Total Petroleum Hydrocarbons									
C6-C9	<20	NA	NA	650	2600	NA	NA	NA	General Solid
C10-C40	360	NA	NA	10000	40000	NA	NA	NA	General Solid
BTEX									
Benzene	<0.1	10	40	18	72	ND	0.5	2	General Solid
Toluene	<0.1	288	1152	518	2073	ND	14.4	57.6	General Solid
Ethyl Benzene	<0.1	600	2400	1080	4320	ND	30	120	General Solid
Xylene	0.6	1000	4000	1800	7200	ND	50	200	General Solid
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	2.4	0.8	3.2	10	23	<0.0005	0.04	0.16	General Solid
Total PAH	29	NA	NA	200	800	NA	NA	NA	General Solid
Organochlorine Pesticides									
Total Endosulfan [1]	<0.5	60	240	108	432	ND	3	12	General Solid
Polychlorinated Biphenyls (PCB)	<1	NA	NA	<50	<50	ND	NA	NA	General Solid
Scheduled Chemicals	<1.0[2]	NA	NA	<50	<50	NA	NA	NA	General Solid

NOTES:
- ND: Not Determined
- NA: Not Applicable
- TCLP: Toxicity Characteristic Leaching Procedure
- 1: Includes alpha, beta Endosulfan and Endosulfan Sulphate
- 2: Includes only Aldrin, Alpha BHC, Beta BHC, gamma BHC (Lindane), delta BHC, Chlordane, DDD, DDE, DDT, Deldrin, Endrin, Heptachlor, Heptachlor Epoxide & HCB
- CT1: Contaminant concentration for defining General Solid Waste (without TCLP)
- CT2: Contaminant concentration for defining Restricted Solid Waste (without TCLP)
- SCC1: Contaminant concentration for defining General Solid Waste when combined with TCLP
- SCC2: Contaminant concentration for defining Restricted Solid Waste when combined with TCLP
- TCLP1: Leachable concentration for defining General Solid Waste when combined with SCC1
- TCLP2: Leachable concentration for defining Restricted Solid Waste when combined with SCC2
- *: Reported as Total Chromium

GEOTECHNIQUE PTY LTD

TABLE A
SCHEDULE OF LABORATORY TESTING
(Ref No: 12619/2-AA)

Sample	Depth (m)	Type	Sampling Date	Duplicate	Split	Metals	TPH & BTEX	PAH	OCP	PCB	VOC	pH	CEC	ASBESTOS
Discrete Samples														
BH36	0-0.1	F	25/01/2016	DC3		✓	✓	✓	✓	✓	✓	✓	✓	✓
BH37	0-0.1	F	25/01/2016		SC3	✓	✓	✓	✓	✓	✓			✓
BH38	0-0.1	N	25/01/2016			✓	✓	✓	✓	✓	✓			✓
BH39	0-0.1	N	25/01/2016			✓	✓	✓	✓	✓	✓	✓	✓	✓
TP40	0-0.1	FCP	21/01/2016	DC1										✓
TP40	0-0.1	F	21/01/2016			✓	✓	✓	✓	✓		✓	✓	✓
TP40	0.5-0.8	F	21/01/2016			✓	✓	✓	✓	✓				✓
TP41	0-0.1	F	14/01/2016			✓	✓	✓	✓	✓		✓	✓	✓
TP42	0-0.1	F	21/01/2016		SC1	✓	✓	✓	✓	✓		✓	✓	✓
TP43	0-0.1	F	21/01/2016			✓	✓	✓	✓	✓		✓	✓	✓
TP43	0.5-0.8	F	21/01/2016			✓	✓	✓	✓	✓				✓
TP43	1.0-1.3	F	21/01/2016											✓
TP44	0-0.1	F	21/01/2016			✓	✓	✓	✓	✓		✓	✓	✓
TP44	0.5-0.8	F	21/01/2016			✓	✓	✓	✓	✓				✓
TP45	0-0.1	F	21/01/2016			✓	✓	✓	✓	✓				✓
TP45	0.5-0.8	F	21/01/2016			✓	✓	✓	✓	✓				✓
TP45	1.0-1.3	F	21/01/2016											✓
TP45	1.5-1.8	F	21/01/2016											✓
TP46	0-0.1	F	21/01/2016			✓	✓	✓	✓	✓				✓
TP47	0-0.1	F	22/01/2016			✓	✓	✓	✓	✓		✓	✓	✓
TP48	0-0.1	F	22/01/2016			✓	✓	✓	✓	✓				✓
TP49	0-0.1	F	22/01/2016			✓	✓	✓	✓	✓		✓	✓	✓
TP49	0.5-0.8	F	22/01/2016			✓	✓	✓	✓	✓				✓
TP50	0-0.1	F	22/01/2016			✓	✓	✓	✓	✓				✓

Notes

Metals: Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel & Zinc
TPH: Total Petroleum Hydrocarbons
BTEX: Benzene, Toluene, Ethyl Benzene, Xylenes
PAH: Polycyclic Aromatic Hydrocarbons
OCP: Organochlorine Pesticides
PCB: Polychlorinated Biphenyls
VOC: Volatile Organic Compounds
F, N: Fill, Natural Soil
FCP: Fibro-Cement Piece
CEC: Cation Exchange Capacity

TABLE B
RINSATE SAMPLES
(Ref No: 12619/2-AA)

ANALYTES	Rinsate RD1 14/01/2016	Rinsate RD2 21/01/2016	Rinsate RD3 22/01/2016	Rinsate RD4 25/01/2016
METALS	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Arsenic	<0.02	<0.02	<0.02	<0.02
Cadmium	<0.001	<0.001	<0.001	<0.001
Chromium	<0.005	<0.005	<0.005	<0.005
Copper	<0.005	<0.005	<0.005	<0.005
Lead	<0.02	<0.02	<0.02	<0.02
Mercury	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	<0.005	<0.005	<0.005	<0.005
Zinc	<0.01	<0.01	<0.01	<0.01

TABLE C
TRIP SPIKE SAMPLES
(Ref No: 12619/2-AA)

ANALYTES	Trip Spike TSD1	Trip Spike TSD2	Trip Spike TSD3
BTEX			
Benzene	81%	82%	87%
Toluene	78%	79%	86%
Ethyl Benzene	81%	90%	89%
Xylenes	79%	89%	87%

Note : results are reported as percentage recovery of know n spike concentrations

TABLE D1
DUPLICATE SAMPLE
(Ref No: 12619/2-AA)

ANALYTES	TP40 0-0.1m mg/kg	Duplicate DC1 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	4	5	22
Cadmium	0.3	0.3	0
Chromium	9.4	11	16
Copper	29	28	4
Lead	100	120	18
Mercury	0.09	0.07	25
Nickel	5.6	5.9	5
Zinc	130	120	8
TOTAL PETROLEUM HYDROCARBONS (TPH)			
F1 (C6-C10 less BTEX)	<25	<25	-
F2 (>C10-C16)	50	84	51
F3 (>C16-C34)	120	<90	-
F4 (>C34-C40)	<120	<120	-
BTEX			
Benzene	<0.1	<0.1	-
Toluene	<0.1	<0.1	-
Ethyl Benzene	<0.1	<0.1	-
Xylenes	<0.3	<0.3	-
POLYCYCLIC AROMATIC HYDROCARBONS			
Benzo(a)Pyrene TEQ	<0.3	0.9	-
Total PAH	<0.8	8.8	-
Naphthalene	<0.1	<0.1	
Benzo(a)Pyrene	<0.1	0.6	-
ORGANOCHLORINE PESTICIDES (OCP)			
Hexachlorobenzene (HCB)	<0.1	<0.1	-
Heptachlor	<0.1	<0.1	-
Aldrin+Dieldrin	<0.15	<0.15	-
Endrin	<0.2	<0.2	-
Methoxychlor	<0.1	<0.1	-
Mirex	<0.1	<0.1	-
Endosulfan (alpha, beta & sulphate)	<0.5	<0.5	-
DDD+DDE+DDT	<0.6	<0.6	-
Chlordane (alpha & gamma)	<0.2	<0.2	-
POLYCHLORINATED BIPHENYLS (PCB)			
Total PCB	<1	<1	-

TABLE D2
DUPLICATE SAMPLE
(Ref No: 12619/2-AA)

ANALYTES	BH36 0-0.1m mg/kg	Duplicate DC3 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	6	12	67
Cadmium	0.4	0.6	40
Chromium	15	18	18
Copper	26	49	61
Lead	66	200	101
Mercury	0.08	0.12	40
Nickel	5.3	7.7	37
Zinc	59	160	92
TOTAL PETROLEUM HYDROCARBONS (TPH)			
F1 (C6-C10 less BTEX)	<25	<25	-
F2 (>C10-C16)	<25	<25	-
F3 (>C16-C34)	<90	<90	-
F4 (>C34-C40)	<120	<120	-
BTEX			
Benzene	<0.1	<0.1	-
Toluene	<0.1	<0.1	-
Ethyl Benzene	<0.1	<0.1	-
Xylenes	<0.3	<0.3	-
POLYCYCLIC AROMATIC HYDROCARBONS			
Benzo(a)Pyrene TEQ	<0.3	<0.3	-
Total PAH	<0.8	<0.8	-
Naphthalene	<0.1	<0.1	
Benzo(a)Pyrene	<0.1	<0.1	-
ORGANOCHLORINE PESTICIDES (OCP)			
Hexachlorobenzene (HCB)	<0.1	<0.1	-
Heptachlor	<0.1	<0.1	-
Aldrin+Dieldrin	<0.15	<0.15	-
Endrin	<0.2	<0.2	-
Methoxychlor	<0.1	<0.1	-
Mirex	<0.1	<0.1	-
Endosulfan (alpha, beta & sulphate)	<0.5	<0.5	-
DDD+DDE+DDT	<0.6	<0.6	-
Chlordane (alpha & gamma)	<0.2	<0.2	-
POLYCHLORINATED BIPHENYLS (PCB)			
Total PCB	<1	<1	-

TABLE E1
SPLIT SAMPLE
(Ref No: 12619/2-AA)

ANALYTES	TP42 0-0.1m mg/kg (SGS)	Split Sample SC1 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	6	5	18
Cadmium	0.3	<0.4	-
Chromium	14	14	0
Copper	22	19	15
Lead	81	30	92
Mercury	0.02	<0.1	-
Nickel	5.2	4	26
Zinc	59	31	62
TOTAL PETROLEUM HYDROCARBONS (TPH)			
F1 (C6-C10 less BTEX)	<25	<25	-
F2 (>C10-C16)	<25	<50	-
F3 (>C16-C34)	<90	<100	-
F4 (>C34-C40)	<120	<100	-
BTEX			
Benzene	<0.1	<0.2	-
Toluene	<0.1	<0.5	-
Ethyl Benzene	<0.1	<1	-
Xylenes	<0.3	<3	-
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
Benzo(a)Pyrene TEQ	<0.3	<0.5	-
Total PAH	<0.8	<1.55	-
Naphthalene	<0.1	<0.1	-
Benzo(a)Pyrene	<0.1	<0.05	-
ORGANOCHLORINE PESTICIDES (OCP)			
Hexachlorobenzene (HCB)	<0.1	<0.1	-
Heptachlor	<0.1	<0.1	-
Aldrin+Dieldrin	<0.15	<0.2	-
Endrin	<0.2	<0.1	-
Methoxychlor	<0.1	<0.1	-
Mirex	<0.1	-	-
Endosulfan (alpha (I), beta (II) & sulphate)	<0.5	<0.3	-
DDD+DDE+DDT	<0.6	<0.3	-
Chlordane (alpha & gamma)	<0.2	<0.2	-
POLYCHLORINATED BIPHENYLS (PCB)			
Total PCB	<1	<0.7	-

TABLE E2
SPLIT SAMPLE
(Ref No: 12619/2-AA)

ANALYTES	BH37 0-0.1m mg/kg (SGS)	Split Sample SC3 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	9	8	12
Cadmium	0.5	0.5	0
Chromium	18	19	5
Copper	40	46	14
Lead	150	250	50
Mercury	0.09	0.2	76
Nickel	5.7	7	20
Zinc	98	130	28
TOTAL PETROLEUM HYDROCARBONS (TPH)			
F1 (C6-C10 less BTEX)	<25	<25	-
F2 (>C10-C16)	<25	<50	-
F3 (>C16-C34)	<90	<100	-
F4 (>C34-C40)	<120	<100	-
BTEX			
Benzene	<0.1	<0.2	-
Toluene	<0.1	<0.5	-
Ethyl Benzene	<0.1	<1	-
Xylenes	<0.3	<3	-
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
Benzo(a)Pyrene TEQ	<0.3	0.8	-
Total PAH	1.1	4.6	123
Naphthalene	<0.1	<0.1	-
Benzo(a)Pyrene	<0.1	0.57	-
ORGANOCHLORINE PESTICIDES (OCP)			
Hexachlorobenzene (HCB)	<0.1	<0.1	-
Heptachlor	<0.1	<0.1	-
Aldrin+Dieldrin	<0.15	<0.2	-
Endrin	<0.2	<0.1	-
Methoxychlor	<0.1	<0.1	-
Mirex	<0.1	-	-
Endosulfan (alpha (I), beta (II) & sulphate)	<0.5	<0.3	-
DDD+DDE+DDT	<0.6	<0.3	-
Chlordane (alpha & gamma)	<0.2	<0.2	-
POLYCHLORINATED BIPHENYLS (PCB)			
Total PCB	<1	<0.7	-

TABLE F1
METALS, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS
DISCRETE SAMPLES
(Ref No: 12619/2-AA)

		METALS (mg/kg)									
Sample Location	Depth (m)	ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	ZINC	CEC (cmol/kg)	pH
BH36	0-0.1	6	0.4	15	26	66	0.08	5.3	59	9.3	6.0
BH37	0-0.1	9	0.5	18	40	150	0.09	5.7	98	-	-
BH38	0-0.1	7	0.3	17	18	100	0.03	4.5	43	-	-
BH39	0-0.1	7	<0.3	13	26	21	0.01	1.7	23	7.3	5.2
TP40	0-0.1	4	0.3	9.4	29	100	0.09	5.6	130	22	7.3
TP40	0.5-0.8	7	0.5	24	30	110	0.06	13	96	-	-
TP42	0-0.1	6	0.3	14	22	81	0.02	5.2	59	18	9.0
TP43	0.5-0.8	<3	<0.3	4.7	8	10	0.01	7.0	39	-	-
TP44	0-0.1	<3	<0.3	2.9	12	20	0.01	3.1	11	11	7.8
TP44	0.5-0.8	3	<0.3	5.2	18	22	<0.01	2.6	24	-	-
TP45	0-0.1	6	0.3	11	18	57	0.07	8.3	60	-	-
TP45	0.5-0.8	6	<0.3	9.9	17	62	0.06	6.8	61	-	-
TP46	0-0.1	4	<0.3	4.8	11	14	0.02	2.4	15	-	-
TP47	0-0.1	5	<0.3	11	19	37	0.06	7.3	73	49	11
TP48	0-0.1	8	0.3	13	22	95	0.14	6.1	72	-	-
TP49	0-0.1	6	<0.3	11	14	70	0.06	4.4	89	34	8.5
TP49	0.5-0.8	6	0.3	12	22	83	0.04	4.6	170	-	-
TP50	0-0.1	9	1.1	19	31	210	0.12	6.8	240	-	-
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01	0.5	0.5	0.02	-
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)											
Health-based Investigation Levels (HIL)[a] A - Residential A		100	20	100[c]	6000	300	10[d]	400	7400		
Ecological Investigation Levels (EIL)[b]: Urban residential		100[e]	-	190[f]	120	1100[g]	-	85	270		
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)											
Provisional Phytotoxity-Based Investigation Levels (PIL)			3				1				

Notes:
a: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.
b: EIL of aged nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; old NSW suburb with low traffic volume; the lowest CEC>7.3 cmolc/kg and pH=5.2 were selected for derivation of EIL.
EIL of aged copper was calulatd as the lowest value based on the pH and the CEC of the sample analysed and background concentration.
c: Chromium (VI)
d: Methyl Mercury
e: Generic EIL for aged arsenic
f: Chromium (III), clay content was assumed =1%, a conservative assum
g: Generic EIL for aged lead

TABLE F2
METALS, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS
DISCRETE SAMPLES
(Ref No: 12619/2-AA)

		METALS (mg/kg)									
Sample Location	Depth (m)	ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	ZINC	CEC (cmol/kg)	pH
TP41	0-0.1	8	1.1	22	57	210	0.33	8.1	390	20	7.5
TP43	0-0.1	<3	0.3	12	47	12	<0.01	91	70	18	8.6
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.01	0.5	0.5	0.02	-
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)											
Health-based Investigation Levels (HIL)[a] A - Residential A		100	20	100[c]	6000	300	10[d]	400	7400		
Ecological Investigation Levels (EIL)[b] - Urban residential		100[e]	-	190[f]	220	1100[g]	-	250	720		
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)											
Provisional Phytotoxity-Based Investigation Levels (PIL)			3				1				

Notes:
a: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.
b: EIL of aged nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; old NSW suburb with low traffic volume; the lower CEC=18 cmolc/kg and pH=7.5 were selected for derivation of EIL.
EIL of aged copper was calulatd as the lowest value based on the pH and the CEC of the sample analysed and background concentration.
c: Chromium (VI)
d: Methyl Mercury
e: Generic EIL for aged arsenic
f: Chromium (III), clay content was assumed =1%, a conservative assum
g: Generic EIL for aged lead

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TABLE G
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
DISCRETE SAMPLES
(Ref No: 12619/2-AA)

												NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)																	
												Health Screening Levels (HSL) A Low density residential						Ecological Screening Levels for fine-grained soil Urban residential								Ecological Screening Levels for coarse-grained soil Urban residential							
			TPH (mg/kg)					BTEX (mg/kg)																							
Sample Location	Depth (m)	Soil type	F1*	F2*	F2**	F3	F4	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	F1	F2*	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	F1	F2**	F3	F4	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	F1	F2**	F3	F4	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
BH36	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH37	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH38	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH39	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP40	0-0.1	clay	<25	50	50	120	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP40	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP41	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP42	0-0.1	sand	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	45	110	0.5	160	55	40	-	-	-	-	-	-	-	-	180	120	300	2800	50	85	70	105
TP43	0-0.1	sand	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	45	110	0.5	160	55	40	-	-	-	-	-	-	-	-	180	120	300	2800	50	85	70	105
TP43	0.5-0.8	sand	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	45	110	0.5	160	55	40	-	-	-	-	-	-	-	-	180	120	300	2800	50	85	70	105
TP44	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP44	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP45	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP45	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP46	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP47	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP48	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP49	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP49	0.5-0.8	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
TP50	0-0.1	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	50	280	0.7	480	NL	110	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
Limits of Reporting (LOR)			25	-	25	90	120	0.1	0.1	0.1	0.3																						

Notes:
F1: C6-C10 less BTEX
F2*: >C10-C16 less Naphthalene
F2**: >C10-C16
F3: >C16-C34
F4: >C34-C40
NL: Not Limiting

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TABLE H
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) TEST RESULTS
DISCRETE SAMPLES
(Ref No: 12619/2-AA)

							NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)				
			PAH (mg/kg)				Health-based Investigation Levels (HIL) A[a] - Residential A		Health Screening Level (HSL) A - Low density residential	Generic Ecological Investigation Level (EIL) - Urban residential	Ecological Screening Level (ESL) - Urban residential
Sample Location	Depth (m)	Soil type	BaP TEQ	TOTAL PAHs	NAPHTHALENE	BENZO(a)PYRENE (BaP)	BaP TEQ	TOTAL PAHs	NAPHTHALENE	NAPHTHALENE	BENZO(a)PYRENE (BaP)
BH36	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
BH37	0-0.1	clay	<0.3	1.1	<0.1	<0.1	3	300	5	170	0.7
BH38	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
BH39	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP40	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP40	0.5-0.8	clay	<0.3	<0.8	<0.1	0.2	3	300	5	170	0.7
TP41	0-0.1	clay	0.8	5.5	<0.1	0.5	3	300	5	170	0.7
TP42	0-0.1	sand	<0.3	<0.8	<0.1	<0.1	3	300	3	170	0.7
TP43	0-0.1	sand	<0.3	<0.8	<0.1	<0.1	3	300	3	170	0.7
TP43	0.5-0.8	sand	<0.3	<0.8	<0.1	<0.1	3	300	3	170	0.7
TP44	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP44	0.5-0.8	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP45	0-0.1	clay	<0.3	1.5	<0.1	0.1	3	300	5	170	0.7
TP45	0.5-0.8	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP46	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP47	0-0.1	clay	0.5	3.7	<0.1	0.3	3	300	5	170	0.7
TP48	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP49	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP49	0.5-0.8	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
TP50	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
Limits of Reporting (LOR)			0.3	0.8	0.1	0.1					

Notes: a: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.

NL: Not Limiting

TABLE I
ORGANOCHLORINE PESTICIDES (OCP) & POLYCHLORINATED BIPHENYLS (PCB) TEST RESULTS
DISCRETE SAMPLES
(Ref No: 12619/2-AA)

Sample Location	Depth (m)	OCP (mg/kg)										PCB (mg/kg)
		HEXACHLOROBENZENE (HCB)	HEPTACHLOR	ALDRIN+DIELDRIN	ENDRIN	METHOXYCHLOR	MIREX	ENDOSULFAN (alpha, beta & sulphate)	DDD+DDE+DDT	DDT	CHLORDANE (alpha & gamma)	
BH36	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
BH37	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
BH38	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
BH39	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP40	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP40	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP41	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP42	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP43	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP43	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP44	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP44	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP45	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP45	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP46	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP47	0-0.1	<0.1	0.2	0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	0.3	<1
TP48	0-0.1	<0.1	0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	0.7	<1
TP49	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP49	0.5-0.8	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
TP50	0-0.1	<0.1	<0.1	<0.15	<0.2	<0.1	<0.1	<0.5	<0.6	<0.2	<0.2	<1
Limits of Reporting (LOR)		0.1	0.1	0.15	0.2	0.1	0.1	0.5	0.6	0.2	0.2	1
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)												
Health-based Investigation Levels (HIL)[a] - Residential A		10	6	6	10	300	10	270	240		50	1
Ecological Investigation Levels (EIL) - Urban residential										180[b]		

Notes: a: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.

b: Generic EIL for DDT

TABLE J
ASBESTOS TEST RESULTS
DISCRETE SAMPLES
(Ref No: 12619/2-AA)

Sample Location	Depth (m)	ASBESTOS
Soil Samples		
BH36	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
BH37	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
BH38	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
BH39	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP40	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP40	0.5-0.8	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP41	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP42	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP43	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP43	0.5-0.8	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP43	1.0-1.3	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP44	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP44	0.5-0.8	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP45	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP45	0.5-0.8	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP45	1.0-1.3	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP45	1.5-1.8	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP46	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP47	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP48	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP49	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP49	0.5-0.8	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
TP50	0-0.1	No bonded asbestos found at the limit of reporting of 0.01% w /w and no friable asbestos found at the limit of reporting of 0.001% w /w
Fibro-cement Piece		
TP40	0-0.1	**Bonded Chrysotile Asbestos Detected**

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TABLE A
RINSATE SAMPLES
(Ref No: 12619/3-AAR1)

ANALYTES	Rinsate RV1 22/02/2016	Rinsate RV2 29/02/2016	Rinsate RV3 1/03/2016	Rinsate RV4 7/03/2016	Rinsate RV5 17/03/2016
METALS	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Arsenic	<0.02	<0.02	<0.02	-	-
Cadmium	<0.001	<0.001	<0.001	-	-
Chromium	-	<0.005	<0.005	-	-
Copper	<0.005	<0.005	<0.005	-	-
Lead	<0.02	<0.02	<0.02	<0.02	<0.02
Mercury	<0.0001	<0.0001	<0.0001	-	-
Nickel	-	<0.005	<0.005	-	-
Zinc	<0.01	<0.01	<0.01	-	-
TOTAL PETROLEUM HYDROCARBONS (TPH)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
F1 (C6-C10 less BTEX)	-	<50	<50	-	-
F2 (>C10-C16)	-	<60	<60	-	-
F3 (>C16-C34)	-	<500	<500	-	-
F4 (>C34-C40)	-	<500	<500	-	-
BTEX	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Benzene	-	<0.5	<0.5	-	-
Toluene	-	<0.5	0.5	-	-
Ethyl Benzene	-	<0.5	<0.5	-	-
Xylenes	-	<1.5	<1.5	-	-
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Benzo(a)Pyrene TEQ	-	-	-	-	-
Total PAH	<1	<1	<1	<1	-
Naphthalene	<0.1	<0.1	<0.1	<0.1	-
Benzo(a)Pyrene	<0.1	<0.1	<0.1	<0.1	-

TABLE B
TRIP SPIKE SAMPLES
(Ref No: 12619/3-AAR1)

ANALYTES	Trip Spike TSV1	Trip Spike TSV2
BTEX		
Benzene	83%	89%
Toluene	86%	95%
Ethyl Benzene	89%	99%
Xylenes	89%	96%

Note : results are reported as percentage recovery of known spike concentrations

TABLE C1
DUPLICATE SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V207 0-0.3m mg/kg	Duplicate DV1 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	7	7	0
Cadmium	0.4	0.4	0
Copper	25	26	4
Lead	29	28	4
Mercury	0.02	0.02	0
Zinc	63	81	25
POLYCYCLIC AROMATIC HYDROCARBONS			
Benzo(a)Pyrene TEQ	<0.3	<0.3	-
Total PAH	<0.8	<0.8	-
Naphthalene	<0.1	<0.1	-
Benzo(a)Pyrene	<0.1	<0.1	-

TABLE C2
DUPLICATE SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V311 0-0.1m mg/kg	Duplicate DV2 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
Lead	84	80	5

TABLE C3
DUPLICATE SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V322 0-0.1m mg/kg	Duplicate DV3 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
Lead	63	66	5

TABLE C4
DUPLICATE SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	BH33 1.2-1.3m mg/kg	Duplicate DV4 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	7	6	15
Cadmium	<0.3	<0.3	-
Chromium	6.9	6.4	8
Copper	25	24	4
Lead	16	15	6
Mercury	0.01	<0.01	-
Nickel	11	7.6	37
Zinc	83	53	44
TOTAL PETROLEUM HYDROCARBONS (TPH)			
F1 (C6-C10 less BTEX)	<25	<25	-
F2 (>C10-C16)	<25	<25	-
F3 (>C16-C34)	<90	<90	-
F4 (>C34-C40)	<120	<120	-
BTEX			
Benzene	<0.1	<0.1	-
Toluene	<0.1	<0.1	-
Ethyl Benzene	<0.1	<0.1	-
Xylenes	<0.3	<0.3	-
POLYCYCLIC AROMATIC HYDROCARBONS			
Benzo(a)Pyrene TEQ	<0.3	<0.3	-
Total PAH	<0.8	<0.8	-
Naphthalene	<0.1	<0.1	
Benzo(a)Pyrene	<0.1	<0.1	-

TABLE C5
DUPLICATE SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V110 0-0.1m mg/kg	Duplicate DV5 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
Lead	35	26	30

TABLE C6
DUPLICATE SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V605 0-0.1m mg/kg	Duplicate DV6 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
Lead	260	280	7

TABLE C7
DUPLICATE SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V808 0-0.1m mg/kg	Duplicate DV7 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
POLYCYCLIC AROMATIC HYDROCARBONS			
Benzo(a)Pyrene TEQ	0.3	0.3	0
Total PAH	1.4	1.4	0
Naphthalene	<0.1	<0.1	-
Benzo(a)Pyrene	0.2	0.2	0

TABLE C8
DUPLICATE SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V606a 0-0.1m mg/kg	Duplicate DV8 mg/kg	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
Lead	60	39	42

TABLE D1
SPLIT SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V212 0-0.1m mg/kg (SGS)	Split Sample SV1 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	5	6	18
Cadmium	0.5	<0.4	-
Copper	28	24	15
Lead	28	21	29
Mercury	0.01	<0.1	-
Zinc	29	36	22
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
Benzo(a)Pyrene TEQ	<0.3	<0.5	-
Total PAH	<0.8	<1.6	-
Naphthalene	<0.1	<0.1	-
Benzo(a)Pyrene	<0.1	<0.05	-

TABLE D2
SPLIT SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V301 0-0.1m mg/kg (SGS)	Split Sample SV2 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
Lead	36	38	5

TABLE D3
SPLIT SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V314 0-0.1m mg/kg (SGS)	Split Sample SV3 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
Lead	67	66	2

TABLE D4
SPLIT SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	BH31 2.2-2.3m mg/kg (SGS)	Split Sample SV4 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
METALS			
Arsenic	9	11	20
Cadmium	0.4	0.4	0
Chromium	8.3	9	8
Copper	40	45	12
Lead	14	12	15
Mercury	<0.01	<0.1	-
Nickel	3.7	5	30
Zinc	38	37	3
TOTAL PETROLEUM HYDROCARBONS (TPH)			
F1 (C6-C10 less BTEX)	<25	<25	-
F2 (>C10-C16)	<25	<50	-
F3 (>C16-C34)	<90	<100	-
F4 (>C34-C40)	<120	<100	-
BTEX			
Benzene	<0.1	<0.2	-
Toluene	<0.1	<0.5	-
Ethyl Benzene	<0.1	<1	-
Xylenes	<0.3	<3	-
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
Benzo(a)Pyrene TEQ	<0.3	<0.5	-
Total PAH	<0.8	<1.6	-
Naphthalene	<0.1	<0.1	-
Benzo(a)Pyrene	<0.1	<0.05	-

TABLE D5
SPLIT SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V111 0-0.1m mg/kg (SGS)	Split Sample SV5 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
Lead	21	19	10

TABLE D6
SPLIT SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V606 0-0.1m mg/kg (SGS)	Split Sample SV6 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
Lead	310	190	48

TABLE D7
SPLIT SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V809 0-0.1m mg/kg (SGS)	Split Sample SV7 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
Benzo(a)Pyrene TEQ	1.0	<0.5	-
Total PAH	7.4	<1.6	-
Naphthalene	<0.1	<0.1	-
Benzo(a)Pyrene	0.7	<0.05	-

TABLE D8
SPLIT SAMPLE
(Ref No: 12619/3-AAR1)

ANALYTES	V610 0-0.1m mg/kg (SGS)	Split Sample SV8 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCES (RPD) %
Lead	94	70	29

TABLE E1
LEAD TEST RESULTS
DISCRETE VALIDATION SAMPLES
(Ref No: 12619/3-AAR1)

Sample Location	Depth (m)	LEAD (mg/kg)
Area 1		
V101	0-0.3	33
V102	0-0.3	22
V103	0-0.3	51
V104	0-0.3	23
V105	0-0.3	62
V106	0-0.3	24
V107	0-0.3	35
V108	0-0.3	34
V109	0-0.3	56
V110	0-0.1	35
V111	0-0.1	21
V112	0-0.1	48
V113	0-0.1	24
V114	0-0.1	31
V115	0-0.1	20
Limit of Reporting (LOR)		1
Procedure D [a] (Normal Distribution)		
Number of Samples		15
Mean		35
Standard Deviation		14
Coefficient of Variance		0.4
95% Upper Confidence Limit (UCL)		*41*
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)		
Health-based Investigation Level (HIL) A - Residential A [b]		300
Ecological Investigation Level (EIL) - Urban residential		1100 [c]

Notes: a: Contaminated Sites: "Sampling Design Guidelines", 1995, EPA
b: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.
C: Generic EIL for aged lead

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TABLE E2
METALS, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS
DISCRETE VALIDATION SAMPLES
(Ref No: 12619/3-AAR1)

Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	COPPER	LEAD	MERCURY	ZINC	CEC (cmol/kg)	pH
Areas 2 & 3									
V201	0-0.3	7	0.5	27	30	0.02	40	15	7.2
V202	0-0.3	6	0.4	25	27	0.03	39	-	-
V203	0-0.3	6	0.5	27	24	0.01	50	-	-
V204	0-0.3	8	0.6	32	26	0.02	55	-	-
V205	0-0.3	6	0.5	29	28	0.02	47	-	-
V206	0-0.3	7	0.6	30	27	0.02	48	-	-
V207	0-0.3	7	0.4	29	29	0.02	81	-	-
V208	0-0.3	7	0.5	29	33	<0.01	42	12	6.1
V209	0-0.1	6	0.5	29	32	0.02	40	12	6.3
V210	0-0.1	6	0.4	25	27	0.02	31	-	-
V211	0-0.1	6	0.5	28	32	0.03	38	-	-
V212	0-0.1	6	0.5	28	28	0.01	36	-	-
V213	0-0.1	7	0.6	64	52	0.02	64	-	-
V214	0-0.1	8	0.7	35	41	0.02	58	11	5.9
V215	0-0.1	9	0.7	38	37	0.03	69	-	-
VC1	0-0.1	8	0.7	49	120	0.02	150	-	-
VC2	0-0.1	6	0.4	29	59	0.07	56	-	-
V301	0-0.1	-	-	-	36	-	-	-	-
V302	0-0.1	-	-	-	49	-	-	-	-
V303	0-0.1	-	-	-	32	-	-	-	-
V304	0-0.1	-	-	-	40	-	-	-	-
V305	0-0.1	-	-	-	37	-	-	-	-
V306	0-0.1	-	-	-	58	-	-	-	-
V307	0-0.1	-	-	-	12	-	-	-	-
V308	0-0.1	-	-	-	50	-	-	-	-
V309	0-0.1	-	-	-	53	-	-	-	-
V310	0-0.1	-	-	-	72	-	-	-	-
V311	0-0.1	-	-	-	84	-	-	-	-
V312	0-0.1	-	-	-	120	-	-	-	-
V313	0-0.1	-	-	-	38	-	-	-	-
V314	0-0.1	-	-	-	67	-	-	-	-
V315	0-0.1	-	-	-	83	-	-	-	-
V316	0-0.1	-	-	-	81	-	-	-	-
V317	0-0.1	-	-	-	48	-	-	-	-
V318	0-0.1	-	-	-	57	-	-	-	-
V319	0-0.1	-	-	-	40	-	-	-	-
V320	0-0.1	-	-	-	88	-	-	-	-
V321	0-0.1	-	-	-	53	-	-	-	-
V322	0-0.1	-	-	-	66	-	-	-	-
V323	0-0.1	-	-	-	35	-	-	-	-
V324	0-0.1	-	-	-	74	-	-	-	-
V325	0-0.1	-	-	-	47	-	-	-	-
V326	0-0.1	-	-	-	45	-	-	-	-
V327	0-0.1	-	-	-	50	-	-	-	-
V328	0-0.1	-	-	-	53	-	-	-	-
V329	0-0.1	-	-	-	61	-	-	-	-
V330	0-0.1	-	-	-	120	-	-	-	-
Limits of Reporting (LOR)		1	0.3	0.5	1	0.01	2	0.02	-
Procedure D [a] (Normal Distribution)									
Number of Samples		17	17	17	47	17	17		
Mean [b]		7	0.5	32	51	0.023	56		
Standard Deviation		1	0.1	10	25	0.014	28		
Coefficient of Variance		0.1	0.2	0.3	0.5	0.592	0.5		
95% Upper Confidence Limit (UCL)		*7*	*0.6*	*37*	*57*	*0.03*	*67*		
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)									
Health-based Investigation Levels (HIL)[c] A - Residential A		100	20 [e]	6000	300	10 [f]	7400		
Ecological Investigation Levels (EIL)[d] Urban residential		100 [g]	-	200	1100 [h]	-	450		
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)									
Provisional Phytotoxicity-Based Investigation Levels (PIL)			3			1			

Notes:
a. Contaminated Sites: "Sampling Design Guidelines", 1995, EPA
b. any concentrations less than LOR are assumed equal to LOR
c. Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools
d. EIL of aged nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC, old NSW suburb with low traffic volume; the lowest CEC=11 cmolc/kg and pH=5.9 were selected for derivation of EIL.
EIL of aged copper was calculated as the lowest value based on the pH and the CEC of the sample analysed and background concentration
e. Chromium (VI)
f. Methyl Mercury
g. Generic EIL for aged arsenic
h. Generic EIL for aged lead

TABLE E3-1
LEAD TEST RESULTS
DISCRETE VALIDATION SAMPLES
(Ref No: 12619/3-AAR1)

Sample Location	Depth (m)	LEAD (mg/kg)
Area 6 - Stage 1		
V601	0-0.3	240
V602	0-0.3	290
V603	0-0.3	260
V604	0-0.3	330
V605	0-0.1	280
V606	0-0.1	310
Limit of Reporting (LOR)		1
Procedure D [a] (Normal Distribution)		
Number of Samples		6
Mean		285
Standard Deviation		33
Coefficient of Variance		0.1
95% Upper Confidence Limit (UCL)		***312***
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)		
Health-based Investigation Level (HIL) A - Residential A [b]		300
Ecological Investigation Level (EIL) - Urban residential		1100 [c]

Notes: a: Contaminated Sites: "Sampling Design Guidelines", 1995, EPA
b: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.
C: Generic EIL for aged lead

TABLE E3-2
LEAD TEST RESULTS
DISCRETE VALIDATION SAMPLES
(Ref No: 12619/3-AAR1)

Sample Location	Depth (m)	LEAD (mg/kg)
Area 6 - Stage 2		
V601	0-0.3	240
V602	0-0.3	290
V603	0-0.3	260
V604a	0-0.1	380
V605	0-0.1	280
V606a	0-0.1	60
V607	0-0.3	120
V608	0-0.3	110
V609	0-0.3	110
V610	0-0.1	94
Limit of Reporting (LOR)		1
Procedure D[a] (Normal Distribution)		
Number of Samples		10
Mean		194
Standard Deviation		108
Coefficient of Variance		0.6
95% Upper Confidence Limit (UCL)		*257*
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)		
Health-based Investigation Level (HIL) A - Residential A[b]		300
Ecological Investigation Level (EIL) - Urban residential		1100[c]

Notes: a: Contaminated Sites: "Sampling Design Guidelines", 1995, EPA
b: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.
C: Generic EIL for aged lead

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TABLE F
METALS, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS
DISCRETE SAMPLES
(Ref No: 12619/3-AAR1)

Sample Location	Depth (m)	METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	ZINC	CEC (cmol/kg)	pH
Shale Bedrock in the former UST area											
BH31	1.2-1.3	8	0.3	7.5	37	12	<0.01	4.5	33	-	-
BH31	2.2-2.3	11	0.4	9	45	14	<0.01	5	38	4.3	5.9
BH31	4.2-4.3	<3	<0.3	2.6	11	32	0.25	1.9	32	-	-
BH32	3.2-3.3	<3	<0.3	2.5	21	10	0.04	0.8	15	3.6	6.0
BH32	4.2-4.3	<3	<0.3	4.3	33	14	<0.01	3.1	36	-	-
BH33	1.2-1.3	7	<0.3	6.9	25	16	0.01	11	83	4.9	5.7
BH33	3.2-3.3	4	<0.3	5.5	44	19	0.01	10	100	-	-
BH34	2.2-2.3	5	<0.3	7.1	29	16	0.01	3.1	30	-	-
BH34	4.2-4.3	<3	<0.3	4.7	15	12	0.03	8.6	45	5.6	6.3
BH35	1.2-1.3	10	0.4	10	33	22	<0.01	7.1	54	-	-
BH35	4.2-4.3	<3	<0.3	3.6	25	12	0.01	5.1	46	5.7	6.1
Limits of Reporting (LOR)		1	0.3	0.5	0.5	1	0.01	0.5	2	0.02	-
Procedure D [a] (Normal Distribution)											
Number of Samples		11	11	11	11	11	11	11	11		
Mean [b]		5	0.3	5.8	29	16	0.04	5.5	47		
Standard Deviation		3	0.04	2.5	11	6	0.07	3.3	25		
Coefficient of Variance		0.6	0.1	0.4	0.4	0.4	2.0	0.6	0.5		
95% Upper Confidence Limit (UCL)		*7*	*0.3*	*7.2*	*35*	*20*		*7.3*	*60*		
Procedure G [a] (Lognormal Distribution)											
Arithmatic Average							0.03				
Variance							1.05				
Standard Deviation							0.04				
95% Upper Confidence Limit (UCL)							*0.08*				
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)											
Health-based Investigation Levels (HIL) [c] A - Residential A		100	20	100 [e]	6000	300	10 [f]	400	7400		
Ecological Investigation Levels (EIL) [d] Urban residential		100 [g]	-	400 [h]	85	1100 [i]	-	20	240		
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)											
Provisional Phytotoxity-Based Investigation Levels (PIL)			3				1				

Notes:
a: Contaminated Sites: "Sampling Design Guidelines", 1995, EPA
b: any concentrations less than LOR are assumed equal to LOR
c: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.
d: EIL of aged nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; old NSW suburb with low traffic volume; the lowest CEC=3.6 cmolc/kg and pH=5.7 were selected for derivation of EIL.
EIL of aged copper was calulatd as the lowest value based on the pH and the CEC of the sample analysed and background concentration.
e: Chromium (VI)
f: Methyl Mercury
g: Generic EIL for aged arsenic
h: Chromium (III), clay content was assumed =10%, a conservative assur
i: Generic EIL for aged lead

Capital Works and Facilities
Western Sydney University
AB.sf/09.06.2016

TABLE G1
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) TEST RESULTS
DISCRETE VALIDATION SAMPLES
(Ref No: 12619/3-AAR1)

							NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)				
			PAH (mg/kg)				Health-based Investigation Levels (HIL) A[a] Residential A		Health Screening Level (HSL) A - Low density residential	Generic Ecological Investigation Level (EIL) - Urban residential	Ecological Screening Level (ESL) - Urban residential
Sample Location	Depth (m)	Soil type	BaP TEQ	TOTAL PAHs	NAPHTHALENE	BENZO(a)PYRENE (BaP)	BaP TEQ	TOTAL PAHs	NAPHTHALENE	NAPHTHALENE	BENZO(a)PYRENE (BaP)
Area 2											
V201	0-0.3	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V202	0-0.3	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V203	0-0.3	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V204	0-0.3	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V205	0-0.3	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V206	0-0.3	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V207	0-0.3	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V208	0-0.3	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V209	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V210	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V211	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V212	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V213	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V214	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
V215	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
VC1	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
VC2	0-0.1	clay	0.4	2.3	<0.1	0.2	3	300	5	170	0.7
Limits of Reporting (LOR)			0.3	0.8	0.1	0.1					
Procedure D[a] (Normal Distribution)											
Number of Samples			17	17	17	17					
Mean[b]			0.3	0.9	0.1	0.1					
Standard Deviation			0.03	0.4	0.0	0.03					
Coefficient of Variance			0.09	0.5	0.0	0.3					
95% Upper Confidence Limit (UCL)			*0.3*	*1.1*	*0*	*0.1*					

Notes:
a. Contaminated Sites: "Sampling Design Guidelines", 1995, EPA
b. For statistical purposes, any concentrations less than LOR are assumed equal to LOR
a. Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.

TABLE G2
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) TEST RESULTS
DISCRETE VALIDATION SAMPLES
(Ref No: 12619/3-AAR1)

			PAH (mg/kg)				NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)				
							Health-based Investigation Levels (HIL) A[a] Residential A		Health Screening Level (HSL) A - Low density residential	Generic Ecological Investigation Level (EIL) - Urban residential	Ecological Screening Level (ESL) - Urban residential
Sample Location	Depth (m)	Soil type	BaP TEQ	TOTAL PAHs	NAPHTHALENE	BENZO(a)PYRENE (BaP)	BaP TEQ	TOTAL PAHs	NAPHTHALENE	NAPHTHALENE	BENZO(a)PYRENE (BaP)
Area 8											
VB01	0-0.2	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
VB02	0-0.2	clay	<0.3	1.1	<0.1	0.1	3	300	5	170	0.7
VB03	0-0.2	clay	<0.3	1.2	<0.1	0.1	3	300	5	170	0.7
VB04	0-0.2	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
VB05	0-0.2	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
VB06	0-0.2	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
VB07	0-0.2	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
VB08	0-0.1	clay	0.3	1.4	<0.1	0.2	3	300	5	170	0.7
VB09	0-0.1	clay	1.0	7.4	<0.1	0.7	3	300	5	170	0.7
VB10	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
VB11	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
VB12	0-0.1	clay	<0.3	<0.8	<0.1	<0.1	3	300	5	170	0.7
Limits of Reporting (LOR)			0.3	0.8	0.1	0.1					
Procedure D[b] (Normal Distribution)											
Number of Samples			12	12	12	12					
Mean[b]			0.36	1.5	0.1	0.2					
Standard Deviation			0.2	2.2	0.0	0.2					
Coefficient of Variance			0.65	1.5	0.0	1.3					
95% Upper Confidence Limit (UCL)			*0.5*		*0.1*						
Procedure G[b] (Lognormal Distribution)											
Arithmetic Average				1.3		0.1					
Variance				0.6		0.6					
Standard Deviation				1.3		0.1					
95% Upper Confidence Limit (UCL)				*2.1*		*0.2*					

Notes:
a. Contaminated Sites: "Sampling Design Guidelines", 1995, EPA
b. For statistical purposes, any concentrations less than LOR are assumed equal to LOR
c. Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.

TABLE H
POLYCYCLIC AROMATIC HYDROCARBONS (PAH) TEST RESULTS
DISCRETE SAMPLES
(Ref No: 12619/3-AAR1)

								NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)				
			PAH (mg/kg)					Health-based Investigation Levels (HIL) A[a] - Residential A		Health Screening Level (HSL) A - Low density residential	Generic Ecological Investigation Level (EIL) - Urban residential	Ecological Screening Level (ESL) - Urban residential
Sample Location	Depth (m)	Soil type	BaP TEQ	TOTAL PAHs	NAPHTHALENE	BENZO(a)PYRENE (BaP)		BaP TEQ	TOTAL PAHs	NAPHTHALENE	NAPHTHALENE	BENZO(a)PYRENE (BaP)
Shale Bedrock in the former UST area												
BH01	1.2-1.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
BH01	2.2-2.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
BH01	4.2-4.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
BH02	3.2-3.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
BH02	4.2-4.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
BH03	1.2-1.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
BH03	3.2-3.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
BH04	2.2-2.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
BH04	4.2-4.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
BH05	1.2-1.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
BH05	4.2-4.3	clay	<0.3	<0.8	<0.1	<0.1		3	300	NL	170	0.7
Limits of Reporting (LOR)			0.3	0.8	0.1	0.1						

Notes: a: Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry)), also includes childcare centres, preschools and primary schools.
NL: Not Limiting

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TABLE I
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
DISCRETE SAMPLES
(Ref No: 12619/3-AAR1)

																	NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)													
											Health Screening Levels (HSL) A Low density residential						Ecological Screening Levels for fine-grained soil Urban residential								Ecological Screening Levels for coarse-grained soil Urban residential							
			TPH (mg/kg)					BTEX (mg/kg)																							
Sample Location	Depth (m)	Soil type	F1	F2*	F2**	F3	F4	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	F1	F2*	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	F1	F2**	F3	F4	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	F1	F2**	F3	F4	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
Shale Bedrock in the former UST area																																	
BH31	1.2-1.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	90	NL	1	NL	NL	310	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH31	2.2-2.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	150	NL	2	NL	NL	NL	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH31	4.2-4.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	290	NL	3	NL	NL	NL	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH32	3.2-3.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	150	NL	2	NL	NL	NL	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH32	4.2-4.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	290	NL	3	NL	NL	NL	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH33	1.2-1.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	90	NL	1	NL	NL	310	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH33	3.2-3.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	150	NL	2	NL	NL	NL	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH34	2.2-2.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	150	NL	2	NL	NL	NL	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH34	4.2-4.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	290	NL	3	NL	NL	NL	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH35	1.2-1.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	90	NL	1	NL	NL	310	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
BH35	4.2-4.3	clay	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	290	NL	3	NL	NL	NL	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-
Limits of Reporting (LOR)			25	-	25	90	120	0.1	0.1	0.1	0.3																						

Notes:
F1: C6-C10 less BTEX
F2*: >C10-C16 less Naphthalene
F2**: >C10-C16
F3: >C16-C34
F4: >C34-C40
NL: Not Limiting

Appendix F Regulatory Search Results

NSW EPA

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Search results

Your search for:LGA: Parramatta City Council

Matched 77 notices relating to 13 sites.

Search Again

Refine Search

Suburb	Address	Site Name	Notices related to this site
CAMELLIA	6 Grand AVENUE	Akzo	8 current and 4 former
CAMELLIA	39 Grand AVENUE	Asciano Properties	8 current and 3 former
CAMELLIA	12 Grand AVENUE	Bitumen Manufacturer	2 current and 7 former
CAMELLIA	Durham STREET	Former Shell Clyde Refinery	1 current
CAMELLIA	14 Grand AVENUE	Hymix Concrete	1 current and 2 former
CAMELLIA	1 Grand AVENUE	James Hardie Factory (former, eastern portion)	1 former
CAMELLIA	41 Grand AVENUE	Sydney Water	3 former
CAMELLIA	37 Grand AVENUE	Veolia	7 current and 3 former
GRANVILLE	2B Factory STREET	Evans Deacon Ind	1 current and 2 former
ROSEHILL	2 Ritchie STREET	2 Ritchie Street, Rosehill	2 former
ROSEHILL	Devon STREET	James Hardie	4 current and 6 former
RYDALMERE	348 Victoria ROAD	Mitsubishi Electric	2 current and 5 former
RYDALMERE	1 Alan STREET	Rheem Australia	5 former

Page 1 of 1

8 April 2016

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Search results

Your search for:Suburb: WESTMEAD

Search Again
Refine Search

did not find any records in our database.

If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the planning process.

Search TIP

To search for a specific site, search by LGA (local government area) and carefully review all sites listed.

... more search tips

More information about particular sites may be available from:

- The POEO public register
- The appropriate planning authority: for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act.

See What's in the record and What's not in the record.

If you want to know whether a specific site has been the subject of notices issued by the EPA under the CLM Act, we suggest that you search by Local Government Area only and carefully review the sites that are listed.
This public record provides information about sites regulated by the EPA under the Contaminated Land Management Act 1997, including sites currently and previously regulated under the Environmentally Hazardous Chemicals Act 1985. Your inquiry using the above search criteria has not matched any record of current or former regulation. You should consider searching again using different criteria. The fact that a site does not appear on the record does not necessarily mean that it is not affected by contamination. The site may have been notified to the EPA but not yet assessed, or contamination may be present but the site is not yet being regulated by the EPA. Further information about particular sites may be available from the appropriate planning authority, for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act. In addition the EPA may be regulating contamination at the site through a licence under the Protection of the Environment Operations Act 1997. You may wish to search the POEO public register.POEO public register

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Search results

Your search for: General Search with the following criteria

Suburb - WESTMEAD

returned 5 results

Export to excel 1 of 1 Pages Search Again

Number	Name	Location	Type	Status	Issued date
6589	SYDNEY WEST AREA HEALTH SERVICE	CNR HAWKESBURY AND DARCY ROAD, WESTMEAD, NSW 2145	POEO licence	No longer in force	30 Mar 2000
1047278	SYDNEY WEST AREA HEALTH SERVICE	CNR HAWKESBURY AND DARCY ROAD, WESTMEAD, NSW 2145	s.58 Licence Variation	Issued	03 May 2005
6867	THE SYDNEY CHILDREN'S HOSPITALS NETWORK (RANDWICK AND WESTMEAD) (INCORPORATING THE ROYAL ALEXANDRA HOSPITAL FOR CHILDREN)	CNR HAWKESBURY ROAD & HAINSWORTH STREET, WESTMEAD, NSW 2145	POEO licence	No longer in force	01 May 2000
1019090	THE SYDNEY CHILDREN'S HOSPITALS NETWORK (RANDWICK AND WESTMEAD) (INCORPORATING THE ROYAL ALEXANDRA HOSPITAL FOR CHILDREN)	CNR HAWKESBURY ROAD & HAINSWORTH STREET, WESTMEAD, NSW 2145	s.58 Licence Variation	Issued	31 Jul 2002
1048157	THE SYDNEY CHILDREN'S HOSPITALS NETWORK (RANDWICK AND WESTMEAD) (INCORPORATING THE ROYAL ALEXANDRA HOSPITAL FOR CHILDREN)	CNR HAWKESBURY ROAD & HAINSWORTH STREET, WESTMEAD, NSW 2145	s.58 Licence Variation	Issued	26 May 2005

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08 April 2016

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List of NSW contaminated sites notified to EPA

Background

A strategy to systematically assess, prioritise and respond to notifications under Section 60 of the Contaminated Land Management Act 1997 (CLM Act) has been developed by the EPA. This strategy acknowledges the EPA's obligations to make information available to the public under Government Information (Public Access) Act 2009.

When a site is notified to the EPA, it may be accompanied by detailed site reports where the owner has been proactive in addressing the contamination and its source. However, often there is minimal information on the nature or extent of the contamination.

For some notifications, the information indicates the contamination is securely immobilised within the site, such as under a building or carpark, and is not currently causing any offsite consequences to the community or environment. Such sites would still need to be cleaned up, but this could be done in conjunction with any subsequent building or redevelopment of the land. These sites may not require intervention under the CLM Act, but could be dealt with through the planning and development consent process.

Where indications are that the nominated site is causing actual harm to the environment or an unacceptable offsite impact (i.e. it is a 'significantly contaminated site'), the EPA would apply the regulatory provisions of the CLM Act to have the responsible polluter and/or landowner investigate and remediate the site.

As such, the sites notified to the EPA and presented in the following table are at various stages of the assessment and/or remediation process. Understanding the nature of the underlying contamination, its implications and implementing a remediation program where required, can take a considerable period of time. The tables provide an indication, in relation to each nominated site, as to the management status of that particular site. Further detailed information may be available from the EPA or the responsible landowner.

The following questions and answers may assist those interested in this issue:

Frequently asked questions

What is the difference between the 'List of NSW contaminated sites notified to EPA' and the 'Contaminated Land: Record of Notices'?

A site will be on the Contaminated Land: Record of Notices only if the EPA has issued a regulatory notice in relation to the site under the Contaminated Land Management Act 1997.

The sites appearing on this 'List of NSW contaminated sites notified to the EPA' indicate that the notifiers consider that the sites are contaminated and warrant reporting to EPA. However, the contamination may or may not be significant enough to warrant regulation by the EPA. The EPA needs to review and, if necessary, obtain more information before it can make a determination as to whether the site warrants regulation.

Why does my site appear on the list?

Your site appears on the list for one or more of the following reasons:

- The site owner and/or the person partly or fully responsible for causing the contamination notified the EPA about the contamination under Section 60 of the Contaminated Land Management Act 1997. In other words, the site owner or the 'polluter' believes the site is contaminated.
- The EPA has been notified via other means and is satisfied that the site is or was contaminated.

Does the list contain all contaminated sites in NSW?

No. The list only contains contaminated sites that EPA is aware of, with regard to its regulatory role under the CLM Act. An absence of a site from the list does not necessarily imply the site is not contaminated.

The EPA relies upon responsible parties to notify contaminated sites.

How are notified contaminated sites managed by the EPA?

There are different ways that the EPA manages these notified contaminated sites. First, an initial assessment is carried out by the EPA. At the completion of the initial assessment, the EPA may take one or more than one of the following management approaches:

- The contamination warrants the EPA's direct regulatory intervention either under the Contaminated Land Management Act 1997 or the Protection of the Environment Operations Act 1997 (POEO Act), or both. Information about current or past regulatory action on this site can be found on the EPA website.
- The contamination with respect to the current use or approved use of the site, as defined under the Contaminated Land Management Act 1997, is not significant enough that it warrants EPA regulation.
- The contamination does not require EPA regulation and can be managed by a planning approval process.
- The contamination is related to an operational underground petroleum storage system, such as a service station or fuel depot. The contamination may be managed under the POEO Act and the Protection of the Environment Operation (Underground Petroleum Storage Systems) Regulation 2014.

Note: There are specific instances where contamination is managed under a specifically tailored program operated by another agency. For example the NSW Resouces & Energy's Derelict mines program and the NSW DPI Cattle tick dip site locator.

The Legacy contamination management procedures for these sites will be detailed in a Memorandum of Understanding between the NSW EPA, NSW Resources and Energy and Dept. Primary Industries (Crown Lands and Biosecurity) (Note: the MoU is currently in draft).

I am the owner of a site that appears on the list. What should I do?

First of all, you should ensure the current use of the site is compatible with the site contamination. Secondly, if the site is the subject of EPA regulation, make sure you comply with the regulatory requirements, and you have considered your obligations to notify other parties who may be affected.

If you have any concerns, contact us and we may be able to offer you general advice, or direct you to accredited professionals who can assist with specific issues.

I am a prospective buyer of a site that appears on the list. What should I do?

You should seek advice from the vendor to put the contamination issue into perspective. You may need to seek independent expert advice.

The information provided in the list, particularly the EPA site management class, is meant to be indicative only, and a starting point for your own assessment. Site contamination as a legacy of past site uses is not uncommon, particularly in an urban environment. If the contamination on a site is properly remediated or managed, it may not materially impact upon the intended future use of the site. However, each site needs to be considered in context.

List of NSW contaminated sites notified to the EPA

Disclaimer

The EPA has taken all reasonable care to ensure that the information in the list of contaminated sites notified to the EPA (the list) is complete and correct. The EPA does not, however, warrant or represent that the list is free from errors or omissions or that it is exhaustive.

The EPA may, without notice, change any or all of the information in the list at any time.

You should obtain independent advice before you make any decision based on the information in the list.

The list is made available on the understanding that the EPA, its servants and agents, to the extent permitted by law, accept no responsibility for any damage, cost, loss or expense incurred by you as a result of:

1. any information in the list
2. any error, omission or misrepresentation in the list
3. any malfunction or failure to function of the list
4. without limiting (2) or (3) above, any delay, failure or error in recording, displaying or updating information.

The following information, is also available in this printable document: List of NSW Contaminated Sites Notified to the EPA as of 1 March 2016 (PDF 889KB).

EPA site management class	Explanation
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.
Regulation under CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record.

List current as of 1 March 2016.

			EPA site

WENTWORTH POINT	TNT Express 23 Bennelong Parkway PARK	Other Petroleum	Under assessment
WENTWORTH POINT	RMS Eastern Precinct 3-7 Burroway ROAD	Other Petroleum	Regulation under CLM Act not required
WENTWORTHVILLE	Former Workshop 2 Rawson Rd and 8 Barfil CRESCENT	Unclassified	Regulation under CLM Act not required
WERRINGTON	Caltex Service Station Cnr Dunheved Rd and Henry Lawson DRIVE	Service Station	Under assessment
WERRINGTON	Claremont Meadows Former landfill Gipps STREET	Landfill	Regulation under CLM Act not required
WERRINGTON	7-Eleven Werrington Lot 122 Dunheved ROAD	Service Station	Under assessment
WEST BALLINA	Caltex Big Prawn Service Station Pacific HIGHWAY	Service Station	Contamination formerly regulated under the CLM Act
WEST GOSFORD	Caltex Service Station 283 Manns ROAD	Service Station	Under assessment
WEST GOSFORD	Caltex Service Station 30a Pacific HIGHWAY	Service Station	Under assessment
WEST GOSFORD	Caltex Service Station 69-71 Pacific HIGHWAY	Service Station	Under assessment
WEST NOWRA	Integral Energy Nowra Field Service Centre 20 Depot ROAD	Other Industry	Under assessment
WEST PENNANT HILLS	7-Eleven (former Mobil) Service Station 552 Pennant Hills ROAD	Service Station	Under assessment
WEST RYDE	Pfizer Australia Pty Ltd 38-42 Wharf ROAD	Chemical Industry	Under assessment
WEST RYDE	Reckitt Benckiser 44 Wharf ROAD	Chemical Industry	Regulation being finalised
WEST RYDE	7-Eleven (former Mobil) Service Station 917 Victoria ROAD	Service Station	Under assessment
WEST TAMWORTH	Woolworths Petrol 119 Bridge STREET	Service Station	Under assessment
West Wollongong	Woolworths Service Station 425 Crown STREET	Service Station	Contamination currently regulated under CLM Act
WEST WYALONG	Caltex Service Station (Wyalong By-pass Rd) Lot 1-3 Showground ROAD	Service Station	Under assessment
WEST WYALONG	Caltex Service Station Mid Western Hwy Cnr Emu STREET	Service Station	Under assessment
WEST WYALONG	Former Mobil Depot Railway STREET	Other Petroleum	Under assessment
WEST WYALONG	West Wyalong Depot (Reliance Petroleum) Town Bypass ROAD	Other Petroleum	Under assessment
WESTON	Illegal Dumping Site Corner Kline Street & First STREET	Unclassified	Regulation under CLM Act not required
WETHERILL PARK	Former Fuel Storage Depot 200-212 Cowpasture ROAD	Other Petroleum	Regulation under CLM Act not required
WETHERILL PARK	Sims Wetherill Park 35-37 Frank STREET	Metal Industry	Regulation under CLM Act not required
WETHERILL PARK	BOC Sydney Operations Centre 428-440 Victoria STREET	Other Industry	Regulation under CLM Act not required

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