



Site Audit Report

0503-1301

Eastern Creek Business Hub
Rooty Hill Road South, Rooty Hill, NSW

4 August 2015
50877-101274 (Rev 0)
JBS&G

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. 0503-1301

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 **Rooty Hill Road South (Western Sydney Parklands)**

ROOTY HILL

NSW

Postcode **2766**

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

- Part Lot 1 DP1103025
- Lot 100 DP882326
- Lots 2 & 3 Section A DP8681
- Lots 3 to Lot 5 Section B DP8681
- Lot 1 DP135665
- Lots 1 & 13 Section B DP8681
- Lots 1 to 10 DP830836
- Lots 2 & 3 DP1041487 * Lots A DP358346
- Lots 1, Lots 3 & 8 DP31130
- Lots 11, 12 and 50 DP1041487
- Part of Public Crown Subdivision Land
- Part of Public Crown Subdivision Road
- Part of Public Crown Reserved Road Easement for Gas Pipeline (Vide Q916928)
- Part of Road being the residue of Land in Certificate of Title Volume 147 Folio 41
- Part of Road being the residue of Land in Certificate of Title Volume 826 Folio 243

Local Government Area **Blacktown City Council**

Area of Site (eg. hectares) **34 hectares**

Current zoning

SEPP (WSP) 2009: UL-Western Parklands

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 **George Henien** Company **Hansen Yuncken Pty Ltd (on behalf of Western Sydney Parklands Trust)**

Address **PO Box 409, Mascot NSW 2020**

Postcode **2010**

Phone **0419 535 103**

Fax **02 9770 7601**

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])~~

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])

- Commercial / industrial including bulk goods; storage and retail use;
- Part of the site to be used for an activity / playground for children;
- Health care services or aged care facilities;
- Detention basins and revegetation; and
- Roadways, utility easements, stormwater drainage and retention.

Information sources for site audit

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

Douglas Partners Pty Ltd

CDM Smith Australia Pty Ltd

Consara Pty Ltd

Coffey Environments Australia Pty Ltd

Title(s) of report(s) reviewed

- *Report on Phase 1 Contamination Assessment, Proposed Redevelopment of Parcel 2.4, Western Sydney Parklands, Rooty Hill Road South, Doonside, Douglas Partners, November 2009 (DP 2009).*
- *Sampling, Analytical and Quality Plan, Eastern Creek Business Hub, Rooty Hill Road South, Rooty Hill NSW, CDM Smith, August 2012 (CDM 2012).*
- *Eastern Creek Business Hub Phase 2 Environmental Site Assessment, Rooty Hill*

Road South, Rooty Hill NSW, CDM Smith, February 2013, (CDM 2013).

- *Concept Remediation Action Plan Eastern Creek Business Hub*, Consara Pty Ltd, April 2013, (Consara 2013a).
- *Remediation Action Plan Phase 1 Early Works for Eastern Creek Business Hub*, Consara Pty Ltd, 25 June 2013, (Consara 2013b).
- *Phase 1 Early Works Remediation Action Plan – Eastern Creek Business Hub*, Coffey Environments Australia Pty Ltd, 28 July 2015 (Coffey 2015).

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

- *Site Audit Report, Eastern Creek Business Hub Rooty Hill Road South Rooty Hill*, JBS42270-53571, JBS Environmental Pty Ltd, April 2013 (JBS 2013a); and
- Site Audit Statement #0503-1112, Andrew Lau of JBS Environmental Pty Ltd, 12 April 2013.
- *Site Audit Report, Eastern Creek Business Hub Rooty Hill Road South Rooty Hill*, JBS42270-54924, JBS&G, July 2013 (JBS 2013b).
- Site Audit Statement #0503-1301, Andrew Lau of JBS&G, 12 July 2013.

Site audit report

Title **Site Audit Report, Eastern Creek Business Hub Rooty Hill Road South Rooty Hill NSW**

Report no. **50877-101274 (Rev 0)**

Date **4th August 2014**

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 plan¹ 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) – part of the site to be used for an activity / playground for children; health care services or aged care facilities; detention basins and revegetation; roadways, utility easement, stormwater drainage and retention; and revegetation and landscaping along the roadways.....

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

Phase 1 Early Works Remediation Action Plan - Eastern Creek Business Hub, Coffey Environments Australia Pty Ltd, 28 July 2015, (Coffey 2015).

subject to compliance with the following condition(s):

1. The Asbestos Management Plan for the site must be reviewed and accepted by a Site Auditor prior to commencement of remediation works.
2. Appropriate supervision by the Remediation Consultant during the excavation of the surface fill materials within the proposed detention basin in Superlot 4.
3. The validation report for the site must be reviewed and accepted by a Site Auditor prior to occupation of the site.
4. Where required, any Long Term Environmental Management Plans for each stage of the site plan must be reviewed and accepted by a Site Auditor prior to occupation.

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

Overall comments

- The site assessment activities and proposed remediation and validation activities are considered to have met the requirements of the *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (2nd Edition) (DEC 2006).
- The site assessment activities identified historically imported fill and waste materials within various areas of the site which contained reworked silty clay, demolition wastes, and fragments of asbestos containing materials.
- The levels of some contaminants of potential concern (i.e., asbestos) in fill/waste soils which are considered to require under the proposed uses.
- There were no levels of the identified contaminants of potential concern in groundwater which are considered not to require remediation or management under the proposed uses.
- There was no evidence of potential or actual migration of contaminants from the site which may result in unacceptable risks to surrounding human or ecological receptors.
- The revised Phase 1 Early Works RAP (Coffey 2015) prepared for the site addressed the identified contamination issues; with the remediation approach documented in the RAP checked by the auditor and found to be: technically feasible; environmentally justifiable given the nature and extent of the identified contamination; and consistent with relevant laws, policies and guidelines.
- The auditor notes that the remediation and validation procedures outlined in the revised Phase 1 Early Works RAP (Coffey 2015) are considered appropriate to render the site suitable for the proposed uses.
- The suitability of the site, is subject to the implementation of the revised Phase 1 Early Works RAP prepared for the site (Coffey 2015), in accordance with the requirements of the development conditions as imposed by the Minister for Planning (# SSD5175). As part of the development consent conditions, a copy of the SAS will also be submitted to Blacktown City Council and the Certifying Authority.

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
4th August 2015

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

0503-1301

Eastern Creek Business Hub
Rooty Hill Road South, Rooty Hill, NSW

4 August 2015
50877-101274 (Rev 0)
JBS&G

Table of Contents

List of Abbreviations	vi
1. Introduction	1
1.1 Introduction and Background	1
1.2 Objectives of Audit	2
1.3 Type of Audit	2
1.4 Documents Reviewed	2
1.5 Site Inspections	3
1.6 Chronology of Site Assessment and Audit Works	3
2. Site Description	4
2.1 Site Identification	4
2.2 Site Condition	4
2.3 Topography	5
2.4 Geology	5
2.5 Hydrology	6
2.6 Hydrogeology	7
2.7 Surrounding Environment	7
2.8 Audit Findings	7
3. Site History	9
3.1 Site History Information Sources	9
3.2 Regulatory Searches	9
3.3 Aerial Photographs	9
3.4 Historical Title Search	10
3.5 Previous Reports	13
3.6 Audit Findings	14
4. Potential Contamination Issues	15
4.1 Source of Contamination	15
4.2 Potentially Affected Media	15
4.3 Audit Findings	15
5. Sampling Analytical and Quality Program	16
5.1 Sampling / Analytical Regime	16
5.2 Sampling Methodology	17

5.2.1	Soil Investigation.....	17
5.2.2	Groundwater Investigation.....	18
5.3	Laboratory Methods.....	19
5.4	Quality Assurance / Quality Control.....	21
5.5	Audit Findings.....	24
6.	Assessment Criteria	28
6.1	Soil Criteria	28
6.2	Groundwater Criteria	29
6.3	Audit Findings.....	30
7.	Site Investigation Results.....	32
7.1	Field Observations.....	32
7.2	Soil Investigation Results.....	33
7.2.1	Metals	33
7.2.2	TPH/BTEX	37
7.2.3	VOCs.....	37
7.2.4	OCPs/OPPs	37
7.2.5	SVOCs and PAHs.....	38
7.2.6	Asbestos.....	38
7.3	Groundwater Investigation Results.....	38
7.3.1	Metals	38
7.3.2	TPH/BTEX	39
7.3.3	VOCs and SVOCs.....	39
7.4	Consultants Interpretation and Conclusions.....	39
7.4.1	Soil.....	39
7.4.2	Groundwater.....	41
7.5	Audit Findings.....	41
8.	Phase 1 Early Works Remediation and Validation	44
8.1	Remediation Objective.....	44
8.2	Remediation Options	44
8.3	Preferred Remedial Approach.....	44
8.4	Remediation Extent.....	45
8.5	Remediation Activities	45

8.5.1	Work Plans and Licenses	45
8.5.2	Site Establishment and Ground Preparation	46
8.5.3	Preparation of Asbestos Containment Zone.....	46
8.5.4	Excavation Works.....	46
8.5.5	Management of Existing Stockpiles	47
8.5.6	Placement of Materials within the Containment Area	47
8.5.7	Remediation Works Contingency Plan.....	48
8.6	Remediation Works Environmental Management Plan.....	48
8.6.1	Asbestos Management	49
8.6.2	Air Monitoring.....	49
8.6.3	Dust Emissions	49
8.6.4	Stormwater and Sediment Control.....	50
8.6.5	Water Management.....	50
8.6.6	Noise Controls.....	50
8.6.7	Materials Tracking.....	50
8.6.8	Waste Disposal.....	51
8.7	Occupational Health and Safety Plan	51
8.8	Validation Plan	51
8.8.1	Validation Sampling, Analytical and Quality Plan	52
8.8.1.1	Validation Approach	52
8.8.1.2	Sampling Methodology.....	53
8.8.1.3	Quality Assurance and Quality Control (QA/QC)	53
8.8.2	Validation Acceptance Criteria	54
8.8.3	Validation of Cover Layer in Containment Zone	54
8.8.4	Validation Report	55
8.9	Consultants Conclusions.....	55
8.10	Audit Findings.....	56
9.	Evaluation of Landuse Suitability.....	57
9.1	Reporting in accordance with EPA requirements	57
9.2	Aesthetic have been addressed	57
9.3	Soils have been assessed against the appropriate investigation levels	57
9.4	Background soil concentrations have been adequately addressed.....	57

9.5	All impacts of chemical mixtures have been assessed.....	58
9.6	Site Management Strategy is Appropriate.....	58
9.7	Contaminant migration (actual or potential) has been addressed.....	58
10.	Site Audit Summary	59
11.	Limitations	60

Tables

Table 1.1: Summary of Audit Inspections	3
Table 1.2: Summary of Assessment, Remediation and Audit Works Undertaken at the Site	3
Table 2.1: Summary Site Details	4
Table 3.1 Lots 11 and 12 in DP 882325 (Superlot 1)	10
Table 3.2 Lot 3 Section A in DP 8681 and Lots 9 and 10 in DP830836 (Superlot 1, Superlot 2) ...	10
Table 3.3 Lot 2 Section A in DP8681 and Lot 7 & 8 in DP830836 (Superlot 2, Area A, Area X)	10
Table 3.4 Lot A in DP 358346 (Superlot 2, Area A, Area X)	11
Table 3.5 Lots 3 and 4 in DP 830836 (Area X)	11
Table 3.6 Lots 1 and 2 in DP 830836 (Area X)	11
Table 3.7 Lot 2 in DP1041487 (Area X)	11
Table 3.8 Lot 1 in DP 1103025 (Area Y).....	12
Table 5.1 Summary of Sampling / Analytical Schedule (DP 2009 and CDM 2013)	16
Table 5.2 Laboratory Methods Used in ECBH Investigations.....	20
Table 5.3 Investigation QA/QC summary (DP 2009)	21
Table 5.4 Investigation QA/QC summary (CDM 2013)	22
Table 6.1 Soil Criteria (mg/kg).....	28
Table 6.2 Groundwater Criteria	29

Appendices

Appendix A: - Guidelines made or approved by the EPA

Appendix B: - Audit Correspondence

Appendix C: - Site Plan

Appendix D - Consultant's Figures

Appendix E - Regulatory Search Results

Appendix F - Consultant's Summary Results Table

Appendix G – Remediation Action Plan

List of 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
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
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 on the 22 July 2015 by Western Sydney Parklands Trust c/o Hansen Yuncken Pty Ltd to conduct a site audit of the land proposed to be developed (legally described in **Table 2.1**) into the Eastern Creek Business Hub (ECBH), located at Rooty Hill Road South, Rooty Hill, NSW.

Andrew Lau is a Site Auditor accredited by the NSW Environment Protection Authority (EPA) under the *Contaminated Land Management Act 1997* (CLMA 1997) (Accreditation Number 0503). The audit was completed with the assistance of Kellie Guenther and Rita Sirianni, JBS&G's senior consultants trained and experienced in contaminated land assessment and auditing. The audit reference number is 0503-1301.

The Western Sydney Parklands Trust intends on redeveloping the ECBH for a variety of mixed uses which are proposed to include commercial retail space; and/or aged care facility; children playground; and the maintenance and revegetation of large areas of the site as Cumberland Plain Woodland. The ECBH has an area of approximately 34 hectares and the proposed redevelopment will occur in a phased approach over a period of up to 20 years.

A concept remediation action plan (RAP) was prepared for the site in 2013 (Consara 2013a) to broadly address the previously identified asbestos contamination issues and fulfil development requirements, as part of the staged development application for the site. The concept RAP (Consara 2013a) was reviewed by the auditor, with a Site Audit Statement (SAS) and Site Audit Report (SAR) previously issued by Mr Andrew Lau on the 12 April 2013 (Audit # 0503-1112).

In June 2013 and following initial discussions with Western Sydney Parklands Trust, a Phase 1 Early Works RAP was prepared for the site (Consara 2013b). This RAP was prepared for a portion of the site only, occupying an area of 3.86 hectares. The Phase 1 Early Works were previously proposed to consist of the construction of stormwater swales and channels; detention basins; water quality filtration devices; the construction of internal roadways; installation of utility services; new signalised intersection and associated utility adjustments at the internal road's intersection with Rooty Hill South; and some revegetation and landscaping along the roadways. The Phase 1 Early Works RAP (Consara 2013b) was reviewed by the auditor, with a SAS and SAR previously issued by Mr Andrew Lau in July 2013 (Audit # 0503-1301).

It is noted that at the time of the preparation of the previous SAS and SARs, the site was in the process of obtaining approval for the concept proposal for the site development and subdivision. As such, the audit works previously undertaken for the site were conducted as non-statutory audits.

Since completion of the Phase 1 Early Works RAP (Consara 2013b), the scope of the Phase 1 early works was revised, with a bulk earthworks plan now proposed for the entire site. It was proposed that cut and fill earthworks are undertaken at the site to enable the preparation of a level site prior to the subdivision and development of each Superlot. Based on the nature of the proposed earthworks, it was considered suitable to address the previously identified asbestos contamination issues across the entire site in conjunction with the Phase 1 early works. Subsequently a revised Phase 1 Early Works RAP (Coffey 2015) has been prepared for the site and review of this document forms the basis of this current SAS and SAR (refer to **Section 1.2**).

1.2 Objectives of Audit

The objectives of this site audit were to:

- Independently review a two investigation reports and the subsequent revised Phase 1 Early Works RAP; and
- Prepare a Site Audit Report (SAR) and issue a Site Audit Statement (SAS) providing an opinion as to whether the remediation and validation processes as outlined in the revised Phase 1 Early Works RAP (Coffey 2015) were considered appropriate to enable suitability of the site for the proposed future landuse.

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 NSW Environment Protection Authority (EPA) (**Appendix A**).

1.3 Type of Audit

The site is currently subject to planning approval as a State Significant Development SSD # 5175 Eastern Creek Business Hub, with approval issued on the 7 January 2015. Development consent conditions have been imposed by the Minister for Planning and Environment, with specific conditions and requirements regarding the involvement of an Accredited Site Auditor stipulated in Schedule 3 of the conditions of consent. These conditions are specific to the STG1 subdivision and early works for the site and relate to the approval of a RAP by the auditor prior to the commencement of remediation works; and preparation of a SAS at completion of the early works remediation works verifying that the site is suitable for the proposed future use. Based on these specific development consent conditions, the site audit has been conducted as a statutory audit.

Site Audit Notification (SAN) number 0503-1301 was sent to the EPA on 27 July 2015, with receipt confirmation provided by the EPA on 30 July 2015 (EPA Reference DOC15/287227).

1.4 Documents Reviewed

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

- *Report on Phase 1 Contamination Assessment, Proposed Redevelopment of Parcel 2.4, Western Sydney Parklands, Rooty Hill Road South, Doonside*, Douglas Partners, November 2009 (DP 2009).
- *Sampling, Analytical and Quality Plan, Eastern Creek Business Hub, Rooty Hill Road South, Rooty Hill NSW*, CDM Smith, August 2012 (CDM 2012).
- *Eastern Creek Business Hub Phase 2 Environmental Site Assessment, Rooty Hill Road South, Rooty Hill NSW*, CDM Smith, February 2013, (CDM 2013).
- *Concept Remediation Action Plan Eastern Creek Business Hub*, Consara Pty Ltd, April 2013, (Consara 2013a).
- *Remediation Action Plan Phase 1 Early Works for Eastern Creek Business Hub*, Consara Pty Ltd, 25 June 2013, (Consara 2013b).
- *Phase 1 Early Works Remediation Action Plan – Eastern Creek Business Hub*, Coffey Environments Australia Pty Ltd, 28 July 2015 (Coffey 2015).

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
4 August 2015	Sahani Gunatunge on behalf of Andrew Lau (JBS&G)	Site inspection.

1.6 Chronology of Site Assessment and Audit Works

The process of site assessment, auditor review and preparation of final audit undertaken at the site has been summarised in **Table 1.2**.

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

Date	Action
November 2009	Completion of a Phase 1 Environmental Site Assessment (ESA) report which included review of historical aerial photographs, regulatory searches and collection and analysis of a limited set of soil samples. The Phase 1 ESA concluded additional site assessment was recommended to assist in examining the extent of preliminary impacts identified and identifying any additional contamination issues.
August 2012	Commencement of Site Audit and review of Phase 1 ESA report (DP2009) and Sampling Analysis and Quality Plan (SAQP) (CDM 2012) and preparation of interim audit advice (0503-1112-01).
September 2012 and November 2012	Phase 2 ESA desktop and fieldworks conducted comprising relevant historical searches, detailed site inspection, soil test pitting and boring and soil and groundwater sampling and analysis.
October 2012	Site Auditor conducted a site inspection.
February 2013	Review of Phase 2 ESA report (CDM 2013) and preparation of interim audit advice (0503-1112-02). The Phase 2 ESA documented the results of the relevant historical searches, the methods and results of the soil and groundwater sampling conducted and the associated quality assurance and quality control (QA/QC) methods and results. The Phase 2 ESA concluded "To manage risk associated with the identified waste, non-respirable ACM and a single sample location identified as a copper concentration hotspot associated with a waste stockpile, a Remediation Action Plan (RAP) is recommended to be developed for each proposed development area, with consideration given to materials that need to be transferred between each area for containment."
April 2013	Preparation of a draft concept RAP (Consara 2013a) to address asbestos contamination issues at the site and fulfil development consent conditions for review by the auditor. The concept RAP documented the procedures required to remediate the site for the proposed residential, commercial and open space land uses.
April 2013	Preparation of Site Audit Statement 0503-1112 and Site Audit Report (JBS 2013a) relating to the concept RAP.
June 2013	Preparation of a Phase 1 Early works RAP (Consara 2013b) for review by the auditor. The RAP documented the procedures required to remediate the site for the proposed uses. It is noted that the Consara 2013b RAP only addressed a small part of the site area (3.86 ha only) and an associated small portion of the asbestos impact.
July 2013	Preparation of Site Audit Statement 0503-1301 and Site Audit Report (JBS 2013b) relating to the Phase 1 Early works RAP.
July 2015	The proposed strategy for the development of the site was revised, with the revised strategy to identify and remediate asbestos impacted areas across the entire development area prior to the development of each Superlot. Based on this, Coffey prepared a revised Phase 1 Early Works RAP (Coffey 2015) detailing the remediation and validation process across the entire site area for review and comment by the auditor.
August 2015	Preparation of a Site Audit Statement 0503-1301 and Site Audit Report (JBS&G 2015), confirming suitability of the revised Phase 1 Early Works RAP (Coffey 2015) for the proposed future landuse.

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 have been presented in **Appendix C**. The site location and layout is shown in **Appendix D**.

Table 2.1: Summary Site Details

Street Address	Rooty Hill Road South, Rooty Hill, NSW
Property Description	The site is identified as follows: - Part Lot 1 DP1103025 - Lot 100 DP882326 - Lot 2 & 3 Section A DP8681 - Lot 3 to Lot 5 Section B DP8681 - Lot 1 DP135665 - Lots 1 & 13 Section B DP 8681 - Lots 1 to 10 DP830836 - Lots 2 & 3 DP1041487 - Lot A DP358346 - Lot 1, Lots 3 & 8 DP31130 - Lots 11, 12 and 14 DP882325 - Lots 1 & 2 DP1069269 - Lot 14 DP1051904 - Lots 11, 12 and 50 DP1041487 - Beggs Road (southern half) – Public Crown Subdivision Land - Beggs Road (northern half) – Road being the residue of Land in Certificate of Title Volume 826 Folio 243 - Belmore Road from intersection with Beggs Road to its intersection with Great Western Hwy (western half) – Road being the residue of Land in Certificate of Title Volume 826 Folio 243 - Belmore Road from intersection with Beggs Road to its intersection with Great Western Hwy (eastern half) – Public Crown Subdivision Road. - Belmore Road from its intersection with Beggs Road to its extent to north-east (western half) – Road being the Residue of Land in Certificate of Title Volume 147 Folio 41. - Belmore Road from its intersection with Beggs Road to its extent to north-east (eastern half) – Public Crown Reserved Road Easement for Gas Pipeline – Easement for Pipeline (Vide Q916928).
Parish	Rooty Hill and Melville
County	Cumberland
Local Government Area	Blacktown City Council
Property Size	Total site area is 34 hectares, with the site divided as follows: - Superlot 1 (PAD 1) – 4.76 hectares - Superlot 2 (PAD 2) – 5.53 hectares - Superlot 3 (PAD 3) – 7.32 hectares - Superlot 4 (PAD 4) – 8.99 hectares - Part 1 DP1103025 – 5.53 hectares - Site Infrastructure – 1.87 hectares
Zoning	SEPP (WSP) 2009:UL-Western Parklands
Previous Use	Historically markets gardens along the intersection of Church Street and Rooty Hill Road South, with the remaining uses across the site varied with further detail provided in Section 3
Existing Use	Predominately grazing land with some residential
Proposed Use	Bulky goods and large retail business, with nature reserve

2.2 Site Condition

The ECBH is bound by the M7 Motorway to the east, Church Street to the north, Rooty Hill Road South to the west and the Great Western Highway to the south. The ECBH is irregular in shape,

with the greatest length extending approximately northwest to southeast. The layout is shown in **Appendix D**.

The consultant (Consara 2013b) reported the ECBH site in 2013 was predominantly vacant and unoccupied, with the exception of a few occupied residential houses located on the western boundary along Rooty Hill Road South (north-western corner of Superlot 1) and some grassed area in the north-eastern used for horse grazing. The ECBH site was secured by a star picket fence to the northern and western boundaries and a chain fence to the east. A portion of the western boundary and the southern boundary were not fenced and were accessible by the public. Gated unsealed access roads are present from both Beggs Road to the west and from Great Western Highway to the south.

The consultant (Consara 2013b) reported the site was unsealed and was generally covered with grasses and weeds, with some larger well-established trees and vegetation, understood to be native Cumberland Woodland Plain, present in limited areas in the central northern and eastern areas. No stockpiles were observed.

The consultant reported an open stormwater channel was present through the central part of the site. Consara (2013b) reported that CDM (2013) noted that in this central area the stormwater channel appears to have been excavated, with the excavated soils stockpiled along the southern bank of the channel.

Additionally, the consultant (Consara 2013b) reported this stormwater channel drained from this central portion of the site to the east and crossed the Belmore Road (Area P) and gas pipeline easement (Area Q) and into a lower topographic area in the northern part of the Proposed Open Space Pt 1 (Area Y) area proximal to the Western M7 Motorway. This lower area was noted to be waterlogged and vegetated with reeds.

Site conditions detailed by the consultant's was consistent with the observations made by the auditor during the recent and previous site inspections.

2.3 Topography

The consultant (Coffey 2015) reported the site is relatively flat with some gently undulating plain and has an elevation of between 38 and 53 metres Australian Height Datum (m AHD). The site and surrounding regional area gently declines from west to east towards Eastern Creek.

The consultant (Consara 2013b) also reported it appears the site has not undergone any significant historical cut and/or fill activities and its current topography is likely to be the natural topography.

2.4 Geology

The consultant (Consara 2013b) reported the site and the ECBH is underlain by the Triassic aged Blue Mountains Bringelly Shale sub-group of the Winamatta Shale Group (DMR, 1991), which comprises black to dark alluvial and estuarine formed grey shale and laminites, carbonaceous claystone, claystone, fine to medium-grained lithic sandstone, and rare coal and tuff. Across the ECBH, the base of the Winamatta Shale is expected to be approximately 10 to 20 m below ground surface (m bgs), dependent on surface elevation, and is underlain by Hawkesbury Sandstone.

Bedrock is likely to be overlain by clay soils formed as a result of the weathering of the shale bedrock, and closer to Eastern Creek the clay soils are expected to be overlain by alluvial deposits of silty to peaty quartz sand and clay with common shell layers deposited during the Holocene in both alluvial and estuarine environments (DMR, 1991).

The consultant (Consara 2013b) reported the Soil Landscape of Penrith 1:100 000 Sheet 9030 (NSW DECCW 2010) indicated the site is likely to comprise the Blacktown Residual soils landscape in the western portion which then grade into the South Creek soil landscapes, associated with the floodplains, valley flats and drainage depressions of Eastern Creek in the east.

Additionally, the consultant (Consara 2013b) reported CDM (2013) identified the soils comprised shallow to moderately deep red and brown podzolic soils comprised of silty clays that generally had medium to high plasticity. The surface soils across the site were reported to comprise generally unconsolidated silts and sands that appeared to have a moderate organic content.

The consultant (Consara 2013b) reported review of the 1:25 000 Prospect/Parramatta River Acid Sulphate Soil Risk Map (DLWC, 1997) indicated there is no known occurrence of acid sulphate soils within the soil profile located on the site.

2.5 Hydrology

The consultant (Consara 2013b) reported Eastern Creek is the closest flowing surface water body, located approximately 300 m to the east of the site. Eastern Creek appears to be part of the drainage line from Prospect Reservoir (located approximately 4 km to the south east of the Site; at approximately 70m AHD) and the Hawkesbury River (located approximately 20 km to the north of the Site; at approximately 9m AHD).

The consultant (Consara 2013b) reported no constructed underground stormwater system was observed on the site. However, several localised surface water drainage channels were observed, with a narrow deeper grassed open drainage channel present through the central portion of the site. This deeper channel appeared to collect stormwater from Rooty Hill Road South, extend into the eastern part of the ECBH and drain into the northern part of Area Y.

The consultants (Consara 2013b and CDM 2013) reported the northern part of Area Y appeared to be topographically lower and was waterlogged and vegetated with reeds. The drainage channel, described above, had been observed to contain stagnant water. No other accumulated surface waters were observed during previous investigations on the site. Furthermore, the channel in many parts was covered with vegetation and weeds. It was considered by Consara (2013b) a section of the channel in the central part of the site was likely excavated to clear vegetation and accumulated sediments to allow waters to flow to the east. It was expected if a sufficient volume of surface water accumulated in this channel it may flow to the east, however, lower volumes would not flow across the surface of the channel but would likely infiltrate into the underlying soil.

The consultant (Consara 2013b) reported given the surface topography of the lower areas of the ECBH site and its vegetated and unsealed surface, it is unlikely significant flows of surface water would originate from the central parts of the ECBH to discharge to the east towards Eastern Creek.

The consultant (CDM 2013) made reference to the DP (2009) report stating a man-made channel running below the M7 Motorway allowed drainage to Eastern Creek.

The consultant (Consara 2013b) reported the potential for minor localised flooding in the lower areas of the site and the ECBH, particularly on Area Y, under high rainfall conditions was considered high, due mainly to the unsealed and vegetated surface and the absence of any drainage systems. However, the consultant (Consara 2013b) considered where surface water accumulates on the ECBH it would likely be dissipated by evaporation and evapotranspiration and/or by infiltration into the soil.

Furthermore, the consultant (Consara 2013b) reported given the elevation of the ECBH and its location, the risk of significant flooding from Eastern Creek was considered low.

The consultant (Consara 2013b) additionally noted the development of the site includes the construction of a large stormwater detention pond in Area Y and a smaller one in Area X1 that will collect waters from drainage channels to be constructed in the western parts of the site.

The consultant (CDM 2013) undertook a review of the Blacktown City Council flood risk data (<http://maps.blacktown.nsw.gov.au/WebSpatial/>) which indicated the majority of the ECBH was

outside the mapped flood risk zones, with the exception of the central east section of Area X north of Beggs Road which is situated within a Low Flood Risk zone.

2.6 Hydrogeology

The consultant (CDM 2013) reported the groundwater at the ECBH is likely to be present within a shallow aquifer within the weathered shale, and that groundwater within the shallow aquifer would flow to the east toward Eastern Creek. Eastern Creek appears to be part of the drainage line from Prospect Reservoir (located approximately 4km to the south east of the site) and the Hawkesbury River (located approximately 20km to the north of the ECBH).

The previous consultant (DP 2009) conducted a review of the NSW Natural Resource Atlas website (<http://www.nratlas.nsw.gov.au>) and identified one bore within the search area, located approximately 700 m to the west of the site. The works summary for the bore indicated it was used for waste disposal and was drilled to a depth of about 218 m, with no groundwater details provided.

During the field investigation, the consultant (CDM 2013) concluded the following in relation to groundwater as measured in the site monitoring wells (which included 11 newly installed monitoring wells and one previously existing well):

- Groundwater was measured at depths between 1 m and 3.2 m bgs (or between 41.84 and 35.97 m AHD), with a groundwater flow direction inferred to the northeast across the ECBH towards Eastern Creek.
- Temperature of the groundwater ranged between 14.8oC and 18.4oC.
- pH was measured at 6.73 pH units.
- ORP (oxidation reduction potential) ranged between -58.8 mV and 130.7 mV.
- Conductivity was measured at 26 108 micro Siemens/cm (uS/cm).
- Dissolved oxygen was measured at 0.83 ppm and 3.8 ppm.
- Based on the above measurements, the consultant concluded that the groundwater at the ECBH is of poor quality and unsuitable for most uses.

2.7 Surrounding Environment

The consultant (Coffey 2015 and Consara 2013b) reported that the site is surrounded by the following:

- Morreau Reserve, a recreational park to the north, with residential housing to the northwest;
- Immediately to the east is the Westlink M7 motorway, followed by vacant lots, with Eastern Creek beyond, approximately 300 m to the east of the ECBH;
- The Great Western Highway is present to the south, with Eastern Creek Public School and sports fields to the southwest across Rooty Hill Road South; and
- Immediately to the west of the site is Rooty Hill Road South, with residential housing beyond.

2.8 Audit Findings

The information provided by the consultants (DP 2009, CDM 2013, Consara 2013b and Coffey 2015) 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 inspection conducted by the site auditor.

Overall, the information provided by the consultants (DP 2009, CDM 2013, Consara 2013b and Coffey 2015), information supplemented by observations made during the site audit inspection 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 exception that details of climate were not provided.

For completeness, the auditor conducted a review of Bureau of Meteorology (BOM) climate statistics for Seven Hills (Collin Street)¹ which indicates the following:

- Mean maximum temperatures ranging from 17.4° C in July to 28.4° C in December;
- Mean minimum temperatures ranging from 4.5° C in July to 17.0° C in February; and
- Mean monthly rainfall ranging from 43.8 mm in July to 117.3 mm in February, with an average annual rainfall of 917.2 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. This additional data does not alter the consultants' findings or conclusions and, hence, does not alter the findings of the audit.

¹ Bureau of Meteorology Climate Statistics for Seven Hills (Collins Street), accessed 11/3/2013
http://www.bom.gov.au/climate/averages/tables/cw_067026.shtml

3. Site History

3.1 Site History Information Sources

The consultants (DP 2009 and CDM 2013) used a combination of sources to provide a site history for the ECBH, including the following:

- Aerial Photographs (1951, 1961, 1970, 1982, 1994 and 2005).
- Historical title search.
- Blacktown City Council information (including a review of s.149 certificates).
- NSW WorkCover dangerous goods licensing records.
- NSW EPA records.

3.2 Regulatory Searches

EPA Records

The consultant (DP 2009) conducted a search of the Contaminated Land Management Act 1997 Register and found the ECBH was not registered. There also were no listed sites in close proximity to the ECBH.

The consultant (DP 2009) also conducted a search of the public register provided under the Protection of the Environment Operations Act 1997 and did not locate any listing for the ECBH.

WorkCover Dangerous Goods Records

The consultant (CDM 2013) reported a search of the Stored Chemical Information Data Base (SCID) and the micro-fiche records held by NSW WorkCover was conducted and did not identify any records regarding dangerous goods on the ECBH.

3.3 Aerial Photographs

The initial consultant (DP 2009) undertook an aerial photograph review of the ECBH site, which was expanded on by the second consultant (CDM 2013), with the following information provided:

- 1951 - Great Western Highway, Church Street, Beggs Road and Rooty Hill Road South were present, with Belmore Road running north-south through the eastern portion of the ECBH. The northern portion of the ECBH (i.e. north of Beggs Road) was primarily bush covered with minor scatterings of buildings presumed to be houses and/or sheds, potentially poultry sheds. Pockets of development exist in the southern and northwestern portions, however the majority of the ECBH was undeveloped, relatively open and grassed, with minimal trees. Land cultivation was evident in the southern corner, and adjacent to Rooty Hill Road South. The ECBH was surrounded by rural residential style properties.
- 1961 - The ECBH was similar to the previous photograph, however some of the sheds have been removed, while new sheds were present in the north-western corner of the ECBH. Some trees have been cleared. Land cultivation was evident in the north-eastern corner, while it appears to have ceased in the south. Increasing urban residential development was observed around the north-western portion.
- 1970 - The majority of trees in the northern portion have been removed, with increasing paddocks/fields for market gardens or other agriculture. Additional houses were present along Beggs Roads, extending to the corner with Rooty Hill Road South. A drainage channel had been built in the southern portion of the site, extending beyond Rooty Hill Road South and Belmore Road. Most structures in the far southern portion have been removed, with signs of

disturbance present in the south-eastern corner. Urban residential development has expanded to the west of the ECBH, whilst surrounding lands to the north, east and south remain rural.

- 1982 - The majority of the ECBH had been cleared, with only pockets of development present remaining, largely in the north-western corner. Warehouses and sheds are present within paddocks, with some residential housing still present. The remainder of the ECBH comprised undeveloped grassland with some trees. The southern portion of Belmore Road appeared less prominent and may be being abandoned. There were minor increases in urban development to the west.
- 1994 - The ECBH appeared similar to the previous aerial photograph, with even fewer buildings remaining onsite in the northwestern corner. Horse feed troughs appeared to be present in the northern portion. The majority of the ECBH was open space, containing some mature trees.
- 2005 - The ECBH appeared similar to the 1994 photograph, with still fewer buildings present, consisting of residential housing in the northwest, and paddocks and buildings elsewhere. The gas trunk receiving station (Jemena) has been built in the south-eastern corner of the ECBH. No other significant changes were noted. The M7 Motorway had been built adjacent to the eastern boundary, while Belmore Road and Beggs Road no longer appeared to be in use.

The consultant (CDM 2013) provided based on the aerial photography review the buildings and warehouses that previously existed across the ECBH would have been constructed between 1950 and 1980. Based on their age, the consultant (CDM 2013) considered there was the potential for ACM and other hazardous materials, such as lead-based paint and asbestos, to have been used in their construction. Additionally, given the potential for part or most of the ECBH to have been used for agricultural purposes, it was likely pesticides may have been used.

3.4 Historical Title Search

A titles search was undertaken at the request of the consultant (CDM 2013) by Land Partners Limited. The results are presented below, by allotment.

Table 3.1 Lots 11 and 12 in DP 882325 (Superlot 1)

Date	Owner	Occupation/Landuse
1887	Harry Haydon Beggs	Blacksmith
1940	Hector Owen Beggs	Musician
1957	Sidney Samuel Luke	Carrier
1962, 1964?	Commissioner for Main Roads	Unknown / none
1999	Environmental Planning and Assessment Act 1979 Minister	Unknown / none
2008	Western Sydney Parklands Trust	Unknown / none

Table 3.2 Lot 3 Section A in DP 8681 and Lots 9 and 10 in DP830836 (Superlot 1, Superlot 2)

Date	Owner	Occupation/Landuse
1907	Ernest Victor Finckh	Agent
1922	Clarence Livingstone Beggs	Blacksmith
1934	Jonathon Haydon Beggs	Blacksmith
1936	May Eileen Weston	Married woman
1977	NSW Planning and Environment Commission	Unknown / none
2008	Western Sydney Parklands Trust	Unknown / none

Table 3.3 Lot 2 Section A in DP8681 and Lot 7 & 8 in DP830836 (Superlot 2, Area A, Area X)

Date	Owner	Occupation/Landuse
1907	Ernest Victor Finch	Agent

1930	John Ellul	Cook
1949	Vera Muriel Lynes	Married woman
1955	Ralph Alexander Crabb Magdalen Raie Crabb	Mill hand Married woman
1972	NSW Planning and Environment Commission	Unknown / none
2008	Western Sydney Parklands Trust	Unknown / none

Table 3.4 Lot A in DP 358346 (Superlot 2, Area A, Area X)

Date	Owner	Occupation/Landuse
1907	Ernest Victor Finch	Agent
1921	Ellen Walker	Married woman
1934	Geoffrey Arthur Walker	Poultry farmer
1959	St Ives Development Pty Ltd	Unknown / none
1967	Giovanni Cuda Silvana Cuda	Fitter mechanic Married woman
1979	Environmental Planning and Assessment Act 1979 Minister	Unknown / none
2008	Western Sydney Parklands Trust	Unknown / none

Table 3.5 Lots 3 and 4 in DP 830836 (Area X)

Date	Owner	Occupation/Landuse
1907	Ernest Victor Finch	Agent
1934	James Smith Kelly	Farmer
1968	Italo Velardo Maria Lucia Veldaro	Poultry farmer Married woman
1980	Environmental Planning and Assessment Act 1979 Minister	Unknown / none
2008	Western Sydney Parklands Trust	Unknown / none

Table 3.6 Lots 1 and 2 in DP 830836 (Area X)

Date	Owner	Occupation/Landuse
1907	Ernest Victor Finch	Agent
1921	James Kelly	Labourer
1946	James Kelly Junior	Farmer
1954	Allen James Haley Elma May Haley	Farmer Married woman
1973	Environmental Planning and Assessment Act 1979 Minister	Unknown / none
2008	Western Sydney Parklands Trust	Unknown / none

Table 3.7 Lot 2 in DP1041487 (Area X)

Date	Owner	Occupation/Landuse
1907	Ernest Victor Finch	Agent
1946	James Gordon Jamieson	Poultry farmer
1951	Istvan Turoczy Margit Turoczy	Farmer Married woman
1952	Djuro Tramosljanin	Labourer
1956	Otto Boege Herta Boege	Machinist Married woman
1961	Stasys Narusevicius	Laboratory assistant
1974	State Planning Authority NSW / Environmental Planning and Assessment Act 1979 Minister	Unknown / none
2008	Western Sydney Parklands Trust	Unknown / none

Table 3.8 Lot 1 in DP 1103025 (Area Y)

Date	Owner	Occupation/Landuse
Parcel 1		
1907	Ernest Victor Finch	Agent
1922	Harry William Murkin Louisa Ann Murkin	Storeman
1946	Cecil Bernard Turner Gladys Turner	Dairy farmer
1948	Alfred Charles Crozier Leila Crozier	Farmer
1950	Commonwealth of Australia	Overseas communications purposes.
Parcel 2		
1907	Ernest Victor Finch	Agent
1924	William Morrison	Labourer
1949	James Morrison	Farmer
1951	Commonwealth of Australia	Overseas communication purposes
Parcel 3		
1907	Ernest Victor Finch	Agent
1918	Marion Beatrice Farrell	Married woman
1926	John Trigg	Labourer
1951	Commonwealth of Australia	Overseas communications purposes.
Parcel 4		
1907	Ernest Victor Finch	Agent
1924	Louis James Kind	Book maker
1933	Herbert Hoare	Railway night officer
1937	Grace Caroline Olsson	Spinster
1951	Commonwealth of Australia	Overseas communications purposes.
Parcel 5		
1907	Ernest Victor Finch	Agent
1926	Paul Healy	Farmer
1930	Gertrude Mary May Richardson	Spinster
1932	Grace Caroline Olsson	Spinster
1951	Commonwealth of Australia	Overseas communications purposes.
Parcel 6		
1907	Ernest Victor Finch	Agent
1921	Camelo Francesco Zammit Giovanni Aquilina	Labourer Labourer
1924	Giovanni Farrugia Spiro Farrugia	Poultry farmer
1927	Spiro Farrugia	Poultry farmer
1950	Commonwealth of Australia	Overseas communications purposes.
Parcel 7		
1907	Ernest Victor Finch	Agent
1937	James Abram	Labourer
1939	Janet Abram	Widow

Date	Owner	Occupation/Landuse
1951	Commonwealth of Australia	Overseas communications purposes.
Parcel 8		
1899	Crown Parcel	Crown Reserve No. R 30199 for access to water
1953	Commonwealth of Australia	Presumed communication purposes.
Parcel 9		
?	Joseph Craven Bottomley	Poultry farmer
1924	Priscilla Jane Beers	Widow
1949	Commonwealth of Australia	Presumed communication purposes.

The consultant (CDM 2013) reported all parcels were transferred to the Minister for the Environmental Planning and Assessment Act 1979 in 2001, before being transferred to the Western Sydney Parklands Trust in 2008.

3.5 Previous Reports

The consultant (CDM 2013) included a report provided by E3 Consulting (now CDM Smith) as an appendix, consisting of a review of the initial Environmental Site Assessment conducted by Douglas Partners. The findings of the E3 report informed the writing of the SAQP (CDM 2012) for the follow up works conducted on the ECBH.

The E3 (2012) report assessed the reliability and scope of the DP (2009) assessment. The findings included:

- The DP (2009) report was intended only as a preliminary investigation and further works would be required.
- Additional works should be undertaken to ascertain necessary remediation.
- E3 (2012) considered the DP (2009) report analytical quality to be poor, based on a poor QA/QC program and results. As such, E3 considered that the results could not be considered quantitatively reliable, particularly for VOCs.
- DP (2009) undertook no groundwater investigation and that NSW OEH guidelines required that a groundwater investigation be undertaken.
- The contents of stockpiles and fly-tipped material at the site might pose aesthetic issues and hence render it unsuitable for re-use on the site, requiring disposal offsite.
- DP (2009) did not complete review of Section 149 Certificates, NSW WorkCover Dangerous Goods records, or current and historical deeds for the ECBH.
- Intrusive investigations of identified areas of environmental concern were conducted using very low sampling densities unable to be justified by reference to NSW Guidelines.
- Many samples were analysed only for asbestos, and did not adequately assess the chemical condition of soils.
- Several fly-tipped stockpiles were identified by DP (2009) but not sampled as part of the works.
- Test pits conducted in stockpiles on the southern part of the site were insufficient to assess chemical and physical contents of these stockpiles and hence were not able to assess whether these materials required offsite disposal or could be beneficially reused on ECBH.

The consultant (E3 2012) recommended both further desktop and intrusive investigations be undertaken for the ECBH.

3.6 Audit Findings

The ECBH history information provided by the consultants (DP 2009 and CDM 2013) has been checked against, and generally meets the requirements of the EPA 1997.

Prior to ESA works as conducted by the consultant (CDM 2013), the auditor provided interim advice based on the review of the previous reports (DP 2009 and CDM 2012). The auditor generally considered that the data in DP 2009 can be used as part of the site audit, in conjunction with the results obtained from CDM 2013.

The consultants (DP 2009 and CDM 2013) did not undertake searches of relevant heritage databases. For the purposes of completeness, the auditor has undertaken these searches. For the NSW Heritage Database, several properties are listed as being located on Rooty Hill Road South, however none are located in the area of the site. For the Australian Heritage register, it is noted the Rooty Hill Park and recreation area has been nominated as an indicative place on the Australian heritage register. However, an application and/or data to support the nomination as a heritage area have not been submitted, nor has the heritage value been assessed. The nominated area appears to fall within the northern portion of the site. Records of the Heritage Register searches conducted are provided in **Appendix E**.

The extent of site history information presented by the consultant (CDM 2013) and the previous consultant (DP 2009) 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. Potential Contamination Issues

4.1 Source of Contamination

Based on the site history review, the consultants (DP 2009 and CDM 2013) identified the following areas of potential contamination within the ECBH:

- Surface soils associated with agricultural use;
- Former market garden areas;
- Historic building locations;
- Asbestos piping used for drainage;
- Fly tipped stockpiles;
- Potential localised area of prior landfilling; and
- Fill materials of unknown origin.

Based on the identified sources of contamination, the consultant (DP 2009 and CDM 2013) identified the following contaminants of potential concern (COPCs), including:

- Heavy metals, TPH, BTEX, PAHs, VOCs, SVOCs, OCPs, PCBs, phenols and asbestos.

4.2 Potentially Affected Media

The consultants (DP 2009 and CDM 2013) identified the COPCs may occur in natural soils, fill material, stockpiled materials and/or groundwater occurring at the site

4.3 Audit Findings

The consultants (DP 2009 and CDM 2013) 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.

Overall, the auditor considers the identified potential contamination issues and potentially contaminated media were appropriate for assessing the nature and extent of contamination present at the site.

5. Sampling Analytical and Quality Program

The site was sampled as part of the broader ECBH site and therefore the sampling analytical and quality program information presented below is for the entire ECBH which incorporates the site.

5.1 Sampling / Analytical Regime

The sampling/analytical regimes adopted as part of the intrusive soil and groundwater works (DP 2009 and CDM 2013) are summarised in **Table 5.1**.

The sample locations are shown on the consultants' sample location diagrams provided in Appendix D.

Table 5.1 Summary of Sampling / Analytical Schedule (DP 2009 and CDM 2013)

Media	Area	No. Sampling Locations	General Depth Intervals (m)	Sampling Regime	No. Analyses (not incl. QA/QC)
DP 2009					
Soil	ECBH-Wide	19 Stockpiles 41 Surface	0.1-0.3 0.1-0.4 0.9-1.0 1.5-1.7 1.6-1.8	Judgmental	Asbestos - 37 Heavy Metals (HM) – 29 PAHs - 11 TPH - 6 BTEX – 6 PCBs – 6 OCPs - 28 Phenols - 6
Materials	ECBH-wide	14	Surface	Judgmental	Asbestos - 14
CDM 2013					
Soil	ECBH-Wide	Superlot 1 – 4 boreholes, 30 test pits and 9 stockpiles Area A – 3 test pits Area C – 4 test pits Superlot 2 – 27 test pits and 2 boreholes Area X – 47 test pits, 3 boreholes and 2 stockpiles Area Y – 15 test pits and 2 boreholes	0-0.05 0.1-0.15 0.2-0.25 0.2-0.3 0.3-0.4 0.45-0.55 0.5-0.6 0.55-0.65 0.9-1.0 0.95-1.05 1.2-1.3 1.4-1.5 1.5-1.6 1.8-1.9 2.4-2.5 2.5-2.6 3.0-3.1 3.5-3.6 4.0-4.1 4.5-4.6 5.0-5.1 5.5-5.6 6.0-6.1 6.5-6.6 7.0-7.1 7.5-7.6 8.0-8.1 8.5-8.6	Systematic	Heavy metals - 323 TPH - 278 BTEX - 278 OCPs - 323 PCBs - 174 VOCs – 174 sVOCs - 323 Asbestos - 173

Media	Area	No. Sampling Locations	General Depth Intervals (m)	Sampling Regime	No. Analyses (not incl. QA/QC)
			9.0-9.1 9.5-9.6 10.0-10.1 10.5-10.6 10.9-11.0		
Materials	ECBH-wide	33	Surface	--	Asbestos - 31
Groundwater	ECBH-wide	12	NA	--	Heavy metals - 12 TPH - 12 BTEX - 12 VOCs - 12 sVOCs - 12

5.2 Sampling Methodology

5.2.1 Soil Investigation

DP 2009

The consultant (DP 2009) reported soil sampling was undertaken as follows:

- Soil samples were collected directly from the backhoe or hand auger using disposable sampling equipment.
- Samples were then transferred into laboratory prepared glass jars, completely filled to ensure the headspace within the sample jar is minimised, and immediately capped jars with Teflon lined lids to minimise the loss of volatiles.
- Sample containers were labelled with unique identifiers, including the project number, sample location and sample depth. Sample jars were stored immediately within a cooled, insulated and sealed container for transport to the laboratory. In addition, replicate samples were collected at a rate of one-in-ten samples.

CDM 2013

The consultant (CDM 2013) reported soil sampling was undertaken as follows:

- Service location was undertaken prior to the start of investigation works on the ECBH, using both a dial-before-you-dig search and an accredited service locator on ECBH. Where services were identified within areas which required sampling proceed, boreholes were initially hand augered to 1 m depth to prevent damage to services, or moved to nearby areas which would not intercept services.
- Testpits were completed using a 6 or 8 tonne track mounted excavator operated by CMS Group. Testpits were advanced through fill materials and into natural soils. Following the completion of sampling works, testpits were reinstated prior to being flagged for subsequent surveying of the testpit locations. Samples were collected from the undisturbed materials in the centre of the excavator bucket or directly from the walls of the test pit using a hand protected by a nitrile glove.
- Boreholes were completed by a GeoProbe rig operated by TerraTest, using a direct push method. They were completed into natural soils below where groundwater occurred. Where refusal was met through direct push methods, solid flight augurs were used to advance the borehole to the desired depth. All boreholes were subsequently converted to groundwater monitoring wells and hence were widened using solid flight auger drilling methods. Samples were collected from each location directly from the centre of the push tube liner using a hand

protected by a nitrile glove. In boreholes first advanced using a hand auger, soil was collected from the undisturbed materials at the centre of the hand auger using a hand protected by a nitrile glove. Samples were collected from each borehole from the surface between 0.0-0.05 m bgs, between 0.1-0.15 m bgs, at 0.5 m bgs, at 1.0 m bgs, and then at 0.5 m intervals or at changes in lithology until the completion depth was reached.

- Field logs were completed during all sampling and recorded soil/rock type, colour, grain size, sorting, inclusions, moisture conditions, staining and observation of any anthropogenic material (i.e. odours, waste materials).
- Additional soil from each sample depth range was placed in a sealed plastic bag for field screening purposes. After waiting approximately 5 minutes for the sample and the headspace to equilibrate the headspace in the bagged samples was assessed by a calibrated (100 ± 3 parts per million (ppm) isobutylene) photoionisation detector (PID) with a 10.6 eV lamp to measure the presence of total VOCs.
- The soil samples were collected in 125 mL or 250 mL jars supplied by the laboratory. All samples were clearly labelled with unique sample identification numbers consisting of the date, sample location, depth of sample and sampler's initials. In the case of field intra-laboratory and inter-laboratory duplicates, sample containers were labelled so as to not reveal their purpose or sample location to the laboratory.
- All samples were kept chilled in an ice-filled ice box prior to dispatch and during transport to the NATA registered laboratory under chain-of-custody procedures.

Asbestos Field Screening

The consultant (CDM 2013) reported samples collected for asbestos analysis from testpits were collected from undisturbed materials in the centre of the excavator bucket or directly from the walls of the test pit using a hand protected by a nitrile glove. Samples were placed immediately into a 0.5 L sealed bag.

The consultant (CDM 2013) reported additional bulk soil samples (10L) were collected from each sample location during testpitting works, and placed into a bucket for field screening for fibrous asbestos and/or asbestos containing materials. Field screening was reportedly undertaken in line with the WA DoH 2009 guidelines, where the bulk sample was passed through a <7mm sieve or spread out on a contrasting colour tarpaulin.

Additionally, the consultant (CDM 2013) reported where suspected asbestos containing materials >7x7 mm were identified these were collected into sealed plastic bags for analysis. No asbestos sampling was undertaken in boreholes due to insufficient material being recovered from the boreholes. Testpits were conducted in proximity to all boreholes to address asbestos concerns.

CDM (2013) reported reusable equipment was decontaminated during soil sampling and included the push-tube cutting shoe, solid flight augers and the excavator bucket. The push-tube cutting shoe was scrubbed clean using a wire brush between sample locations. The solid flight auger was not generally used to collect samples from, but was cleaned by dropping and scraping. The excavator bucket was cleaned by shaking free loose materials, and decontamination assured by collecting samples only from the centre of the bucket.

5.2.2 Groundwater Investigation

The consultant (CDM 2013) reported following the completion of boreholes, and the widening of the holes using solid flight augers, the wells were immediately installed as follows:

- The groundwater monitoring wells were constructed using Class 18 uPVC 50 mm inside diameter machine threaded casing and 0.4 mm slotted screen and casing.

- Once the well was in the ground, a filtered sand of 2 mm in diameter was introduced as a filter pack to reduce sediment infiltrating the well annulus. The filter pack was placed around the screened section of the well to approximately 0.5m above the top of the screen. Fine-grained bentonite pellets were placed above the sand filter pack around the well for 0.5 m and was slightly wetted to ensure an adequate seal was formed to prevent surface infiltration into the well. The remainder of the well was then backfilled using clean materials removed during drilling to approximately 0.2 m from the surface. A lockable well cap was then inserted and a steel well monument was installed and secured with concrete at the top to prevent tampering and damage.
- The wells were developed using a high powered submersible Monsoon Pump. The pump was used to disturb the water column within the well annulus to remove any groundwater and well debris that may have been introduced during the installation process. Development volumes were variable depending on the hydraulic conductivity; however, approximately 20 L was removed from each well or until the well was purged dry. Wells were then left to recharge and stabilise for approximately 7 days prior to purging and sampling.
- Measurement of the standing water level in each groundwater monitoring well was undertaken prior to purging, using an electronic interface probe. Both the standing water level and the depth to the base of the well were measured.
- All newly installed wells were purged using dedicated 'medical grade' bonded tubing and a low flow bladder pump. Purging was continued with frequent measurements of the water quality until the water quality parameters stabilised or until the well went dry.
- Water quality parameters including, temperature, electrical conductivity, dissolved oxygen, redox potential and pH were measured during purging using a calibrated water quality meter.
- Sampling of the monitoring wells was completed using the same methods as for purging and was only completed following the stabilisation of the water quality parameters. Samples were collected using the bladder pump directly into laboratory prepared bottles. Samples for heavy metals analysis were first filtered through 0.45 micron filters prior to being poured into a bottle. All bottles were then sealed immediately using a Teflon lined cap, labelled and placed on ice.
- All samples were clearly labelled with unique sample identification numbers consisting of the date, sample location and sampler's initials. All samples were kept chilled in an ice-filled ice box prior to dispatch and during transport to the NATA registered laboratory under chain-of-custody procedures.
- During the gauging of groundwater monitoring wells, the bladder pump, water quality meter and interface probe were reused. All three instruments were decontaminated between each well location by scrubbing with a solution of Decon 90 (a phosphate-free detergent) followed by a rinse in potable water.
- The groundwater purged from the wells during development and purging that did not contain odour, discolouration or sheen was discharged to ground at a distance of at least 10 m from the groundwater well to prevent infiltration back into the well annulus.

5.3 Laboratory Methods

The consultants (DP 2009 and CDM 2013) used laboratories which were NATA accredited for the chemical analyses undertaken. Envirolab Pty Ltd in Chatswood, NSW was the primary analytical laboratory, and ALS Pty Ltd in Smithfield, NSW, was the secondary analytical laboratory during CDM (2013) soil analysis only.

The methods used by the laboratories as part of the ECBH investigation programs are shown in **Table 5.2**.

Table 5.2 Laboratory Methods Used in ECBH Investigations

	Limit of Reporting - ALS Soil (mg/kg)	Limit of Reporting - Envirolab Soil (mg/kg)	Limit of Reporting - Envirolab Groundwater (mg/L)	Laboratory Method
METALS				
Arsenic	5	4	1	ICP-AES, ICP-OES, AAS
Cadmium	1	0.5	0.1	ICP-AES, ICP-OES, AAS
Chromium (Total)	2	1	1	ICP-AES, ICP-OES, AAS
Copper	5	1	1	ICP-AES, ICP-OES, AAS
Lead	5	1	1	ICP-AES, ICP-OES, AAS
Manganese		1	5	ICP-AES, ICP-OES, AAS
Mercury	0.1	0.1	0.05	CV-ICP-MS, FIMS
Nickel	2	1	1	ICP-AES, ICP-OES, AAS
Zinc	5	1	1	ICP-AES, ICP-OES, AAS
TOTAL PETROLEUM HYDROCARBONS				
C ₆ – C ₉ Fraction	n/a	25	10	Purge Trap-GC/MS, PT/GC/FID/MSD
C ₁₀ – C ₃₆ Fraction	200	250	250	GC/FID
MONOCYCLIC AROMATIC HYDROCARBONS (MAHs)				
Benzene	0.5	0.2-0.5	1	Purge Trap-GC/MS, PT/GC/FID/MSD
Toluene	0.5	0.5	1	Purge Trap-GC/MS, PT/GC/FID/MSD
Ethylbenzene	0.5	1	1	Purge Trap-GC/MS, PT/GC/FID/MSD
Xylenes	1.5	3	3	Purge Trap-GC/MS, PT/GC/FID/MSD
PAHs				
Benzo(a)pyrene	0.5	0.05	n/a	GC/MS
Naphthalene	0.5	0.1	n/a	GC/MS
Total PAHs	n/a	1.55	n/a	GC/MS
OCPs				
Aldrin	0.05	0.1	n/a	GC with dual ECDs
Dieldrin	0.05	0.1	n/a	GC with dual ECDs
Chlordane	0.05	0.1	n/a	GC with dual ECDs
DDT + DDD + DDE	0.3	0.3	n/a	GC with dual ECDs
Heptachlor	0.05	0.1	n/a	GC with dual ECDs
Semi-Volatile Organic Compounds (sVOCs)				
sVOCs (Individual)	0.05-1	0.1-10	10-100	GC/MS
Volatile Organic Compounds (VOCs)				
VOCs (Individual)	0.2-5	1	0.001-10	Purge Trap-GC/MS
Phenols				
Total Phenolics	n/a	5	n/a	Colorimetrically following distillation
PCBs				
Total PCBs	n/a	0.6-0.7	n/a	GC-ECDs, GC with dual ECDs
OTHER				

	Limit of Reporting - ALS Soil (mg/kg)	Limit of Reporting - EnviroLab Soil (mg/kg)	Limit of Reporting - EnviroLab Groundwater (mg/L)	Laboratory Method
Asbestos	n/a	0.1 g/kg	n/a	PLM / Dispersion Staining

5.4 Quality Assurance / Quality Control

The consultants (DP 2009 and CDM 2013) broadly developed pre-determined data quality indicators broadly based on the seven step process referred to in DEC 2006. Both a field and laboratory quality assurance/quality control (QA/QC) program was conducted during the ECBH investigation works. Field QA/QC consisted of the following procedures:

- New (disposable) sampling equipment was used where possible for each sampling location.
- Equipment decontamination was conducted between sampling locations using phosphate free detergent and water.
- Collection and analysis of 'blind duplicate' soil and groundwater samples for a suite of potential chemicals of concern (intra or 'within' laboratory duplicates).
- Collection and analysis of 'split duplicate' (inter-laboratory) soil samples for a suite of potential chemicals of concern.
- Inclusion of trip spike and trip blank samples collected during a portion of the soil and groundwater sampling programs.
- Collection of rinsate samples to determine the potential for cross-contamination between samples occurring due to sampling equipment during groundwater sampling program.
- Transporting samples in ice-cooled chests, under chain of custody conditions, to laboratories that were NATA accredited for the analysis performed.

Laboratory QA/QC consisted of the following procedures:

- Analysis and reporting of laboratory duplicate samples.
- Analysis and reporting of laboratory method blank samples.
- Analysis and reporting of laboratory control samples.
- Analysis and reporting of laboratory control spikes, matrix and surrogate spikes.

The QA/QC undertaken by the consultant(s) has been reviewed and summarised in **Table 5.3** and **5.4** against the PARCC parameters (precision, accuracy, representativeness, comparability and completeness).

Table 5.3 Investigation QA/QC summary (DP 2009)

Quality Indicator	Reported Results	Meets the Requirements of Site Audit?
Precision		
Intra-laboratory (blind) duplicates	Soil Frequency = 3/37 primary samples RPDs = 0% – 54%	Yes ¹
Inter-laboratory (split) duplicates	No triplicates collected	Partial ¹

Quality Indicator	Reported Results	Meets the Requirements of Site Audit?
Laboratory Duplicates	<u>Soil</u> Frequency = 5/37 primary samples RPDs = 0% - 29%	Yes
Accuracy		
Laboratory Control Samples	81% - 121%	Yes
Matrix Spike	80% - 128%	Yes
Surrogate Spikes	95% - 122%	Yes
Representativeness		
Sampling appropriate for media and analytes	Samples were generally collected using appropriate methods	Yes ¹
Rinsate blanks	No rinsates collected and analysed	Partial ¹
Trip spike	No trip spikes collected and analysed	Partial ¹
Trip blank	No trip blanks collected and analysed	Partial ¹
Laboratory blanks	<LOR for all reported sample batches	Yes
Samples extracted and analysed within holding times.	All samples extracted and analysed within holding times.	Yes
Comparability		
Standard operating procedures used for sample collection and handling	Suitable description of sampling procedures provided.	Yes
Standard analytical methods used for all analyses	Analytical methods were referenced and NATA Accredited	Yes
Consistent field conditions, sampling staff and laboratory analysis	Project team were identified and single primary laboratory used during each assessment	Yes
Limits of reporting appropriate and consistent	Reporting limits were less than the site criteria.	Yes
Completeness		
Soil logs completed and appropriate	No soil logs included in the report	Partial ¹
Appropriate & complete COC documentation	Complete & appropriate COCs in report	Yes
Satisfactory frequency and result for QC samples	The frequency and results reported as acceptable	Yes ¹
Data from critical samples valid See discussion in Section 5.5	Critical sample data are considered valid	Partial ¹

Table 5.4 Investigation QA/QC summary (CDM 2013)

Quality Indicator	Reported Results	Meets the Requirements of Site Audit?
Precision		
Intra-laboratory (blind) duplicates	<u>Soil</u> Frequency = 34/323 primary samples RPDs = 0% – 158% <u>Groundwater</u> Frequency = 2/12 primary samples RPDs = 0% - 26%	Yes ¹ Yes
Inter-laboratory (split) duplicates	<u>Soil</u> Frequency = 17/323 primary samples RPDs = 0% - 176% <u>Groundwater</u> None collected and analysed	Yes ¹ Partial ¹
Laboratory Duplicates	<u>Soil</u>	

Quality Indicator	Reported Results	Meets the Requirements of Site Audit?
	Frequency = 44/323 primary samples RPDs = 0% - 128% <u>Groundwater</u> Frequency = 2/12 primary samples RPDs = 0-7%	Partial ¹ Yes
Accuracy		
Laboratory Control Samples	11% - 140%	Yes ¹
Matrix Spike	0, 62% - 140%	Yes ¹
Surrogate Spikes	19% - 140%	Yes ¹
Representativeness		
Sampling appropriate for media and analytes	Samples were generally collected using appropriate methods	Yes
Rinsate blanks	No rinsate blanks collected for the soil sampling. Two rinsate blanks collected for the groundwater investigation, all results <LOR.	Partial ¹ Yes
Trip spike	Eight completed during soil works only results were within range; One trip spikes completed during groundwater sampling results were within range	Yes
Trip blank	Seven completed during soil works only results <LOR; no trip blanks completed during groundwater sampling	Partial ¹
Laboratory blanks	<LOR for all reported sample batches	Yes
Samples extracted and analysed within holding times.	All samples extracted and analysed within holding times.	Yes
Comparability		
Standard operating procedures used for sample collection and handling	Suitable description of sampling procedures provided.	Yes
Standard analytical methods used for all analyses	Analytical methods were referenced and NATA Accredited	Yes
Consistent field conditions, sampling staff and laboratory analysis	Project team were identified and single primary laboratory used during each assessment	Yes
Limits of reporting appropriate and consistent	Reporting limits were less than the site criteria. Except for the following groundwater analytes: • Pentachlorophenol LOR 100 µg/L and groundwater criteria of 10 µg/L and 22 µg/L. • DDT LOT 10 µg/L and groundwater criteria of 0.01 µg/L. • Endrin LOR of 10 µg/L and a groundwater criteria of 0.02 µg/L and 0.008 µg/L. • Lindane LOR of 10 µg/L and a groundwater criteria of 0.2 µg/L. • Heptachlor LOR of 10 µg/L and a groundwater criteria of 0.09 µg/L. • 2,4-dinitrophenol 100 µg/L and a groundwater criteria of 45 µg/L. • BaP LOR of 10 µg/L and a groundwater criteria of 0.1 µg/L.	Yes ¹

Quality Indicator	Reported Results	Meets the Requirements of Site Audit?
Completeness		
Soil logs completed and appropriate	Complete & appropriate soil logs in report	Yes
Appropriate & complete COC documentation	Complete & appropriate COCs in report	Yes
Satisfactory frequency and result for QC samples	The frequency and results reported as acceptable	Yes ¹
Data from critical samples valid	Critical sample data are considered valid	Yes
Precision See discussion in Section 5.5.		

¹ See discussion in Section 5.5.

5.5 Audit Findings

DP 2009

The number of soil sampling locations adopted by the consultant (DP 2009) during the initial Phase 1 investigation provided limited coverage of the ECBH noting the potential areas of concern and associated COPCs identified as part of the ECBH history review, whilst taking into consideration the gaps in such information. The Phase 1 was designed as a preliminary assessment and sampling was conducted judgements across the ECBH. The auditor notes that the report (DP 2009) recommended further investigation across the ECBH prior to assessing site suitability. The consultant (CDM 2012) prepared the SAQP after reviewing the previous report (DP 2009).

The sample intervals at each of the sampling locations were appropriate given the identified potential contamination sources at the ECBH and the site geology. The sample depths were also appropriate to assess the vertical extent of contamination at the ECBH.

The auditor notes that an additional groundwater assessment was recommended at the ECBH (CDM 2012) as a groundwater assessment was not conducted by DP (2009).

The consultant (DP 2009) did not provide soil logs in the report. While this is considered a non-conformance, given the preliminary nature of this assessment and a Phase 2 ESA (CDM 2013) has since been conducted at the ECBH this omission is considered unlikely to materially affect the outcome of the site audit.

The primary laboratory (Envirolab) employed for the chemical analyses used analytical methods which were considered appropriate for the identified COPCs at the ECBH and were NATA accredited.

Sufficient soil intra-laboratory duplicates were collected and analysed as part of the ESA investigation (DP 2009). The relative percentage difference (RPDs) calculated for the intra-laboratory soil duplicates ranged between 0% - 54% with one RPD exceeding the DQI for zinc. Given that the samples were obtained from fill materials, the auditor considers that the higher than expected RPDs are attributable to sample heterogeneity, and is of the opinion that the isolated elevated RPD results do not affect the overall reliability of the analytical data.

The consultant (DP 2009) did not collect or analyse any inter-laboratory duplicates during the soil sampling program. While this is considered a non-conformance, given the preliminary nature of this assessment and a Phase 2 ESA (CDM 2013) has since been conducted at the ECBH this exclusion is considered not to affect the overall reliability of the analytical data.

All internal laboratory duplicates and laboratory control samples reported by the primary laboratories were within the laboratory control limits. All matrix spike recoveries and surrogate spike recoveries reported by the primary laboratories were also within the control limits.

Holding time compliance reports provided by both laboratories confirmed that all samples were analysed within their holding times for all analyses undertaken.

Rinsate blank samples were not collected and analysed by the consultant (DP 2009). The consultant (DP 2009) provided soil samples were recovered directly from the auger by the Environmental Scientist using disposable latex gloves and no additional sampling equipment was utilised therefore negating the need for decontamination. The auditor considers this a non-conformance and does not accept the consultants (DP 2009) explanation. The auditor notes a rinsate blank should have been collected from the auger. However given this assessment was a Phase 1 with some preliminary sampling and subsequent investigations have occurred across the ECBH (CDM 2013) this oversight is considered unlikely to materially affect the outcome of the site audit.

Laboratory prepared trip spikes and trip blanks were not submitted by the consultant (DP 2009), with no explanation provided. The auditor considers this a minor non-conformance unlikely to affect the representativeness of the data as the TPH and BTEX results of all soil sampling activities do not show a pattern of sustained elevated impact. As such, the BTEX/TPH concentrations in soil are considered representative of ECBH conditions.

The consultant (DP 2009) did not report measure or record PID measurements. The auditor considers this a minor non-conformance unlikely to affect the representativeness of the data as soil samples were analysed by a NATA accredited laboratory.

The quality assurance/quality control measures employed by the consultant (DP 2009) were checked and found, overall, to adequately comply with the requirements outlined in OEH 2011, DEC 2006 and NEPC 1999. The laboratory QA/QC results have been reviewed and the results indicate that the analytical laboratories were achieving adequate levels of precision and accuracy during the time when samples from the ECBH were being analysed. As such, the sampling, analytical and quality protocols undertaken by the consultant (DP 2009) were considered satisfactory. However, given the preliminary nature of the assessment these data should not be used in isolation for the purpose of assessing the contamination status of the ECBH. The auditor notes an additional, more robust soil and groundwater investigation was conducted at the ECBH by CDM Smith (CDM 2013). Both data sets should be used for the purpose of assessing the contamination status of the ECBH.

CDM 2013

The number of soil sampling locations adopted by the consultant (CDM 2013) during the ESA investigation provided sufficient coverage of the ECBH noting the potential areas of concern and associated COPCs identified as part of the ECBH history review, whilst taking into consideration the gaps in such information.

The whole development area measures approximately 34 ha, however the development areas subject to this site audit are Superlot 1 and 2 and Areas A, C, X and Y. The consultant (CDM 2012 and 2013) provided the areas as follows:

- Superlot 1 – 4.76 ha;
- Superlot 2 – 4.29 ha;
- Area C, X and Y – 15.5 ha; and
- Area A – 0.78 ha.

Superlot 1 and 2 required a minimum of 50 sampling locations, Areas C, X and Y required additional sub-division and Area A required a minimum of 5, as outlined in Table A of EPA 1995. The previous consultant (DP 2009) conducted a total of 41 targeted surface sampling locations at the ECBH, which did not meet the recommended minimum number of locations as outlined in EPA 1995.

Additional sampling was recommended by the consultant (DP 2009) and documented in the SAQP (CDM 2012).

In general, the auditor considers the sampling density and strategy as adopted by the consultant (CDM 2012 and 2013) acceptable for the purposes of the Phase 2 ESA.

The sample intervals at each of the sampling locations were appropriate given the identified potential contamination sources at the ECBH and the site geology.

The screen interval in all monitoring wells was installed targeting the natural materials (shale). The bentonite 'plug' at the monitoring well locations was generally installed approximately 0.5-1.0 m in thickness above the sand filter pack, 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 ECBH.

The groundwater sampling methods are considered appropriate given the geology encountered on-site. The majority of field parameters were within the 10% of each other upon sampling.

The analytical schedule is considered appropriately complete given the ECBH history and the identified COPCs.

The primary laboratory (Envirolab) and the secondary laboratory (ALS) employed for the chemical analyses used analytical methods which were considered appropriate for the identified COPCs at the ECBH and for which the laboratories were NATA accredited. Some of the LORs for SVOCs were higher than the adopted groundwater criteria however given no soil sources or impacts were identified this is considered a minor non-conformance and unlikely to affect the comparability of the data.

Sufficient soil intra-laboratory and soil inter-laboratory (split) duplicates were collected and analysed as part of the supplementary ESA investigation (CDM 2013). The RPDs calculated for the intra-laboratory soil duplicates ranged between 0% - 158% with a number of RPDs exceeding the DQI for metals. The RPDs calculated for the inter-laboratory duplicates ranged between 0% and 176% with a number of RPDs exceeding the DQI for metals. The consultant (CDM 2013) attributed the elevated RPD to sample heterogeneity. Given that the samples were obtained from fill materials, the auditor accepts the consultant's explanation of the higher than expected RPDs and is of the opinion that the isolated elevated RPD results do not affect the overall reliability of the analytical data.

However, the consultant (CDM 2013) did not include the ALS analytical certificates for the soil inter-laboratory duplicates and therefore the auditor cannot verify the results reported in the summary tables. While this is considered a non-conformance, given the sufficient intra-laboratory duplicates were collected and the results of all soil sampling activities do not show a pattern of sustained elevated impact (with the exception of some variable metals results, which is attributable to the natural background levels). As such, the concentrations in soil are considered representative of ECBH conditions.

Sufficient groundwater intra-laboratory duplicates were collected and analysed as part of the ESA investigation (CDM 2013). The RPDs calculated for the intra-laboratory groundwater duplicates ranged between 0% - 26%, with no exceedances of the DQI.

While the consultant (CDM 2013) provided in the report that a groundwater inter-laboratory duplicate was collected no results were tabulated nor were any analytical certificates included. Therefore, the auditor is of the opinion that no groundwater inter-laboratory duplicates were collected and analysed. While this is considered a non-conformance, given the sufficient intra-laboratory duplicates were collected and the results of all groundwater sampling activities do not show a pattern of sustained elevated impact. As such, the concentrations in groundwater are considered representative of ECBH conditions.

The internal laboratory duplicates analysed by the primary laboratory were generally within the control limits and do not indicate a sustained pattern of reduced precision by the testing laboratory, and are considered to confirm the overall reliability of the analytical data.

All laboratory control samples reported by the primary laboratory were within the laboratory control limits. All matrix spike recoveries and surrogate spike recoveries reported by the primary laboratory were within the control limits. Overall, the RPDs of laboratory control samples, matrix spike recoveries and surrogate spike recoveries do not indicate a sustained pattern of reduced precision by the testing laboratory and the accuracy of the results are acceptable for assessing the suitability of the environmental condition of the ECBH.

Holding time compliance reports provided by the primary laboratory confirmed that all samples were analysed within their holding times for all analyses undertaken.

Chain of custody documentation was provided and generally complete.

Rinsate blank samples were collected during the groundwater investigation works conducted by the consultant (CDM 2013), with no COPCs reported above laboratory LORs.

No rinsate blank samples were collected during the soil sampling works as conducted by the consultant (CDM 2013). The consultant (CDM 2013) reported no rinsate samples were necessary as samples were collected using disposable nitrile gloves and taking the sample from the centre of the disposable push-tube liner or from undisturbed materials from the centre of the excavator bucket. The auditor notes that the analytical data presented by the consultant does not show a pattern of sustained elevated impact (with the exception of some variable metals results, which is attributable to the natural background levels). As such, the auditor does not believe these data have been compromised, and the lack of rinsate blank sample data across all soil sampling field works does not affect the overall reliability of the analytical data.

Eight laboratory prepared trip spikes were submitted by the consultant (CDM 2013) for the soil sampling works and one laboratory prepared trip spike was submitted by the consultant (CDM 2013) for the groundwater sampling works. All reported acceptable results.

Seven laboratory prepared trip blanks were submitted for the soil sampling works, all results were less than the LOR. Trip blanks were not submitted for the groundwater sampling works. The consultant (CDM 2013) did not discuss why no trip blanks were collected during groundwater sampling. The auditor considers this a minor non-conformance unlikely to affect the representativeness of the data as rinsate samples and trip spike samples were prepared and analysed for the groundwater sampling activities, with both sets of samples reporting favourable results. As such, the BTEX/TPH concentrations in groundwater are considered representative of ECBH conditions.

The consultant (CDM 2013) provided calibration records for the PID and water quality meter for the respective sample dates.

The quality assurance/quality control measures employed by the consultant (CDM 2013) were checked and found, overall, to adequately comply with the requirements outlined in OEH 2011, DEC 2006 and NEPC 1999. The laboratory QA/QC results have been reviewed and the results indicate that the analytical laboratories were achieving adequate levels of precision and accuracy during the time when samples from the ECBH were being analysed. As such, the sampling, analytical and quality protocols undertaken by the consultant (CDM 2013) were considered satisfactory and the data are considered to be adequately reliable for the purpose of assessing the contamination status of the ECBH.

6. Assessment Criteria

The site was sampled as part of the broader ECBH site and therefore the assessment criteria presented below is for the entire ECBH which incorporates the site.

6.1 Soil Criteria

At the time the ESA fieldworks were conducted, the consultant (CDM 2013) stated the planned future use of the ECBH will consist of mixed commercial and open space uses. Accordingly, the most stringent assessment criteria were used to consider these potential uses.

The soil criteria used by the consultant (CDM 2013) for the investigation works at the ECBH include Health-based Investigation Levels (HILs) for 'parks, recreational open space, playing fields including secondary schools' (Column 3, EPA 2006), 'commercial or industrial' (Column 4, EPA 2006), Provisional phytotoxicity based criteria (PILs) (Column 5, EPA 2006) and the Service Station Guidelines (EPA 1994), as presented in **Table 6.1**.

Table 6.1 Soil Criteria (mg/kg)

Substance	Health-Based Investigation Criteria (Parks/Open Space) (HIL-E) ¹ (mg/kg)	Health-Based Investigation Criteria (Commercial Industrial) (HIL-F) ² (mg/kg)	NSW EPA 1994	Provisional Phytotoxicity Based Criteria (PIL) ³ (mg/kg)
Metals				
Arsenic	200	500	-	20
Cadmium	40	100	-	3
Chromium (III)	24%	60%	-	400
Chromium (VI)	200	500	-	1
Copper	2000	5000	-	100
Lead	600	1500	-	600
Manganese	3000	7500		
Mercury (inorganic)	30	75	-	1
Nickel	600	3000	-	60
Zinc	14000	35000	-	200
TPH				
TPH C ₆ – C ₉	-	-	65	-
TPH C ₁₀ – C ₃₆	-	-	1,000	-
BTEX				
Benzene	-	-	1	-
Toluene	-	-	1.4	-
Ethyl benzene	-	-	3.1	-
Total Xylene	-	-	14	-
PAHs				
Benzo (a) pyrene	2	5	-	-
Total PAHs	40	100	-	-
PCBs				
Total PCBs	20	50	-	-
OCPs				
Aldrin+Dieldrin	20	50	-	-
Chlordane	100	250	-	-
DDT+DDD+DDE	400	1000	-	-
Heptachlor	20	50	-	-
Other				
Asbestos	-	-	-	-

Note 1: Health Based Investigation Levels for parks / open space, (Column 3, EPA 2006)

Note 2: Health Based Investigation Levels for commercial / industrial, (Column 5, EPA 2006)

Note 3: Provisional Phytotoxicity Based Investigation Levels (Column 5, EPA 2006)

The soil assessment criteria during these investigations also took into consideration the Western Australian Department of Health (WA DoH) *Guidelines for Remediation and Management of Asbestos Contaminated Sites in Western Australia* (WA DoH 2009) for asbestos. The auditor notes that even though the WA DoH 2009 Guidelines were not endorsed by the NSW EPA at this time, it has now been subsequently adopted in the revision of the NEPM 1999 Guidelines. A summary of the adopted criteria for asbestos in soil is presented as follows:

- All uses: 0.001% w/w for friable asbestos (FA) and asbestos fines (AF) and no visible asbestos in surface soils (0 - 0.1 m bgs);
- Parks/Open Space – 0.02% w/w asbestos containing materials (ACM); and
- Commercial/Industrial – 0.05% w/w ACM.

6.2 Groundwater Criteria

The consultant (CDM 2013) reported the ECBH and offsite areas are located in an urbanised area with ready access to reticulated, potable water. Therefore the potential for groundwater to be used for drinking water was considered negligible and the drinking water guidelines do not apply.

Similarly, the consultant (CDM 2013) reported the receiving water of Eastern Creek is not known to be used for recreational purposes and therefore the recreational water quality guidelines do not apply.

The groundwater criteria adopted by the consultant (CDM 2013) adopted 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

Substance	Trigger Values for protection of 95% of fresh water species (µg/L) ¹
Metals/metalloids	
Arsenic III	24
Cadmium	0.2
Chromium (VI)	1
Total Chromium	10
Copper	1.4
Lead	3.4
Manganese	1700
Mercury	0.6
Nickel	11
Zinc	8
Petroleum Hydrocarbons	
Benzene	950
Toluene	180 ²
Ethylbenzene	80 ²
m & p - Xylene	275 ²
PAHs	
Naphthalene	16
Benzo(a)pyrene	0.2 ²
Phenanthrene	2 ²
Anthracene	0.4 ²
Fluoranthene	1.4 ²
PCBs	
Arochlor 1016	0.001 ²
Arochlor 1232	0.3 ²
Arochlor 1242	0.3 ²
Arochlor 1248	0.03 ²
Arochlor 1254	0.01 ⁴

Substance	Trigger Values for protection of 95% of fresh water species (µg/L) ¹
Arochlor 1260	25 ²
OCPs	
Aldrin	0.001 ²
Aldrin and Dieldrin	-
Heptachlor	0.01 ⁴
Endosulfan I	0.03 ⁴
Dieldrin	0.01 ²
Endrin	0.01 ⁴
4,4-DDE	0.03 ²
4,4-DDT	0.0006 ⁴
Cis-Chlordane	0.03 ⁴
Endosulfan II	0.007 ²
Methoxychlor	0.005 ²
OPPs	
Fenitrothion	0.2
Dichlorvos	-
Demeton-S-methyl	0.04 ²
Monocrotophos	-
Malathion	0.05
Dimethoate	0.15
Diazinon	0.01
Parathion	0.004
Parathion-methyl	-
Chlorpyrifos	0.01
Primphos-ethyl	-
Chlorfenvinphos	-
Bromophos-ethyl	-
Ethion	-
Carbophenothion	-
Azinphos Methyl	0.01 ²

Note: 1. ANZECC/AMRCANZ (2000) 'Australian and New Zealand Guidelines for Fresh and Marine Water' – Protection of Freshwater Species, 95% Protection Level
2. ANZECC/AMRCANZ (2000) 'Australian and New Zealand Guidelines for Fresh and Marine Water' – Protection of Freshwater Species, Low Reliability Trigger Values
3. ANZECC/AMRCANZ (2000) 'Australian and New Zealand Guidelines for Fresh and Marine Water' – Protection of Freshwater Species, Moderate Reliability Trigger Values
4. ANZECC/AMRCANZ (2000) Trigger Value for 99% level protection (recommended for slightly to moderately disturbed ecosystems where chemicals may bioaccumulate or 95% provides inadequate protection for test species).

6.3 Audit Findings

The previously adopted soil criteria (CDM 2013) have been checked against and were consistent with the EPA criteria. Specifically, the consultant appropriately adopted the most conservative set of criteria relating to the mix of proposed future uses, consistent with guidance provided in EPA 2006. The auditor also notes that the previously adopted criteria were generally lower than the current adopted NEPC 2013 levels.

The consultant (CDM 2013) adopted WA DoH 2009 for the asbestos criteria. In the absence of any NSW or national endorsed criteria for asbestos in soil, the auditor has exercised professional judgement in accordance with the requirements of EPA 2006 and is satisfied that the asbestos criteria in WA DoH 2009 are appropriately protective of human health and represent some, if not the most, conservative criteria for asbestos in soil in the world, as at the time of the audit. On this basis, the asbestos criteria adopted by the consultant are considered appropriate and accepted by the auditor for use in the assessment and validation of asbestos in soil at the ECBH.

The consultant (CDM 2013) also took into consideration aesthetic issues (i.e., odours and discolouration) as part of the ECBH assessment.

The auditor notes that as part of the preparation of the revised RAP (Coffey 2015) for the site, all previous soil data was reassessed in accordance with the NEPC 2013.

The groundwater investigation criteria adopted by the consultant have been checked against, and were sourced from relevant EPA endorsed guidelines, namely ANZECC/ARMCANZ 2000. The adopted criteria are considered appropriate for assessing the potential impacts to ecological receptors relevant to the ECBH setting (i.e., fresh water in a semi-urban environment).

Reference to each specific PAH, OCP, OPP, PCB etc groundwater criterion was not provided by the consultant in the report. For completeness, the auditor has provided these details in **Table 6.2**. Additionally, the criterion quoted for manganese by the consultant was 1.9 mg/L, however the Auditor notes in ANZECC/ARMCANZ 2000 it is 1.7 mg/L, this has been provided in Table 6.2.

The consultant's exclusion of drinking water and recreational criteria in the groundwater assessment was based on ECBH being located in an urbanised area and Eastern Creek is not known to be used for recreational purposes. The auditor does not accept this justification as appropriate, however, notes the estimated concentrations of total dissolved solids (TDS) provided by the consultant were sufficiently high to indicate groundwater would be unsuitable for drinking or recreational purposes. As such, the auditor considers the omission of drinking water guidelines as part of the groundwater assessment did not have any material impact on the conclusions drawn regarding groundwater quality or the potential migration of contamination from the ECBH.

Overall, the auditor considers that the soil and groundwater criteria adopted by the consultant (CDM 2013) were appropriate for the nature of the investigation and for assessing the suitability of the ECBH for the proposed uses.

7. Site Investigation Results

7.1 Field Observations

DP 2009

Field observations were summarised by the consultant (DP 2009) as follows:

- The stockpiles sampled in the southern portion of the site generally comprised a clayey matrix with various proportions of building rubble (concrete, brick, metals rods), rootlets, sandstone, plastics, cans, bottles, road base, pipes and scrap metal. Potential asbestos containing materials were noted in a few stockpiles.
- Building rubble was encountered within area of concern (AEC) 2 to AEC 17.
- Surface or near surface fragments of potential ACM were noted within AEC 2, 3, 5, 6, 7, 8, 10, 11 and 16.
- Ash was encountered in the surface profile at A2S1.
- Although the majority of the surface samples were logged as filling it is possible the ground surface had been disturbed through past demolition works giving the impression of non-natural soils.

CDM 2013

The consultant (CDM 2013) did not provide a summary of the field observations. The following has been summarised by the Auditor from the borelogs provided by CDM (2013) for the portions of the ECBH which the site lies within:

Superlot 1

- Fill materials were encountered between approximately 0-1.1 m bgs and comprised dark brown silts and clays with inclusions of demolition waste, bricks, concrete, rusted metal, tiles, roots, bitumen, rope, plastic, ceramic pipes, nails, cables, Steel, plastic bags at TP05L1, TP12L1, TP19L1, TP27L1, TP28L1, TP29L1, TP31L1, TP32L1 and TP33L1.
- Natural materials were encountered between approximately 0-5.6 m bgs and comprised brown clayey silt to brown/orange silty clay with brown/grey mottles and rootlets trace gravels.
- Shale was encountered from 3.4 m bgs to greater than 11 m bgs.
- Nine stockpiles were identified – fill plastic, bricks, concrete, steel, brown silt, roots, demolition waste, bitumen, cement, gravels, steel pipes, wood, corrugated iron, rocks, tyres, underlain by brown silty clay with grey mottles
- Tar odour was noted at TP27L1, TP29L1, TP31L1, TP32L1 and SP2L1a-b-c within fill.

Area A

- Natural materials were encountered between approximately 0-1 m bgs and comprised brown clayey silt to brown/orange silty/gravelly clay with brown/grey/red mottles and rootlets trace gravels and weathered shale.

Area X

- Fill materials were encountered between 0-0.8 mbgs and comprised brown/black silt, demolition waste, gravels, bricks, metal pipe, roots, asphalt, plastic, charcoal, rubbish, wood, tiles, bottles, concrete (TP11X, TP15X, TP18X, TP28X, TP29X, TP36X, TP38X, TP42X and TP47X).

- Natural materials were encountered between approximately 0-4.5 m bgs and comprised brown clayey silt to brown/orange silty/gravelly clay with brown/grey/red mottles and rootlets trace gravels and weathered shale.
- Shale was encountered from 3.3 m bgs to greater than 6 m bgs.
- A sulphur odour was noted at TP47X at 0.5 m bgs.

Area Y

- Fill materials were encountered between 0-0.05 mbgs and comprised brown silts with demolition waste, tiles, bricks, concrete and roots (TP6Y).
- Natural materials were encountered between approximately 0-5.4 m bgs and comprised brown clayey silt to brown/orange silty/gravelly clay with brown/grey/red mottles and rootlets trace gravels and weathered shale.
- Shale was encountered from 1.4 m bgs to greater than 8 m bgs
- A PID was used to screen any volatile hydrocarbons during the investigation; no significant volatile hydrocarbons were detected during the investigation during screening.
- No oily substances or petroleum hydrocarbon odour were observed in the groundwater during monitoring well development, purging and groundwater sampling. A slight sulphur odour was noted during purging of BH7L1 and BH30L1.
- The inferred groundwater flow direction for groundwater present in the natural materials underlying the site was calculated in a north-easterly direction.
- Groundwater quality parameters during groundwater sampling were reported as follows:
 - pH ranged from 6.01 to 6.81.
 - Electrical conductivity ranged from 17.95 mS/cm to 31.778 mS/cm.
 - Dissolved oxygen ranged from 0.83 mg/L to 3.8 ppm.
 - Redox potential ranged from -58.8 mV to 130.7 mV.

7.2 Soil Investigation Results

The consultant (DP 2009 and CDM 2013) provided summary results tables (**Appendix F**) in addition to detailed laboratory reports and chain of custody documentation. In comparison to the adopted soil criteria (**Section 6.1**), the following results for the site were reported.

7.2.1 Metals

DP 2009

- The reported concentrations of arsenic in the soils samples ranged from 4 mg/kg to 19 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of cadmium in the soil samples ranged from less than the LOR to 2.9 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of chromium in the soil samples ranged from 15 mg/kg to 46 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of copper in the soil samples ranged from 8 mg/kg to 40 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.

- The reported concentrations of lead in the soil samples ranged from 23 mg/kg to 1400 mg/kg at sample Ax4S1, with one reported concentration (Ax4S1) exceeding the adopted PIL and HIL-E and none exceeding the adopted HIL-F.
- The reported concentrations of mercury in the soil samples ranged from less than the LOR to 1 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of nickel in the soil samples ranged from 5 mg/kg to 32 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of zinc in the soil samples ranged from 11 mg/kg to 1600 mg/kg, with seven reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.

CDM 2013

Superlot 1

- The reported concentrations of arsenic in the soils samples ranged from <4 mg/kg to 20 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of cadmium in the soil samples ranged from less than the LOR (0.5 mg/kg) to 4.5 mg/kg, with two reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of chromium in the soil samples ranged from 3 mg/kg to 36 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of copper in the soil samples ranged from 4 mg/kg to 120 mg/kg, with two reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of manganese in the soil samples ranged from 5 mg/kg to 2300 mg/kg, with 38 reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of mercury in the soil samples ranged from less than the LOR (0.1 mg/kg) to 2.2 mg/kg, with one reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of nickel in the soil samples ranged from 2 mg/kg to 47 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of lead in the soil samples ranged from 6 mg/kg to 610 mg/kg, with one reported concentration (SP6L1-0-0.05) exceeding the adopted PIL and HIL-E and none exceeding the adopted HIL-F.
- The reported concentrations of zinc in the soil samples ranged from 4 mg/kg to 3400 mg/kg, with 14 reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.

Superlot 2 and Area A

- The reported concentrations of arsenic in the soils samples ranged from <4 mg/kg to 24 mg/kg, with one reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.

- The reported concentrations of cadmium in the soil samples ranged from less than the LOR (0.5 mg/kg) to 1 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of chromium in the soil samples ranged from 10 mg/kg to 38 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of copper in the soil samples ranged from 7 mg/kg to 192 mg/kg, with one reported concentration exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of manganese in the soil samples ranged from 9 mg/kg to 3700 mg/kg, with 44 reported concentrations exceeding the adopted PIL and two reported concentrations (TP9L2-0-0.05, 3700 mg/kg and TP7L2-0-0.05, 3300 mg/kg) exceeding HIL-E and none exceeding the HIL-F.
- The reported concentrations of mercury in the soil samples ranged from less than the LOR (0.1 mg/kg) to 1.6 mg/kg, with one reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of nickel in the soil samples ranged from 2 mg/kg to 25 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of lead in the soil samples ranged from 6 mg/kg to 300 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of zinc in the soil samples ranged from 6 mg/kg to 451 mg/kg, with nine reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.

Area Y

- The reported concentrations of arsenic in the soils samples ranged from <4 mg/kg to 8 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of cadmium in the soil samples were less than the LOR (0.5 mg/kg), with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of chromium in the soil samples ranged from 7 mg/kg to 24 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of copper in the soil samples ranged from 4 mg/kg to 29 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of manganese in the soil samples ranged from 6 mg/kg to 2300 mg/kg, with 15 reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of mercury in the soil samples ranged from less than the LOR (0.1 mg/kg) to 0.1 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of nickel in the soil samples ranged from 2 mg/kg to 16 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.

- The reported concentrations of lead in the soil samples ranged from 6 mg/kg to 78 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of zinc in the soil samples ranged from 3 mg/kg to 140 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.

Area X

- The reported concentrations of arsenic in the soils samples ranged from <4 mg/kg to 29 mg/kg, with one reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of cadmium in the soil samples ranged from less than the LOR (0.5 mg/kg) to 22 mg/kg, with one reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of chromium in the soil samples ranged from 7 mg/kg to 110 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of copper in the soil samples ranged from 4 mg/kg to 11 000 mg/kg, with two reported concentrations exceeding the adopted PIL and one concentration TP47x-0.1-0.15 exceeding both the HIL-E and HIL-F. All remaining concentrations were below adopted HIL-E and HIL-F.
- The reported concentrations of manganese in the soil samples ranged from 4 mg/kg to 4600 mg/kg, with 61 reported concentrations exceeding the adopted PIL and the following seven concentrations exceeded HIL-E, none exceeded HIL-F:
 - BH20X-1.5-1.6 – 3100 mg/kg.
 - TP21X-0-0.05 – 3800 mg/kg.
 - BH22X-0-0.05 – 3900 mg/kg.
 - TP23X-0-0.05 – 3200 mg/kg.
 - TP24X-0.1-0.15 – 3400 mg/kg.
 - TP28X-0.1-0.15 and its duplicate QAQC29 – 3900 mg/kg and 4600 mg/kg, respectively.
- The reported concentrations of mercury in the soil samples ranged from less than the LOR (0.1 mg/kg) to 0.4 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of nickel in the soil samples ranged from 2 mg/kg to 98 mg/kg, with two reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of lead in the soil samples ranged from 4 mg/kg to 1100 mg/kg, with two reported concentrations (TP47x-0.1-0.5, 1100 mg/kg and TP47x-0.-0.4, 770 mg/kg) exceeding the adopted PIL and HIL-E and none exceeding the adopted HIL-F.
- The reported concentrations of zinc in the soil samples ranged from 7 mg/kg to 6800 mg/kg, with six reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.

Area C

- The reported concentrations of arsenic in the soils samples ranged from <4 mg/kg to 13 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.

- The reported concentrations of cadmium in the soil samples ranged from less than the LOR (0.5 mg/kg) to 0.6 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of chromium in the soil samples ranged from 3 mg/kg to 36 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of copper in the soil samples ranged from 7 mg/kg to 90 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of manganese in the soil samples ranged from 18 mg/kg to 770 mg/kg, with three reported concentrations exceeding the adopted PIL and no reported concentrations exceeding the adopted HIL-E and HIL-F.
- The reported concentrations of mercury in the soil samples ranged from less than the LOR (0.1 mg/kg) to 0.1 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of nickel in the soil samples ranged from 3 mg/kg to 34 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of lead in the soil samples ranged from 7 mg/kg to 23 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.
- The reported concentrations of zinc in the soil samples ranged from 8 mg/kg to 57 mg/kg, with no reported concentrations exceeding the adopted PIL or the adopted HIL-E and HIL-F.

7.2.2 TPH/BTEX

The reported concentrations of BTEX compounds and TPH C₆-C₉ were all below the laboratory LORs reported in both DP (2009) and CDM (2013).

The reported concentrations of TPH C₁₀-C₃₆ in the analysed soil samples from both DP (2009) and CDM (2013) ranged from less than the LOR to 2560 mg/kg at TP27L1B 0.1-0.15 within Superlot 1 (CDM 2013). This sample and surface sample TP05L1 exceeded the adopted soil criterion (1000 mg/kg). All remaining analysed samples were below the adopted soil criterion.

7.2.3 VOCs

The reported concentrations of VOCs in the analysed soil samples within the site from CDM (2013) were all below the laboratory LORs.

7.2.4 OCPs/OPPs

The reported concentrations of PCBs in the analysed soil samples were all below the laboratory LORs during both investigations (DP 2009 and CDM 2013).

The reported concentrations of OCPs in the analysed soil samples from both investigations (DP 2009 and CDM 2013) ranged from less than the laboratory LORs to 2.9 mg/kg of DDD/DDE/DDT detected in SP6L1-0-0.05 within Superlot 1 (CDM 2013). Additionally, Aldrin/Dieldrin was detected within one sample (SP4L1-0.5-0.6) at 0.55 mg/kg also within Superlot 1 (CDM 2013). No reported concentrations within DP (2009) and CDM (2013) exceeded adopted HIL-E and HIL-F.

7.2.5 SVOCs and PAHs

The reported concentrations of SVOCs in the analysed soil samples from CDM (2013) were below the laboratory LORs, with the exception of the following:

- Bis-2-ethylhexyl phthalate detected at TP05L1 (5 mg/kg).
- Diethyl phthalate detected at TP31L1-0.5-0.6 (3 mg/kg).
- Di-n-butyl phthalate detected at TP32L12-0-0.05 (3 mg/kg).

The reported concentrations of benzo(a)pyrene in the analysed soil samples from both investigations (DP 2009 and CDM 2013) ranged from less than the LOR to 2 mg/kg at sample TP48x-0-0.05 located within Area X. No reported concentrations within DP (2009) and CDM (2013) exceeded adopted HIL-E and HIL-F.

The reported concentrations of total PAHs in the analysed soil samples from both investigations (DP 2009 and CDM 2013) ranged from less than the LOR to 16 mg/kg at sample TP48x-0-0.05 located within Area X. No reported concentrations within DP (2009) and CDM (2013) exceeded adopted HIL-E and HIL-F.

7.2.6 Asbestos

During the DP (2009) investigation 16 fragments were reported to contain asbestos collected from locations across the site.

During the CDM (2013) investigation the consultant reported the following for the site:

- Superlot 1 - one fragment was analysed from TP16L1 and reported to contain asbestos. Additionally, two soil samples were reported to contain ACM (SP8L1-0-0.05 and SP9L1-0-0.05) above the laboratory LOR. One of these samples was also reported to contain asbestos fines (SP9L1-0-0.05). The remaining soil samples analysed were reported as non-detect for asbestos.
- Superlot 2 and Area A – 12 fragments were analysed and all were found to contain asbestos. Additionally, two soil samples were reported to contain ACM (TP24L2 and QA55) above the laboratory LOR. No soil samples analysed were reported to contain asbestos fines. The remaining soil samples analysed were reported as non-detect for asbestos.
- Area X – six fragments were analysed and five were reported to contain asbestos. Additionally, one soil sample was reported to contain ACM (TP47x-0-0.5) above the laboratory LOR and one soil sample was reported to contain asbestos fines (TP21x-0-0.05) above the laboratory LOR. The remaining soil samples analysed were reported as non-detect for asbestos.
- Area C and Y – all soil samples analysed for asbestos were reported as non-detect.

7.3 Groundwater Investigation Results

The groundwater results present below are for the entire ECBH site.

The consultant (CDM 2013) provided summary results tables (**Appendix F**) in addition to detailed laboratory reports and chain of custody documentation. In comparison to the adopted groundwater criteria (**Section 6.2**), the following results were reported.

7.3.1 Metals

- The reported concentrations of arsenic in the groundwater samples were all <1 µg/L, with no reported concentrations exceeding the adopted groundwater criteria.
- Concentrations of cadmium in the groundwater samples ranged from <0.1 µg/L to 1 µg/L, with five reported concentrations exceeding the adopted groundwater criteria.

- Concentrations of chromium in the groundwater samples ranged from <1 µg/L to 1 µg/L, with no reported concentrations exceeding the adopted groundwater criteria.
- Concentrations of copper in the groundwater samples ranged from <1 µg/L to 2 µg/L, with one reported concentrations exceeding the adopted groundwater criteria.
- Concentrations of manganese in the groundwater samples ranged from 420 µg/L to 19 000 µg/L, with eight reported concentrations exceeding the adopted groundwater criteria.
- Concentrations of mercury in the groundwater samples were all reported at levels less than the LOR (< 0.05 µg/L).
- Concentrations of nickel in the groundwater samples ranged from <1 µg/L to 20 µg/L, with one reported concentration exceeding the adopted groundwater criteria.
- Concentrations of lead in the groundwater samples were all reported at levels less than the LOR (< 1 µg/L).
- Concentrations of zinc in the groundwater samples ranged from 26 µg/L to 990 µg/L, with all reported concentrations exceeding the adopted groundwater criteria.

7.3.2 TPH/BTEX

TPHs and BTEX in the analysed groundwater samples were reported at concentrations less than the laboratory LORs in all analysed samples.

7.3.3 VOCs and SVOCs

VOCs and SVOCs in the analysed groundwater samples were reported at concentrations less than the laboratory LORs in all analysed samples.

7.4 Consultants Interpretation and Conclusions

7.4.1 Soil

The consultant (DP 2009) concluded the following in relation to soil contamination at the ECBH:

- Is not environmentally suitable for redevelopment, due primarily to the presence of asbestos on the ground surface in a number of areas and to a lesser extent the presence of dumped stockpiles / fly tipping of soils and building rubble. The site can be made suitable for redevelopment following the remediation and/or management of the identified contamination.

The consultant (CDM 2013) reported the following in relation to soil contamination:

Superlot 1

- All metals concentrations were below the industrial health criteria.
- Mean concentrations of manganese and zinc in soil within the proposed shale woodlands area in the northeast were above ecotoxicity criteria but within published background soil metals concentrations (NEPC 1999).
- No management of heavy metals impacted soil was considered necessary.
- The TPH C₁₀-C₃₆ concentration in TP27L1 and TP05L1 contain some bitumen waste and should be managed for aesthetics. No evidence of hydrocarbons was detected in surrounding soil.
- ACM present in the surface soils in locations TP16L1, SP8L1, and SP9L1 will require management.
- Waste material was identified in several locations in the southern portion of the lot. No waste materials were identified in the woodland areas.

Superlot 2 and Area A

- All metals concentrations were below the industrial health criteria. Locations with exceedances of metals concentrations in soil above the ecological criteria did not show signs of stress to vegetation.
- No actions or management of heavy metals impacted soil was considered necessary.
- No significant organic compound concentrations were detected in soil within the lots.
- ACM present at locations TP5L2, TP6L2, TP22L2, TP6L2, TP24L2, TP27L2, TP28L2, TP29L2, TP31L2, and TP32L2 will require management.
- Waste materials were identified in several locations in the southwest, west, northwest and northeast which will require management.
- Wastes identified in woodland areas will require control under a Long term Environmental Management Plan (LEMP).

Area C

- Mean metal concentrations in soil were below the ecotoxicity and all health related criteria. Locations with exceedances of metals concentrations in soil above ecological criteria did not show signs of stress to vegetation.
- No actions or management of heavy metals impacted soil was considered necessary.
- Samples collected from bituminous material on Beggs Road contained TPH. No other significant organic compound concentrations were detected in soil within Area C. No management actions required.
- ACM was not detected in Area C.
- Waste material identified in Area C comprised bitumen road base which will require management.

Area X

- Mean metals concentrations in soil were below the ecotoxicity and all health related criteria, with exception of manganese and zinc which were above background ranges. There was no evidence of effect on the abundant grasses, shrubs and trees at the Site.
- No actions or management of heavy metals impacted soil was considered necessary, with exception of location TP47X to approximately 0.4 mbgs or until no waste is visually identified.
- No significant organic compound concentrations were detected in soil.
- ACM contained in the surface soils in locations TP11X, TP21X, TP38X2, TP43X, and TP47X will require management.
- Waste material was identified in several locations across the area that will require management.

Area Y

- Mean metals concentrations in soil were below the ecotoxicity and all health related criteria. Locations with exceedances of metals concentrations in soil above ecological criteria did not show signs of stress to vegetation.
- No actions or management of heavy metals impacted soil was considered necessary.

- No significant organic compound concentrations were detected in soil.
- ACM was not detected in Area Y.
- Waste materials were detected at TP06Y on the western edge of the proposed detention basin and will require management.

The consultant (CDM 2013) overall summarised the ECBH site may be developed for the proposed uses through the implementation of a remediation strategy and Remediation Action Plan (RAP) for each proposed development area.

7.4.2 Groundwater

The consultant (CDM 2013) reported the following in relation to groundwater contamination:

- Concentrations of TPH, BTEX, VOCs, and SVOCs were not detected in any groundwater samples in any locations across the ECBH.
- For SVOCs pentachlorophenol, DDT, endrin, g-BHC (lindane), heptachlor, and 2,4-dinitrophenol laboratory limits of reporting for water analysis were greater than the ANZECC/ARMCANZ 2000 trigger value concentrations. Since these contaminants were not detected in soil, and no concentrations of SVOCs were detected in groundwater at the ECBH, analyses at lower detection limits was not considered necessary, and the analyses performed are satisfactory.
- ANZECC/ARMCANZ 2000 low reliability trigger values can be incorporated for analytes that do not have high reliability trigger values (i.e. some metals, SVOCs (OCPs, PAHs), however given that metals were detected and are considered indicative of background ranges, and SVOC concentrations were not detected in any concentrations the trigger values included in the laboratory report are considered suitable.
- Heavy metals in filtered samples collected from several monitoring wells at the ECBH indicated heavy metals above the ANZECC 2000 freshwater guidelines for protection of aquatic ecosystems, including cadmium, copper (BH17Y location only), manganese, nickel (in BH20X location only), and zinc. Zinc was detected at a mean value of 0.47 µg/L, and present in all groundwater samples above the ANZECC 2000 freshwater criteria.

The consultant (CDM 2013) concluded groundwater at the ECBH contained heavy metal concentrations above freshwater ecosystem criteria, but the source of heavy metals is likely off-site, and any risk to identified potential receptors is considered low. The consultant noted that manganese concentrations in groundwater in the region of the ECBH are known to be elevated. No management/remediation of groundwater is required.

7.5 Audit Findings

The consultant (DP 2009) provided tables that were generally accurate and complete.

The consultant (CDM 2013) provided tables that were generally accurate and complete, with the following exceptions:

- TPH, BTEX and metals results for a number of soil samples were not presented in the summary tables (specifically, Table 1A as provided in CDM 2013), however, these sample results were provided in a draft version of the report (dated 12 December 2012). It is unclear as to why these sample results were not summarised in the final report. These samples include the following:
 - TP21L1 0.0-0.05 and TP21L1 0.3-0.4;
 - TP22L1 0.0-0.05 and TP22L1 0.1-0.15;
 - TP23L1 0.0-0.05 and TP23L1 0.45-0.55;

- TP24L1 0.0-0.05 and TP24L1 0.95-1.05;
- TP25L1 0.0-0.05 and TP25L1 0.1-0.15;
- TP26L1 0.0-0.05 and TP26L1 0.1-0.15;
- TP27L1 0.0-0.05, TP27L1B 0.1-0.15 and TP27L1 0.9-1.0;
- TP28L1 0.0-0.05, TP28L1 0.45-0.55 and TP28L1 1.2-1.3;
- TP29L1 0.0-0.05 and TP29L1 0.1-0.15;
- BH30L1 0.0-0.05, BH30L1 0.1-0.15, BH30L1 4.0-4.1, and BH30L1 8.0-8.1; and
- TP31L1 0.0-0.05 and TP31L1 0.5-0.6;
- It is noted the above listed sample results were generally consistent with no results reported at concentrations exceeding the laboratory LORs and/or adopted SAC with the following exceptions:
 - Manganese was reported at concentrations exceeding the adopted SAC in the majority of the above referenced samples;
 - Zinc was reported at concentrations exceeding the adopted SAC in samples TP21L1 0.0-0.05, TP28L1 0.0-0.05, TP28L1 0.45-0.55 and BH30L1 0.1-0.15; and
 - TPH C10-C36 was reported at a concentration exceeding the adopted SAC in sample TP27L1B 0.1-0.15.
- Samples TP9L1 0.0-0.05 and TP9L1 0.1-0.15 (collected 26/09/2012) were incorrectly referenced as TP19L1 0.0-0.05 and TP19L1 0.1-0.15, respectively, on Tables 1A, 1B, 1C and 1D.
- A number of manganese sample results on Table 1A were bolded to indicate a guideline exceedance, however, some of these results were reported below the adopted SAC and as such did not require bolding.
- Sample TP29L1 0.0-0.05 on Table 1B indicates VOCs were not analysed, however, a full VOC analysis was conducted on this sample with all results reported at levels <LOR.
- Low levels of SVOCs were reported for sample TP29L1 0.0-0.05, however, these results were incorrectly reported as <LOR on Table 1C. All results reported at levels exceeding the laboratory LOR for this sample were below the adopted SAC (where applicable).
- Asbestos analysis corresponding to sample TP29L1 0.0-0.05 was not summarised on Table 1D (no asbestos was detected in this sample).
- Sample SP28L2 as collected from a stockpile on 3 October 2012 is mislabeled as SP29L2 on Table 2D.
- Samples BH22X 0.0-0.05 and BH22X 0.5-0.6 as provided in Envirolab report #79126 are incorrectly labeled on Table 3D as samples BH22Y 0.0-0.05 and BH22Y 0.5-0.6. In addition, sample BH17Y 0.0-0.05 is incorrectly labeled on Table 3D as sampled on 12 September 2012 (this sample was collected on 19 September 2012).
- Asbestos analysis corresponding to samples TP9X and TP46X were not summarised on Table 4D (no asbestos was detected in these samples). In addition, material sample TP47X was not summarised on Table 4D (this material was confirmed as containing asbestos).
- Sample TP1X 0.0-0.05 as collected on 3 October 2012 is mislabeled as TP2X 0.0-0.05 on Table 4D.

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 and waste material.

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 site plans provided by the consultants (DP 2009 and CDM 2013) were to scale and adequately identified the sampling locations relevant to the main site features such as boundaries and street frontages.

The consultant (CDM 2013) provided an assessment of aesthetic conditions of fill materials at the site. The assessment of these materials revealed ACM, bitumen/road base fill and demolition wastes. These observations were incorporated into consideration of the proposed remedial strategy (Section 8) and are considered appropriate for the purposes of this site audit.

The consultant (DP 2009 and CDM 2013) reported the analysed fill/waste and topsoil contained asbestos above the adopted soil criteria. These results were incorporated into consideration of the proposed remedial strategy (Section 8) and are considered appropriate for the purposes of this site audit.

Soil waste classifications were conducted by the consultant (CDM 2013) on soils across the site, however the auditor considers these waste classifications preliminary in nature and additional sampling and analyses will be required during the proposed remediation works at the site.

Superlot 3, Area B, Area P and Area Q were not intrusively investigated by CDM Smith (2013) and therefore site suitability has not been assessed. The auditor requires prior to any redevelopment works detailed assessments be conducted within these areas.

The conclusions reached by the consultant in relation to the soil and groundwater contamination issues are considered appropriate and meet the requirements of the site audit. However, additional sampling is required to adequately conduct a waste classification for materials requiring off-site disposal. Overall, the consultant (CDM 2013) is considered to have obtained and reported results in a manner which enables conclusions to be drawn regarding the need for remediation (**Section 8**) and therefore meets the requirements of the site audit.

8. Phase 1 Early Works Remediation and Validation

8.1 Remediation Objective

As outlined in the Phase 1 Early Works RAP (Coffey 2015), the objective of the remedial program is to ensure that the site is suitable for the redevelopment for the proposed uses. As indicated in Coffey 2015, the proposed future use of the land is not known, however will include mixed uses with potential redevelopment to include bulky good and self-storage; retail centres or aged care and/or health facilities; nature reserves; children playground; detention basins; and associated site infrastructure including roads and services.

8.2 Remediation Options

The consultant (Coffey 2015) reported, in accordance with EPA 2006, the preferred options for remediation and/or management of contaminated land are summarised as follows, in order of preference:

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

8.3 Preferred Remedial Approach

Based on the nature and extent of the identified contamination, low human health risk and the proposed redevelopment of the site, the consultant (Coffey 2015) considered the following most viable remediation options for the site:

- Areas identified to have ACM in the surface soils and where significant volumes of asbestos contaminated materials are identified (if any), excavation or removal by other means (such as emu picking) of contaminated surface soil materials, and their transfer and placement to a designated containment area and long-term management;
- Areas identified with only small or minor volumes of asbestos contaminated materials are found to be present or where chemical contamination of soils is identified to be present (if any), these materials will be removed for disposal off-site to a landfill appropriately licenced to accept these materials;
- Large areas of the site to be used for parks, open space and recreational uses that will be fenced and not accessible for use by the public and in which no asbestos contamination has been identified, but where the likelihood of contamination may exist in the future, no remediation will be undertaken. However as a precautionary measure and to ensure protection of future users and to ensure suitability of these areas for the proposed use, a long-term management plan will be required; and
- Areas which no contamination has been or is identified during the completion of the Early Works and for which an appropriate sampling and analytical density has been demonstrated to have been conducted no remediation or long-term management will be required in order for these areas to be suitable.

8.4 Remediation Extent

The consultant (Coffey 2015) reported that the areas requiring remediation are those where asbestos impact has been identified or reasonably expected, with asbestos impact identified at the site as being 'high' or 'low' and are summarised as follows:

- 'High' likelihood areas –include areas in the vicinity of former and current structures where ACM has been used in construction; stockpiles of uncontrolled fill; and fly tipping; and
- 'Low' likelihood areas – which includes the remainder of the site where activities have not involved the use or illegal placement of ACM.

The consultant (Coffey 2015) reported that areas with a 'high' likelihood of asbestos impact will be remediated by excavation, removal of ACM and asbestos impacted soil prior to the bulk earthworks in the Phase 1 Early Works; with the 'low' likelihood areas to be managed through the implementation of a site management plan, where remediation will only be triggered if asbestos impact is encountered.

The consultant (Coffey 2015) reported that previous investigations indicated that heavy metals may pose an unacceptable risk to ecological receptors in designated open space areas. The consultant recommended that a review of the screening level risk assessment is required in these areas prior to considering remediation and assessing the potential risk that these concentrations may pose to ecological receptors, if any. The consultant (Coffey 2015) noted that as part of the bulk earthworks, the landform on the western portion of the site will be substantially modified, as such the available heavy metal information may not be relevant for the site.

The consultant (Coffey 2015) also reported that remediation and / or management of groundwater is not required at the site, as the observed groundwater quality indicates that groundwater is not impacted.

8.5 Remediation Activities

8.5.1 Work Plans and Licenses

The consultant (Coffey 2015) detailed that preparatory works will be required to be undertaken at the site prior to the any commencement of site remediation works and will include the following:

- A construction and environment management plan (CEMP) must be prepared as part of the construction activities. The CEMP will document control measures for managing environmental aspects associated with the Phase 1 Early works.
- The majority of asbestos identified at the site is bonded. Prior to the commencement of any bonded asbestos removal works, preparation of an Asbestos Removal Control Plan (ARCP) by a Class B licensed asbestos removal contractor for all identified bonded asbestos will be required.
- Friable asbestos has been previously identified in two areas of the site, removal of the friable asbestos contaminated soils must be supervised by a Class A licensed asbestos removal contractor. As part of these works and prior to the commencement of any asbestos removal works, preparation of an Asbestos Management Plan (AMP); preparation of an ARCP; and notification to WorkCover for works associated with the removal of 'friable' asbestos (7 days prior to the commencement of works) will be required.
- The remediation works form part of the redevelopment of the site which has planning approval as a under SSD # 5175 (refer to **Section 1.3**). Based on the change in the nature and extent of the Phase 1 Early Works, a Section 96 will be submitted by the Certifying Authority for an amendment, with the RAP (Coffey 2015) submitted to support the application, prior to the commencement of any site works.

8.5.2 Site Establishment and Ground Preparation

The consultant (Coffey 2015) reported that permanent and/or temporary fencing will be erected to designate the remediation zones at the site and to restrict access by unauthorised personnel and will be maintained throughout the duration of the works.

Asbestos contaminated has been previously identified at isolated locations across the site within the upper 0.15 m soil profile, comprising topsoil, grass and the root zone of the grass cover. The consultant (Coffey 2015b) reported that the grass is long in some areas of the site and for remediation to be effective, will need to be removed. The following approach has been detailed by the consultant (Coffey 2015) in the RAP:

- Slash the grass across the entire site, enabling the cut grass to be removed and allowing observations to be made as to the condition of the ground surface; and
- In areas where there is a high likelihood of asbestos occurrence, remaining vegetation will be sprayed with a non-persistent herbicide. Once the vegetation has died and dried out, a mechanical rake will be used to remove the residual organic matter. Some soil disturbance may occur, however the consultant reported that this will be minimised to the extent practicable. Inspection of the raked ground and removed dry vegetation for potential bonded ACM will occur during the raking process.

8.5.3 Preparation of Asbestos Containment Zone

The consultant (Coffey 2015) reported that the asbestos containment zone is located at the base of the deepest fill area on the eastern edge of Pad 3. As such, the consultant considered that minimal preparation if required with respect to earthworks in this area.

The consultant (Coffey 2015) considered that based on the current 'cut to fill' volumes, it is estimated that there is sufficient volume in fill areas to accommodate asbestos impacted material and achieve a minimum of 3 m cover above the containment zone. The consultant (Coffey 2015) has provided conservative volume estimates as follows:

- Containment Zone – covering an of 200 m north-south and 50 m east-west, with a thickness of 1 m at the eastern edge tapering to nil – volume of 2,900 m³;
- Stockpiles at southern end of site – covering an area of 5,000 m², with an average thickness of 1.5 m – volume of 7,500 m³ (allowing 10% asbestos impact); and
- Aggregate area surrounding the former structures – covering an area of 2.5 hectares, with an thickness of 0.1 m – volume of 2,500 m³.

The consultant (Coffey 2015) has estimated that approximately 3,250 m³ of asbestos impacted material will be generated, with available capacity of approximately 2,900 m³ in the containment zone. It is considered that a proportion of the available volume may be required as engineered fill, which will be placed above potentially geotechnical unsuitable (such as asbestos impacted material) material, however, this feature may be able to be designed into the 3 m cover layer. The consultant reported that a design for engineered fill to ensure acceptable structural performance of Pad 3 will be provided by a geotechnical engineer.

It has been indicated (Coffey 2015) that if the actual volume of asbestos impacted material exceeds the initial containment zone capacity, then the natural base of the containment zone will be excavated to provide additional capacity to ensure that asbestos impacted material has a minimum cover of 3 m.

8.5.4 Excavation Works

The consultant (Coffey 2015) reported that asbestos impacted material will be excavated, with minor occurrences (i.e, ACM fragments) will be removed via emu picking.

The consultant reported that the lateral extent and estimated volumes will be determined by the former building footprints, historical demolition practices and distribution of fly tipping occurrences at the site, with the actual remediation extents of impacted areas to be confirmed by observations made during the excavation works. Site observations and excavations will radiate out from the known point source of the asbestos contamination, such as the footprint of a former structure. The excavation area will also include any location where bonded ACM was observed during removal of dried vegetation.

The vertical extent of the excavation will generally range between the upper 0.1m and 0.15m of the soil profile but will extend vertically to the natural clay soils to reduce the need of validation soil sampling.

Based on the extent of the asbestos impact occupying relatively large areas, the consultant (Coffey 2015) considered that excavations should be undertaken using a grader, or similar. An excavator can then be used to load excavated material directly into the trucks for transfer to the fill area.

The consultant (Coffey 2015) reported that a qualified environmental consultant will be present during works to guide and direct the excavation of potentially contaminated soils. The consultant reported that excavations will be extended until visually no evidence of asbestos impact is observed, and will be validated to confirm asbestos impact has been effectively removed. The consultant (Coffey 2015) reported that the excavated area will be securely barricaded and fenced until an asbestos clearance is given.

8.5.5 Management of Existing Stockpiles

The consultant (Coffey 2015) reported that numerous stockpiles are located across the site of varying composition and sizes, with the majority of stockpiles located within the southern portion of the site. The stockpiles generally comprise soil, with varying amounts of building rubble including bricks and concrete. An estimated volume of these stockpiles is not known, however the consultant (Coffey 2015) has recommended management of the stockpiles as follows:

- Option 1 - Screening of the stockpiles for recovery of recyclable waste, assessing soil composition for reuse or classify for offsite disposal as appropriate; or
- Option 2 - Transfer and place the stockpiles into the fill area.

The consultant (Coffey 2015) considered that Option 1 may not be commercially viable should the stockpiles be heterogeneous; and the amount of recoverable recyclable materials is relatively small for the time spent in screening for ACM fragments. The consultant considered that if Option 2 is adopted, the stockpiled material will be transferred directly to trucks for transport to the fill area. It has also been recommended that the ground surface beneath the stockpile footprint be scrapped and also transferred to the fill area.

The consultant (Coffey 2015) considered that the most viable option for the management of the existing stockpiles can be considered once the area is suitably cleared of vegetation and a thorough inspection of the stockpiled material can be made.

8.5.6 Placement of Materials within the Containment Area

The consultant (Coffey 2015) reported that as part of the preparation of the site for bulk earthworks, geotechnically unsuitable materials are removed from the site. Unsuitable materials typically include topsoil, vegetation and loose saturated soils. Based on the previous investigations, the consultant reported that asbestos occurrence is within geotechnically unsuitable materials (typically topsoil with grass), as such additional geotechnical engineering advice will be required prior to the commencement of the remediation works to allow appropriate placement of unsuitable materials, so that performance of pavements and buildings in the vicinity of the containment zone is not compromised.

The consultant (Coffey 2015) has recommended that asbestos impacted materials will be spread thinly (<100mm) across the fill area where it will be nominally compacted. Should the geotechnical properties of the asbestos impacted material require improvement to achieve the geotechnical design specification, coarse fill will be placed then worked into asbestos impacted materials to provide necessary structure to this material. The consultant (Coffey 2015) has reported that working of the materials would require water application to keep raised dust to a practical minimum.

The consultant (Coffey 2015) has reported that the remediation of asbestos impacted soils will occur at the beginning of earthworks program, however, development may be undertaken in three or four separate events, with the timing of the works to be directed through the land releases. It has been reported that the period between land releases could be several months to a year or more. At the completion of each earthworks event, the asbestos impacted material will be covered with a minimum of 0.5m of suitable fill material and will be surveyed to determine the lateral and vertical

Position of the material. The consultant (Coffey 2015) reported that the area around the containment zone will be enclosed within a 1.8m high fence during the interval between earthworks events until Pad 3 is constructed to provide the final 3m cover.

8.5.7 Remediation Works Contingency Plan

The consultant (Coffey 2015) provided a contingency plan which outlines procedures for the identification and management of unexpected issues or events that may arise during the remediation works and the corresponding corrective actions. It contains provisions for the following events:

- Identification of ACM in low likelihood areas of the site;
- Identification of friable ACM during removal activities within a 'bonded asbestos' area;
- The asbestos containment zone reaches its capacity (i.e, 3m below the final surface level);
- Air monitoring at the perimeter of an asbestos work zone exceeds the acceptable working level of asbestos fibres in air;
- Identification of 'suspicious' material including but not limited to oily materials or materials with unusual odours; drums; plastic chemical containers; buried solid waste; ash; slag; coke; and putrescible or other biological waste.

8.6 Remediation Works Environmental Management Plan

The consultant (Coffey 2015) reported a construction and environment management plan (CEMP) will be prepared for the site prior to the commencement of construction and remediation works and must meet the following minimum requirements:

- Hours of operation;
- Soil and Water Management;
- Asbestos Management;
- Stormwater Control;
- Soils and Erosion Control;
- Excess/Accumulated Waters;
- Site Access;
- Noise and Vibration;

- Ambient Air Monitoring;
- Odour;
- Material Transporting and Tracking; and
- Complaint Reporting and Resolution.

8.6.1 Asbestos Management

The consultant (Coffey 2015) reported the presence of both bonded and fibres asbestos at the site, as such, on site control measures will be required during remedial works to prevent release of asbestos fibres. Control measures and air monitoring requirements for the asbestos removal works will be documented in the AMP. In general, control measures will include at a minimum materials tracking, dust suppression, control and monitoring and are discussed below.

8.6.2 Air Monitoring

The consultant (Coffey 2015) reported that the main type and source of air emissions from the site during the works will be dust and other particulates generated during soil disturbance.

During the asbestos removal works, the consultant (Coffey 2015) reported that air monitoring will be undertaken at the site in accordance with the requirements of the AMP. No other chemical emission, such as petroleum hydrocarbon are expected at the site. Records of air monitoring conducted during the excavation works will be made available to relevant regulatory officers, as requested.

8.6.3 Dust Emissions

The consultant (Coffey 2015) reported that the remediation works will include the excavation of a shallow later of soil, stockpiling, transportation of soil, placement of soil and general movement of vehicles across the site. The consultant considered that dust generation is considered a potential environmental impact to the surrounding environment and public.

The consultant (Coffey 2015) recommended that the following management measures are implemented at the site to prevent dust impacts:

- Where the area of remediation is within 20 m of a public road (with the exception of the M7), a fence covered with high-density oven shade cloth will be erected as a barrier between the remediation zone and public land;
- A communication and complaints register will be operated to ensure that any concerns of local residencies and businesses are recorded and addressed;
- Emission of air-borne dust beyond the immediate area of excavation will be kept to a practical minimum by regular application of water across exposed soil areas, including any roads within the site;
- If dust migration is considered excessive due to high winds and cannot be controlled with water, the works will be delayed or limited during these periods;
- Stockpiles that are not in active use will be covered with a high-density polyethylene (HDPE) sheet to reduce the potential for dust generation;
- Regular dampening of stockpiles with water mist may be required to minimise dust generation;
- For remediation areas, where a fence on the adjacent site boundary is required, stockpiles will not exceed the height of the fencing so that any dust migration to the surrounding environment is minimised;

- All trucks transporting asbestos impacted soils must be covered in order to minimise dust generation;
- Consideration of the implementation of a tyre grid / wash to prevent soil being transported offsite via vehicular movement; and
- All vehicles involved with the handling of asbestos impacted soils, must be washed down in a designated area which has a trap sediment from wash-down water before leaving the site or being reassigned to an activity in an area of the site which has a low likelihood of asbestos impact.

8.6.4 Stormwater and Sediment Control

The consultant (Coffey 2015) reported that excavated soils will be stockpiled directly on the ground surface adjacent to the excavation, with the stockpiled soils bunded with adequate provision for offsite stormwater control by the placement of hay bales and silt fencing. The soil erosion and sedimentation control measures will be implemented:

- Ensuring silt fencing and hay bales will cope with high rainfall events particularly on the downgradient sides of each stockpile;
- Stockpiles will be placed where erosion by overland flow is minimised, with all stockpiles to be covered securely to prevent erosion by rain;
- Additional sediment erosion and control structures readily available on site in the event that controls fail;
- Inspection of all vehicles to ensure that no soil is transported to other parts of the site or offsite; and
- Regular maintenance and replacement of damaged sediment control structures and improve other temporary measures as required.

8.6.5 Water Management

The consultant (Coffey 2015) reported that seepage water and stormwater may collect and accumulate in open excavations. Based on the level of contamination present, the consultant reported that any accumulated water will be pumped out and reused on site for dust suppression.

Any surface water (Coffey 2015) will be directed away from the excavations and onsite watercourses, where possible, through the use of budding or sand bags.

8.6.6 Noise Controls

The consultant (Coffey 2015) reported that all contractors will be required to comply with statutory regulations regarding noise limitations in residential and commercial areas, and hours as restricted by Blacktown City Council.

The consultant reported that if control measures are not sufficient to reduce noise levels, a noise monitoring program will be implemented, which will include noise surveys at the noise source and surrounding properties.

8.6.7 Materials Tracking

The consultant (Coffey 2015) reported that the management and tracking of excavated material will be recorded on a site diagram and daily logs by the remediation contractor and will be stored in the site office. The daily log will be required to detail the area in which the work was conducted; general description of the works completed; movement of material offsite, if required; and movement of materials across the site. The site diagram will also be required to record the source location of the excavated material.

8.6.8 Waste Disposal

The consultant (Coffey 2015) reported that general waste generated during the works may include domestic rubbish, disposable PPE and disused sediment and erosion control structures. The disposal of domestic rubbish and disposable PPE will be collected and disposed appropriately at regular intervals; whilst the disposal of disused sediment and erosion control structures will be disposed offsite to landfill. General waste potentially containing asbestos is required to be handled and disposed in accordance with the requirements stipulated in the AMP (which will be required prior to the commencement of works).

The consultant (Coffey 2015) reported that a small volume of water may be used as part of the decontamination process at the site. Based on the nature of the identified contamination at the site, it is unlikely that any excess water will be contaminated with any chemicals of concern. As such, the consultant considered that any excess water will be spread over the stockpiled soils, to be placed in the containment zone.

8.7 Occupational Health and Safety Plan

The consultant (Coffey 2015) reported that in compliance with NSW *Work Health and Safety Act* 2010 and associated regulations and codes of practice, a site specific safety plan (SSP) will be required to be prepared for the site prior to the commencement of the remediation and validation works. The SSP will contain procedures and requirements (including PPE requirements) that will be implemented during the remediation works and should consider the following::

- Hazard identification and control;
- Air monitoring during earthworks;
- Chemical hazard control;
- Handling procedures;
- Personal protection equipment (PPE);
- Work zones;
- Decontamination procedures;
- Contingency plans;
- Details of key personnel and contact telephone numbers;
- Emergency response; and
- Incident reporting.

The consultant (Coffey 2015) reported that the SSP will be reviewed and updated prior to various projects being undertaken at the site. All personnel will require inductions by a Class A licensed asbestos removal contractor prior to entering designated works areas deemed impacted by friable asbestos.

8.8 Validation Plan

The consultant (Coffey 2015) reported that the objective of the validation plan is to adequately demonstrate whether the remediation goals stipulated in the Phase 1 Early Works RAP have been met.

8.8.1 Validation Sampling, Analytical and Quality Plan

8.8.1.1 Validation Approach

The consultant (Coffey 2015) reported that the validation approach for the site will be undertaken in accordance with the NEPM 2013; NSW EPA 1995 Guidelines; and the WA DoH 2009 Guidelines. The consultant reported that the validation approach will include a combination of field observations and field screening; and soil sampling and analysis program across the areas where 'friable' asbestos is identified to assess the effective removal of impacted soils.

The consultant's (Coffey 2015) nominated validation procedure is summarised as follows:

- Validation sampling with the excavation will be dependent on the nature of asbestos (i.e, bonded vs friable); the extent of the excavation (i.e, natural vs fill); and the condition of the ACM. The consultant reported that upon completion of the excavation works, a visual inspection of the walls and base of the excavation will be undertaken. Where the soil is observed to be clayey and in an undisturbed natural condition, a photographic record to the excavated surface will be taken and will be used as evidence of validation.
- Where the soil can be tilled with a rake, visual inspection will involve two passes along the walls and base with a rake, with a 90° direction change between the passes;
- In areas where only bond ACM has been identified in good condition, no validation sampling will be undertaken;
- If no ACM is observed, the excavation would be considered successfully validated.
- Validation soil sampling will be undertaken at excavations removing friable asbestos impact at TP21X and any other location where ACM fragments have been assessed as being in poor condition. Validation sampling will be undertaken generally in accordance with the WA DoH 2009 Guidelines and will include the following:
 - Sampling to be carried out every 5m along the excavation walls (assuming the depth of the excavation is <1m deep);
 - Visual inspection of the base of the excavation to confirm absence of ACM;
 - Collection one sample per 25m² of the base, with a minimum of 1 sample, number rounded up, if the excavation terminates in fill soil. If the excavation terminates on natural soils, a photographic record will be undertaken and no soil validation sampling will be undertaken;
 - At every sample location, 10 litres of material will be spread out for inspection on a contrasting colour material, or sieved through a 7mm sieve, and any ACM picked out and placed into a labelled zip lock bag for weighing by the analytical laboratory;
 - One wetted 500ml sub sample will be collected for laboratory analysis for asbestos identification (AS4964-2004); and
 - Where asbestos is detected in any sample, the concentration of asbestos as fragments (ACM) and as loose fibres (FA or AF) will be compared with the validation assessment criteria.

At the time of the preparation of the Phase 1 Early Works RAP, the consultant (Coffey 2015) has assumed that the existing stockpiles with inclusions of building rubble will be placed directly in the containment zone and as such no validation sampling is required. However the consultant noted that a photographic record of the stockpile footprint will be made during the works. The consultant reported that an addendum to the RAP will be prepared should 'Option 1' (detailed in **Section 8.4.5**) be implemented during the works.

The consultant (Coffey 2015) reported that the footprint of any stockpile of excavated asbestos impacted material placed outside an excavated area will be validated using the same approach as described for excavations of asbestos impact areas.

8.8.1.2 Sampling Methodology

The consultant (Coffey 2015) reported that the validation soil samples will be collected according to the procedures outlined as follows:

- Samples will be collected from directly from the excavator bucket or as a manual grab sample directly from the excavation. Where an excavator is used, samples will be collected as manual grab samples from the centre of the bucket to prevent cross-contamination;
- Soil samples collected from the stockpiles will be collected by hand at a depth of at least 0.3 m below the surface of the stockpile;
- Sampling for asbestos in soil will be undertaken out in accordance with the WA DOH (2009) guidelines. A 10L sample will be collected from the relevant stratum. Once the sample has been screened for bonded ACM, a 500mL subsample will be collected from the finer material passing the 7mm mesh and placed in a zip-lock bag. Any potential ACM fragments found during the screening process will also be placed in a separate zip-lock bag;
- Sampling for other contaminants, if required, will be placed in clean laboratory prepared and supplied 250 mL glass jars which will be filled to minimise headspace and immediately sealed with Teflon lined caps to reduce the loss of volatiles;
- If petroleum hydrocarbon contaminated is suspected, a portion of each sample will be placed inside a sealed plastic bag for field headspace screening for VOCs;
- New disposable nitrile gloves will be used for the handling of each sample; and
- All samples will be transported in secure containers to a NATA accredited laboratory under chain of custody control.

8.8.1.3 Quality Assurance and Quality Control (QA/QC)

The consultant (Coffey 2015) reported that data quality objectives (DQO) for the validation process were developed in accordance with the seven step process referred to in EPA 2006.

The consultant (Coffey 2015) provided both a field and laboratory QA/QC program will be conducted during the validation works.

The consultant reported that as the primary contaminant of concern at the site is asbestos, the field QA/QC will consist of the collected of inter-laboratory ('blind') duplicates at a rate of 1 duplicate per 20 primary samples.

The consultant (Coffey 2015) reported that for contaminants, other than asbestos the field QA/QC will consist of the following:

- Collection and analysis of 'blind and split duplicates';
- Collection of rinsate samples to determine the potential for cross-contamination between samples occurring due to sampling equipment; and
- Collection of trip spikes and blank samples.

Laboratory QA/QC will consist of the following procedures:

- Analysis and reporting of laboratory duplicate samples.
- Analysis and reporting of laboratory method blank samples.

- Analysis and reporting of laboratory control samples.
- Analysis and reporting of laboratory control spikes, matrix and surrogate spikes.

The consultant (Coffey 2015) reported the proposed validation works will include the use of laboratories which are NATA accredited for the chemical analyses undertaken. Laboratory analysis will be conducted in accordance with NEPM and are referenced to USEPA methods. The analytical schedule, laboratory methods, laboratory LORs and reference methods to be applied for the validation works must be appropriate to meet the project DQOs and DQIs.

8.8.2 Validation Acceptance Criteria

The consultant (Coffey 2015) reported that based on the nature of the identified contamination (i.e. asbestos), the NEPM Schedule B1 will be used to screen for health risks posed by asbestos if identified in validation samples. It has been noted that the NEPM 2013 (Section 4) also references the WA DoH 2009 *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. Based on this, the consultant (Coffey 2015) has nominated the following validation acceptance criteria for the site:

- No visible fragments of asbestos containing material (ACM) present at the surface (surface defined as the upper 0.1m);
- No respirable fibres of asbestos identified in soil validation samples;
- The concentration of asbestos fines (AF) and/or friable asbestos (FA) should not exceed 0.001% w/w; and
- If one or more fragments of bonded ACM are found in validation samples, then the concentration of bonded ACM should not exceed
 - 0.05% w/w for commercial / industrial land use.
 - 0.04% w/w for residential with minimal access to soil.
 - 0.02% w/w for recreational open space areas.

The consultant (Coffey 2015) has reported that the south-eastern corner of Pad 2 has been identified as an area which has the potential for use as a children's playground. The consultant has reported that this area will comprise approximately 700m² and is located in an area which consists of deep fill (more than 3m thick). Should this area coincide with the asbestos removal area, the consultant (Coffey 2015) considers that the relevant exposure scenario for validation is commercial / industrial use as the placement of fill will eliminate the exposure pathway from the remediation area. Based on this, the consultant considered that the more sensitive exposure scenario appropriate for a children's playground is not applicable to the site and is not included as part of the validation activity.

8.8.3 Validation of Cover Layer in Containment Zone

The cover 'capping' layer within the containment zone (interim and final) will be surveyed laterally and vertically and will include the following:

- Confirmation that the cover layer leaves no asbestos impacted material exposed;
- Review of pre and post survey data to confirm cover layer thickness and that it is appropriate relative to the design for that area;
- Documentation of observations with site photographs showing areas following excavation and after covering and including this information in the validation report; and

- This stage will be treated as a “hold point”. If the cover ‘capping’ layer thickness is considered satisfactory, then the barrier fence around the containment zone will be erected (or extended or closed, as applicable).

8.8.4 Validation Report

The consultant (Coffey 2015) reported at the completion of the remediation and validation of the site a Validation Report is required to be completed by the Remediation Consultant. The Validation Report is required to be written in compliance with the relevant requirements of the EPA guidelines and other applicable guidelines and will be provided to the site auditor for review and endorsement, with a SAR and SAS issued outlining the suitability of the site for the intended use. The validation report will also provide a statement as to whether the objectives of the remediation works have been met.

The consultant (Coffey 2015) reported that the validation report (in conjunction with the Notice of Completion) will be required to be submitted to the Certifying Authority; other relevant authorities and Blacktown City Council to fulfil consent condition D9 of SSD # 5175.

The consultant (Coffey 2015) reported the Validation Report must contain information including, but not limited, to the following:

- Summary of previous investigations;
- Details of the remediation works conducted on the site, with emphasis on material tracking records;
- Summary of validation results and field observations;
- Waste classification, if required;
- Any further investigations that may have been carried out during the course of the site activities;
- Disposal and imported material documentation, if required;
- Figures and photos showing the remediation and validation activities and sampling locations; and
- Site survey plan detailing specific detail of the asbestos containment zone including a cross-section.

8.9 Consultants Conclusions

The consultant (Coffey 2015) concluded the following in relation to the Phase 1 Early Works RAP:

- The previously identified asbestos impacted soil is largely in the form of fragments of bonded ACM, making the site currently unsuitable for its proposed use. The sources of asbestos impact are either remnant fragments of ACM used in former buildings (known as fibro) and ACM within uncontrolled fill materials placed in stockpiles at various locations around the site (generally located within the southern portion of the site).
- Redevelopment of the site commences with Phase 1 Early Works which includes bulk earthworks to alter the naturally sloping topography into four large (Superlots) level areas enabling future use as retail centres or aged care (or health care) facilities.
- The bulk earthworks allows an opportunity for the isolation of asbestos impacted materials in one or more containment zones, which will have a final cover of 3m of fill placed for pad construction. The consultant (Coffey 2015) reported that the asbestos impacted material may require mixing with more granular fill to achieve an acceptable geotechnical performance.

- Remediation areas will be validated following removal of the asbestos impacted materials. Suitable controls will be implemented during the works to ensure that the storage and transport of asbestos impacted material does not cause cross-contamination in other areas of the site.

Overall the consultant (Coffey 2015) considered if the remediation and validation works set out in the RAP are implemented the remedial objectives will be achieved and the site will be suitable for the proposed land uses.

8.10 Audit Findings

The consultant's nominated remediation objectives were appropriate and consistent with the proposed uses of the site.

The consultant considered a range of remediation and management options and adopted a range of options for the site, including excavation or removal (via emu picking) of asbestos contaminated materials; and excavation and offsite disposal of asbestos contaminated materials to a licensed landfill. In areas where no contamination has been identified, no remediation will be undertaken and will be managed, if required via a long-term management plan; with remaining large areas (where no asbestos contamination has been identified) which are to be used for parks, open space and recreational uses will be fenced and will not be accessible for use by the public. 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 presented in the Phase 1 Early Works RAP (Coffey 2015) 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.

Upon successful completion of the remediation and validation activities, the consultant (Coffey 2015) stated a validation report will be prepared. The auditor notes the report will need to be prepared in accordance with the requirements of EPA 2011 and EPA 2006 and other relevant endorsed EPA guidelines, with SAR and SAS issued outlining the suitability of the site for the intended uses.

The site management provisions appear to broadly control the potential impacts associated with the proposed remediation works, and appear adequately protective of both the remediation workforce and the surrounding environment (including the neighbouring community).

The remediation strategy proposed for the site is considered appropriate for the site given the identified contamination issues, and is able to make the site suitable for the proposed uses. As such, the proposed remediation and validation work process, as detailed in the Phase 1 Early Works RAP (Coffey 2015) meets the requirements of the site audit.

The RAP is attached to this Site Audit Report (**Appendix G**) and also to the Site Audit Statement.

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 previous site investigation reports (DP 2009 and CDM 013) and reviewing and assessing the suitability of the revised RAP (Coffey 2015) to determine if the land can be made suitable for the proposed landuse by the implementation of the process outlined in the RAP.

9.1 Reporting in accordance with EPA requirements

The documents provided by the consultant have been checked against, and meet the requirements of, EPA 1997. 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 have been addressed

In general, the consultants (DP 2009 and CDM 2013) provided a detailed assessment and adequate consideration to contaminant odours emanating from the site, soil discolouration and the presence of asbestos containing materials during the site investigation process and the proposed remediation/validation works.

The auditor notes any adverse contaminant odours posed by these materials, soil discolouration or presence of asbestos containing materials are unlikely to impact the future uses of the site due to the proposed remedial strategy (excavation and containment or off-site disposal of impacted soils) required to make the site suitable for the proposed uses. However, the RAP (Coffey 2015) makes provision for assessing aesthetic issues during the remediation and validation process. As such, aesthetic issues have been, and will be, appropriately addressed.

9.3 Soils have been assessed against the appropriate investigation levels

The chemical criteria adopted by the consultant (DP 2009 and CDM 2013) have been checked against, and are consistent with, appropriate criteria endorsed by the EPA for the proposed uses. As such the soils are considered to have been assessed against appropriate investigation levels.

The consultant (CDM 2013) adopted WA DoH 2009 for the asbestos criteria. It is noted that this criteria is currently endorsed by the EPA and is considered appropriate and accepted by the auditor for use in the assessment and validation of asbestos in soil at the site.

It is noted that the investigations (DP 2009 and CDM 2013) were conducted prior to the revisions to NEPM 1999 coming into force in June 2013, however, as part of the preparation of the proposed validation report, the consultant will provide a summary of analytical data in comparison to the NEPM 2013.

9.4 Background soil concentrations have been adequately addressed

The consultants (DP 2009 and CDM 2013) generally sampled to depths which provided penetration into natural soils within the site to give an indication and representation of local natural soil profiles. The chemical concentrations in soil samples from the natural soil profile were below the appropriate soil criteria and were generally within published background ranges (where available). 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

In accordance with the requirements of EPA 2006, the site management strategy outlined in the revised Phase 1 Early Works RAP (Coffey 2015) is considered to be:

- technically feasible;
- environmentally justifiable given the large quantity of materials that would otherwise have to either be treated onsite or disposed offsite; and
- consistent with relevant laws, policies and guidelines.

On this basis, the auditor accepts that the proposed site management strategy is appropriate and, if implemented appropriately, will make the site suitable for the proposed uses. The proposed future use of the site is not known, however will include four superlots with potential redevelopment to include bulky good and self-storage; retail centres or aged care and/or health facilities; nature reserves; children playground; detention basins; and associated site infrastructure including roads and services.

9.7 Contaminant migration (actual or potential) has been addressed

The consultant (CDM 2013) addressed both the potential and actual migration of the identified contaminants of concern through an assessment of groundwater.

There were no reported concentrations of contaminants identified in groundwater which were considered to pose any unacceptable risks to any off-site human or ecological receptors. As such, the requirements of the site audit in relation to consideration of contaminant migration have been met.

10. Site Audit Summary

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 proposed remediation and validation works are considered to have met the requirements of the *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (2nd Edition) (EPA 2006).
- The site investigation activities identified historically imported fill and waste materials within various areas of the site which contained reworked silty clay, demolition wastes, and fragments of asbestos containing materials.
- The levels of some contaminants of potential concern (i.e., asbestos) in fill/waste soils which are considered to require remediation or management under the proposed uses.
- There were no levels of the identified contaminants of potential concern in groundwater which are considered not to require remediation or management under the proposed uses.
- There was no evidence of potential or actual migration of contaminants from the site which may result in unacceptable risks to surrounding human or ecological receptors.
- The revised Phase 1 Early Works RAP (Coffey 2015) prepared for the site addressed the identified contamination issues; with the remediation approach documented in the RAP checked by the auditor and found to be: technically feasible; environmentally justifiable given the nature and extent of the identified contamination; and consistent with relevant laws, policies and guidelines.
- The auditor notes that the remediation and validation procedures outlined in the revised Phase 1 Early Works RAP (Coffey 2015) are considered appropriate to render the site suitable, subject to the following conditions:
 - The Asbestos Management Plan for the site must be reviewed and accepted by a Site Auditor prior to commencement of remediation works.
 - Appropriate supervision by the Remediation Consultant during the excavation of the surface fill materials within the proposed detention basin in Superlot 4.
 - The validation report for the site must be reviewed and accepted by a Site Auditor prior to occupation of the site.
 - Where required, any Long Term Environmental Management Plans (LTEMPs) for the site, must be reviewed and accepted by a Site Auditor prior to occupation.
- The suitability of the site, is subject to the implementation of the revised Phase 1 Early Works RAP prepared for the site (Coffey 2015), in accordance with the requirements of the development conditions as imposed by the Minister for Planning (# SSD5175). As part of the development consent conditions, a copy of the SAS will also be submitted to Blacktown City Council and the Certifying Authority.

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

Rita Sirianni

From: Tim Ireson <Tlreson@hansenyuncken.com.au>
Sent: Thursday, 14 May 2015 10:31 AM
To: Andrew Lau
Cc: Michael.Dunbavan@coffey.com; Colee Quayle (Colee.Quayle@coffey.com); George Henien
Subject: Eastern Creek Retail Centre: WSPT
Attachments: CO12693.00-SKC11-A.PDF; Notes for Discussion with Site Auditor_ECRH_06may15.pdf
Importance: High

Hi Andrew,

I am managing Business Hubs at Western Sydney Parklands Trust and we have recently received consent from the Department of Planning & Environment for our State Significant Development.

We have met with the Department recently and expressed our interest to amend the application and increase the "early works" scope to:

- Include Bulk Earthworks to the lots
- Revise the Stormwater strategy

As such the "early works" RAP will need to be revised. Michael Dunbavan from Coffey has been assisting us with this and we'd like to set up a meeting to discuss our strategy.

Can you confirm your availability next week (Monday / Tuesday) to meet and discuss at Hansen Yuncken's offices?

We are running our marketing of the site concurrently with the amendment and therefore are under some pressure to submit and approve the amended works.

Thanks and I look forward to hearing from you.

Regards,

Tim Ireson
Development Manager



Hansen Yuncken Pty Ltd
Level 6, 15 Bourke Road, Mascot NSW 2020
PO Box 409 Mascot 1460
T 02 9770 7600 F 02 9770 7601 M 0437 945 499
tlreson@hansenyuncken.com.au
www.hansenyuncken.com.au



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INDICATIVE LOT ACCESS POINT:



SECTION 1 HORIZONTAL SCALE 1:2000 VERTICAL SCALE 1:400									
DATUM 38.00									
BULK EARTHWORKS LEVEL									
EXISTING SURFACE LEVEL									
CHANGING	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000

SECTION 2 HORIZONTAL SCALE 1:2000 VERTICAL SCALE 1:400									
DATUM 38.00									
BULK EARTHWORKS LEVEL									
EXISTING SURFACE LEVEL									
CHANGING	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000

SECTION 3 HORIZONTAL SCALE 1:2000 VERTICAL SCALE 1:400									
DATUM 39.00									
BULK EARTHWORKS LEVEL									
EXISTING SURFACE LEVEL									
CHANGING	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000

SECTION 3 HORIZONTAL SCALE 1:2000 VERTICAL SCALE 1:400									
DATUM 39.00									
BULK EARTHWORKS LEVEL									
EXISTING SURFACE LEVEL									
CHANGING	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000

SUMMARY NOTES									
LEVELS DATUM IS AND:									
PRELIMINARY BULK EARTHWORKS VOLUMES BASED ON DIFFERENCE BETWEEN PROPOSED FLAT PAD TOP AND EXISTING SURFACE WITH A NOMINAL TOPSOIL STRIP OF 200mm.									
TOTAL:									
CUT									
DETAILED EXCAVATION									
BALANCE									
DETAILED EXCAVATION ALLOWANCE OF 100mm for 6% for TRENCHES, FOOTINGS, ETC.									
DETAILED EXCAVATION ALLOWANCE FOR RETAINING WALLS, 800-500mm, BOLDING ON COMPACTION OF FILLED SOILS.									
NOTE:									
ABOVE VOLUMES INCLUDE ALLOWANCE FOR 650mm PAVEMENT DEPTH FOR ACCESS ROAD									

DEPTH RANGE									
No.	FROM DEPTH	TO DEPTH	COLOR	DEPTH RANGE	VOLUME				
1	-0.000	-5.000	Red	0.00m	1054m				
2	-5.000	-4.000	Red	0.00m	307m				
3	-4.000	-3.000	Red	0.00m	396m				
4	-3.000	-2.000	Red	0.00m	1930m				
5	-2.000	-1.000	Red	0.00m	1492m				
6	-1.000	0.000	Red	0.00m	5440m				
7	0.000	1.000	Green	1.00m	2557m				
8	1.000	2.000	Green	2.00m	1946m				
9	2.000	3.000	Green	3.00m	2825m				
10	3.000	4.000	Green	4.00m	2825m				

PRELIMINARY
FOR INFORMATION ONLY



BULK EARTHWORKS - OPTION 1
SCALE 1:2000

FOR INFORMATION ONLY

23.01.15

A

ISSUE

Western Sydney
PARKLANDS TRUST
WESTERN SYDNEY BUSINESS HUB
LEVEL 4, 10 VALENTINE AVE
PARRAMATTA NSW 2150

Western Sydney
PARKLANDS TRUST
WESTERN SYDNEY BUSINESS HUB
LEVEL 4, 10 VALENTINE AVE
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PARRAMATTA NSW 2150

Western Sydney
PARKLANDS TRUST
WESTERN SYDNEY BUSINESS HUB
LEVEL 4, 10 VALENTINE AVE
PARRAMATTA NSW 2150

PROJECT

EASTERN CREEK BUSINESS HUB

WESTERN SYDNEY PARKLANDS

DESIGNED BY

DATE

CHECKED BY

DATE

SCALE

DATE

SCALE

DATE

SCALE

Costin Roe Consulting Pty Ltd
Consulting Engineering
Level 1, 8 Watford Street
Kahla Bay, Sydney NSW 2000
Tel: (02) 955-0900 Fax: (02) 955-0901
Email: info@costinroe.com.au

Value In Engineering and Management

PRELIMINARY BULK EARTHWORKS
PAD LEVELS & VOLUMES
OPTION 1

DATE

SCALE

SCALE

SCALE

When you
think with a
global mind
problems
get smaller



Eastern Creek Retail Hub Variation to Early Works

Western Sydney Parklands Trust

May 2015



- Substantial earthworks are required
- The majority of the development area is affected by earthworks
- Asbestos containing material (fibro) was found at isolated locations across the site – associated with former buildings
- Other contamination was identified, but not at a level requiring action

- Isolation of asbestos impacted material beneath a capping layer – no development on this area
- Previously proposed location for capped area is at southern end of the development area

- Locations of asbestos impact – former houses and farm buildings
- Volume of asbestos impacted material
- Method of removal of asbestos impacted material – how does this relate to removal of vegetation and topsoil, which is required for bulk earthworks

- Asbestos impact not apparent for current condition of the site
- Thick grass cover over majority of site
- Stockpiles of mixed waste materials in southern end of the site – these need management
- Concern over geotechnical suitability of asbestos impacted material (mostly topsoil & organic matter)

- Extended scope of earthworks as Early Works
- Risk management approach to management of potential asbestos impact
- Conditions for isolation of asbestos impacted material – can an EMP be avoided for a developer?
- Auditor's concerns and issues for this site
- Schedule for preparation of draft RAP for review

Rita Sirianni

From: Tim Ireson <Tireson@hansenyuncken.com.au>
Sent: Monday, 18 May 2015 5:25 PM
To: Andrew Lau; Michael.Dunbavan@coffey.com; Colee Quayle (Colee.Quayle@coffey.com)
Cc: George Henien
Subject: ECRC: Remediation Action Plan (Section 96)

Thanks for your time today,

As discussed see below update:

- Andrew L to provide FP to review revised RAP & produce amended Section B SAS.
- Strategy to contain ACM in 3m (or greater) fill discussed and conceptually agreed upon.
- Works will require a new Early Works RAP & updated Section B SAS.

Timing:

- Coffey provides revised Early Works RAP to JBS&G 08/06/15
- JBS&G provides comments to Coffey on RAP 12/06/15
- Coffey provides final Early Works RAP to JBS&G 22/06/15
- JBS&G provides Section B SAS 26/06/15

Note that any time we can make up on the above would be HUGELY appreciated. If we are in a position to have the documentation drafted when the RFP is being submitted it would be of great benefit to WSPT.

Regards

Tim Ireson
Development Manager



Hansen Yuncken Pty Ltd
Level 6, 15 Bourke Road, Mascot NSW 2020
PO Box 409 Mascot 1460
T 02 9770 7600 F 02 9770 7601 M 0437 945 499
tireson@hansenyuncken.com.au
www.hansenyuncken.com.au



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Rita Sirianni

From: Tim Ireson <Tlreson@hansenyuncken.com.au>
Sent: Thursday, 21 May 2015 5:42 PM
To: Andrew Lau
Subject: RE: ECRC: RAP Impact

Thanks Andrew.

I'll have a think

Tim Ireson
Hansen Yuncken Pty Ltd
0437 945 499

From: Andrew Lau [mailto:ALau@jbsg.com.au]
Sent: Thursday, 21 May 2015 3:22 PM
To: Tim Ireson
Subject: RE: ECRC: RAP Impact

Hi Tim,

I can't see much if any impact at all, certainly not in relation to capping asbestos at depth.

The RAP will need to consider the previous data in light of the additional potential site uses (there are different chemical criteria for those landuses to conventional commercial/industrial) and the audit report will need to confirm that any 'new' contamination that is identified from the different/more stringent landuse criteria is appropriately dealt with in the RAP.

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

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From: Tim Ireson [mailto:Tlreson@hansenyuncken.com.au]
Sent: Thursday, 21 May 2015 3:02 PM
To: Andrew Lau
Subject: ECRC: RAP Impact

Hi Andrew,

The Trust would like to pursue the potential of "Nursing Homes" or "Health Services Facilities" at the site (most likely pads 3 & 4) subject to responses from the market on the current EOI for Bulky Goods retail.

What would be the impact in light of our current strategy (assuming that the targeted asbestos would still be buried 3m or greater below the surface).

Thanks,

Rita Sirianni

From: Tim Ireson <Tlreson@hansenyuncken.com.au>
Sent: Friday, 29 May 2015 2:10 PM
To: Andrew Lau
Subject: RE: Remediation: Eastern Creek Retail Centre

Thanks for the reminder!

Sorry mate I'll follow up again with WSPT.

Tim Ireson
Hansen Yuncken Pty Ltd
0437 945 499

From: Andrew Lau [mailto:ALau@jbsg.com.au]
Sent: Friday, 29 May 2015 2:02 PM
To: Tim Ireson
Subject: RE: Remediation: Eastern Creek Retail Centre

Hi Tim,
Would you like me to proceed with the audit on the basis of my fee proposal?
Regards,
Andrew



Andrew Lau | Managing Director, Accredited Auditor | JBS&G
Sydney | Melbourne | Adelaide | Perth | Brisbane
Level 1, 50 Margaret Street Sydney NSW 2000

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From: Tim Ireson [mailto:Tlreson@hansenyuncken.com.au]
Sent: Friday, 29 May 2015 11:58 AM
To: Michael.Dunbavan@coffey.com; Colee Quayle (Colee.Quayle@coffey.com); Andrew Lau
Cc: George Henien; george.henien@wspt.nsw.gov.au; Tim Colless
Subject: Remediation: Eastern Creek Retail Centre

Hi Mike / Andrew,

As discussed WSPT would like to allow for the potential for Health Services Facilities within Stage 2 of the development of ECRC. As such can you ensure your documentation reflects this? Assume that the Bulk Earthworks Levels will remain the same for now & that we will keep to our proposed strategy of burying asbestos >3m.

Please also ensure that the following Conditions of Consent are contemplated in your works – and should any of the conditions become redundant due to our strategy – this should be identified

<https://majorprojects.affinitylive.com/public/1a94657b3bc8bf4087ccd8297681396b/Development%20Consent.pdf>

Schedule 2: Conditions to be met in future Development Applications:

B10: Contamination

Future development applications for the construction of buildings shall include a Remediation Action Plan addressing the potential contamination of the land including mitigation measures in accordance with SEPP55, where necessary.

Schedule 3: Conditions of Consent for STG1 Subdivision & Early Works:

B21: Remediation (PRIOR TO COMMENCEMENT)

Remediation approved as part of this development consent shall be carried out in accordance with the *Remediation Action Plan Phase I Early Works for Eastern Creek Business Hub* prepared by Consara dated 25 June 2013. A site audit must be carried out by a site auditor prior to the commencement of remediation works.

Schedule 3: Conditions of Consent for STG1 Subdivision & Early Works:

C3: Site Remediation (DURING CONSTRUCTION)

The site the subject of the early works is to be remediated in accordance with the *Remediation Action Plan Phase I Early Works for Eastern Creek Business Hub* prepared by Consara dated 25 June 2013.

Schedule 3: Conditions of Consent for STG1 Subdivision & Early Works:

D9: Site Remediation (PRIOR TO ISSUE OF SUBDIVISION CERTIFICATE)

Upon completion of the remediation works on the subject site, the applicant shall submit to the Certifying Authority and council a final salinity management plan, validation report, notice of completion and site audit statement prepared by a site auditor. The Validation Report and site audit statement must verify that the land is suitable for the proposed future uses, should be submitted.

Note: The applicant must comply with clauses 17 & 18 of SEPP55 – Remediation of Land.

Note: Words and expressions uses in these conditions have the same meaning as in the Contaminated Land Management Act 1997.

I note that our strategy is to complete remediation of the site during the early works – therefore the condition of a RAP for each individual building seems redundant.

Regards,

Tim Ireson
Development Manager



Hansen Yuncken Pty Ltd

Level 6, 15 Bourke Road, Mascot NSW 2020

PO Box 409 Mascot 1460

T 02 9770 7600 F 02 9770 7601 M 0437 945 499

tireson@hansenyuncken.com.au

www.hansenyuncken.com.au



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Rita Sirianni

From: George Henien <GHenien@hansenyuncken.com.au>
Sent: Wednesday, 22 July 2015 9:27 PM
To: zz_Arc_KHenderson; Tim Ireson
Cc: Andrew Lau
Subject: ECRC_Admin_JBSG_150722_Site Audit fee acceptance instruction to proceed

Hi Ken and Andrew,

We hereby confirm acceptance of the fixed lump sum price of **\$14,800 excl. GST** for the provision of consultancy service as set out in your tender letter dated 19 May 2015.

It is a condition of this acceptance that you enter and execute a Professional Services Agreement with attachments, varied and amended as necessary to reflect the requirements of your service. This document will be drafted and sent out to you for review and acceptance, and to be signed and witnessed where indicated with changes to any pages initialled within 8 days.

In the interim, please proceed with the works as set out in your fee proposal.

Should you wish to discuss, please don't hesitate to contact myself.

Thanks in advance.

Regards,

George Henien
Hansen Yuncken Pty Ltd
M: 0419 535 103
Think about it! - Safety First

From: Ken Henderson [mailto:Khenderson@jbsg.com.au]
Sent: Tuesday, 19 May 2015 9:12 AM
To: Tim Ireson
Cc: Andrew Lau; George Henien
Subject: Site Audit Fee Proposal - Eastern Creek Retail Centre

Hi Tim,

As discussed with Andrew yesterday, attached please find the Site Audit Fee Proposal for the Eastern Creek Retail Centre.

We can confirm that the SAR can be provided in the timeframe outlined in your email (below), however, in order to achieve that timeframe additional senior JBS&G resources will be required for this audit.

Andrew Lau, a NSW EPA Accredited Site Auditor (No. 0503), has conducted over 100 site audits (including the previous SAR for the Eastern Creek Business Hub) and is well suited to assist you with this audit.

Please also note that Andrew will be on leave during the last week of June/first week of July and will be unavailable during this time.

Thank you for the opportunity to provide this proposal. Please ring if you have any questions.

Regards,
Ken



Ken Henderson | Associate Environmental Consultant | JBS&G

Sydney | Melbourne | Adelaide | Perth | Brisbane

Level 1, 50 Margaret Street Sydney NSW 2000

T: 02 8245 0300 | M: 0409 582 845 | www.jbsg.com.au

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From: Tim Ireson <TIreson@hansenyuncken.com.au>

Date: 18 May 2015 17:24:32 AEST

To: "alau@jbsg.com.au" <alau@jbsg.com.au>, "Michael.Dunbavan@coffey.com" <Michael.Dunbavan@coffey.com>, "Colee Quayle (Colee.Quayle@coffey.com)" <Colee.Quayle@coffey.com>

Cc: George Henien <GHenien@hansenyuncken.com.au>

Subject: ECRC: Remediation Action Plan (Section 96)

Thanks for your time today,

As discussed see below update:

- Andrew L to provide FP to review revised RAP & produce amended Section B SAS.
- Strategy to contain ACM in 3m (or greater) fill discussed and conceptually agreed upon.
- Works will require a new Early Works RAP & updated Section B SAS.

Timing:

- Coffey provides revised Early Works RAP to JBS&G 08/06/15
- JBS&G provides comments to Coffey on RAP 12/06/15
- Coffey provides final Early Works RAP to JBS&G 22/06/15
- JBS&G provides Section B SAS 26/06/15

Note that any time we can make up on the above would be HUGELY appreciated. If we are in a position to have the documentation drafted when the RFP is being submitted it would be of great benefit to WSPT.

Regards

Tim Ireson
Development Manager



Hansen Yuncken Pty Ltd

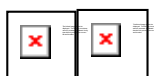
Level 6, 15 Bourke Road, Mascot NSW 2020

PO Box 409 Mascot 1460

T 02 9770 7600 F 02 9770 7601 M 0437 945 499

tireson@hansenyuncken.com.au

www.hansenyuncken.com.au



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Rita Sirianni

From: George Henien <GHenien@hansenyuncken.com.au>
Sent: Wednesday, 22 July 2015 9:32 PM
To: Andrew Lau
Cc: Tim Ireson
Subject: FW: WSPT - Eastern Creek Retail Centre: Draft RAP for WSPT comment
Attachments: ENAURHOD04683AC-R01a Draft for WSPT comment_21jul15.pdf

Hi Andrew,

Thank you for providing your fee proposal. I have issued email acceptance of this to proceed with the works.

As discussed this morning, please find attached Draft copy of the RAP prepared for your review and comment. If at all possible, could we please target return comments by Tuesday 28/07/15. I would like to provide feedback to the trust on Wednesday.

Should you require additional information, please don't hesitate to contact myself.

Regards,

George Henien
Hansen Yuncken Pty Ltd
M: 0419 535 103
Think about it! - Safety First

From: Michael Dunbavan [mailto:Michael.Dunbavan@coffey.com]
Sent: Tuesday, 21 July 2015 2:52 PM
To: George Henien
Cc: Colee Quayle
Subject: WSPT - Eastern Creek Retail Centre: Draft RAP for WSPT comment

George – as mentioned in my phone call yesterday, Coffey submits our draft RAP for Phase 1 Early Works for WSPT comment. The nature of comments Coffey is seeking is on the use of Retail Centre instead of Business Hub, and not on technical details which the Auditor will review.

I seems to recall that the auditor (Andrew Lau) would not be available during the early part of August, so timing may be important if WSPT intends to accelerate submission of its Section 96 application.

Would you please check with Andrew on the issue of timing in the context of WSPT's program.

Please advise if you want Coffey to provide this draft immediately. Any changes arising from WSPT comments should not make a material difference to the Auditor's review.

Please call if you have any questions.

Regards

Dr Michael Dunbavan CP SAM
Senior Principal Consultant Environments

Level 19, Tower B, Citadel Towers
799 Pacific Highway
Chatswood NSW 2067

t: +61 2 9406 1206

From: Tim Ireson <Tlreson@hansenyuncken.com.au>
Sent: Thursday, 23 July 2015 7:14 AM
To: Andrew Lau
Subject: Re: ECRC_Admin_JBSG_150722_Site Audit fee acceptance instruction to proceed

Andrew - much appreciated mate.

On 23 Jul 2015, at 5:31 am, Andrew Lau <ALau@jbsg.com.au> wrote:

Thanks George,

Will get started and have comments across on the RAP in the next couple of days. If Coffey can address an comments/revise/finalise the RAP by mid-late next week, then I'll be able to finalise the audit before I go on leave on 7 august.

Regards,
Andrew

Ps – Ken no longer works with JBS&G so can you please direct all correspondence directly to me.



Andrew Lau | Managing Director, Accredited Auditor | JBS&G
Sydney | Melbourne | Adelaide | Perth | Brisbane
Level 1, 50 Margaret Street Sydney NSW 2000
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Sent: Wednesday, 22 July 2015 9:27 PM
To: zz_Arc_KHenderson; Tim Ireson
Cc: Andrew Lau
Subject: ECRC_Admin_JBSG_150722_Site Audit fee acceptance instruction to proceed

Hi Ken and Andrew,

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In the interim, please proceed with the works as set out in your fee proposal.

Should you wish to discuss, please don't hesitate to contact myself.

Thanks in advance.

Regards,

George Henien

Hansen Yuncken Pty Ltd

M: 0419 535 103

Think about it! - Safety First

From: Ken Henderson [<mailto:Khenderson@jbsg.com.au>]

Sent: Tuesday, 19 May 2015 9:12 AM

To: Tim Ireson

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Subject: Site Audit Fee Proposal - Eastern Creek Retail Centre

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Thank you for the opportunity to provide this proposal. Please ring if you have any questions.

Regards,

Ken

<image006.jpg>Ken Henderson | Associate Environmental Consultant | JBS&G

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From: Tim Ireson <TIreson@hansenyuncken.com.au>

Date: 18 May 2015 17:24:32 AEST

To: "alau@jbsg.com.au" <alau@jbsg.com.au>, "Michael.Dunbavan@coffey.com" <Michael.Dunbavan@coffey.com>, "Colee Quayle (Colee.Quayle@coffey.com)" <Colee.Quayle@coffey.com>

Cc: George Henien <GHenien@hansenyuncken.com.au>

Subject: ECRC: Remediation Action Plan (Section 96)

Thanks for your time today,

As discussed see below update:

- Andrew L to provide FP to review revised RAP & produce amended Section B SAS.
- Strategy to contain ACM in 3m (or greater) fill discussed and conceptually agreed upon.
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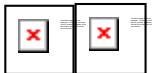
Note that any time we can make up on the above would be HUGELY appreciated. If we are in a position to have the documentation drafted when the RFP is being submitted it would be of great benefit to WSPT.

Regards

Tim Ireson
Development Manager



Hansen Yuncken Pty Ltd
Level 6, 15 Bourke Road, Mascot NSW 2020
PO Box 409 Mascot 1460
T 02 9770 7600 F 02 9770 7601 M 0437 945 499
tireson@hansenyuncken.com.au
www.hansenyuncken.com.au



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From: Andrew Lau
Sent: Thursday, 23 July 2015 11:23 AM
To: George Henien
Cc: Tim Ireson; Andrew Lau; Sahani Gunatunge; Rita Sirianni; Kellie Guenther
Subject: Re: WSPT - Eastern Creek Retail Centre: audit comments on Draft RAP

George

I've reviewed the RAP and have the following comments:

Section 4.1. Super lot 2 includes a playground for children. The NEPM land use listed in Table 1 (commercial/industrial) isn't appropriate for this use. In addition, if there are accessible soils as part of the playground, then the ecological receptor column will need to include plants.

Section 8.2.1. The remediation works (or parts thereof) may constitute category 1 works under SEPP55 due to the Cumberland plain woodland and/or possible (?) flood status of parts of the site, so in the absence of more detailed justification in the RAP I'm unable to accept the statement that the works are category 2 remediation works. In any event, the classification of the works under sepp55 is largely irrelevant given that consent has already been granted for the works. Please include SEPP55 notification of completion requirements in the RAP as this applies to all remediation works, regardless of category 1 or 2.

Section 8.4. Please include an inspection requirement for visible ACM in any vegetation stockpiles being removed from site (or mulched for onsite reuse).

Section 8.8. Please include contingency actions in the event that air monitoring trigger levels are exceeded.

Section 10.4. Please see previous comment about children's play area and amend criteria as appropriate.

Section 10.5. Please ensure survey shows lateral extent of capping along with capping thickness.

Section 9. Please include intra and inter lab duplicates for asbestos samples.

Section 10.3. If any impacted materials are stockpiled on site then validation of the stockpile footprints will be required based in the same approach outlined for the excavations (ie, visual for bonded, sampling/analyses of AF/FA and degraded ACM, naturally excluding wall samples for stockpile footprints).

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

Regards
Andrew

Andrew Lau
JBS&G
0412 512 614
www.jbsg.com.au

On 22 Jul 2015, at 21:32, George Henien <GHenien@hansenyuncken.com.au> wrote:

Hi Andrew,

Thank you for providing your fee proposal. I have issued email acceptance of this to proceed with the works.

As discussed this morning, please find attached Draft copy of the RAP prepared for your review and comment. If at all possible, could we please target return comments by Tuesday 28/07/15. I would like to provide feedback to the trust on Wednesday.

Should you require additional information, please don't hesitate to contact myself.

Regards,

George Henien

Hansen Yuncken Pty Ltd

M: 0419 535 103

Think about it! - Safety First

From: Michael Dunbavan [<mailto:Michael.Dunbavan@coffey.com>]

Sent: Tuesday, 21 July 2015 2:52 PM

To: George Henien

Cc: Colee Quayle

Subject: WSPT - Eastern Creek Retail Centre: Draft RAP for WSPT comment

George – as mentioned in my phone call yesterday, Coffey submits our draft RAP for Phase 1 Early Works for WSPT comment. The nature of comments Coffey is seeking is on the use of Retail Centre instead of Business Hub, and not on technical details which the Auditor will review.

I seems to recall that the auditor (Andrew Lau) would not be available during the early part of August, so timing may be important if WSPT intends to accelerate submission of its Section 96 application.

Would you please check with Andrew on the issue of timing in the context of WSPT's program.

Please advise if you want Coffey to provide this draft immediately. Any changes arising from WSPT comments should not make a material difference to the Auditor's review.

Please call if you have any questions.

Regards

Dr Michael Dunbavan CP SAM

Senior Principal Consultant Environments

Level 19, Tower B, Citadel Towers
799 Pacific Highway
Chatswood NSW 2067

t: +61 2 9406 1206

m: +61 419 395 971

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CILDISCL0005

<ENAU RHOD04683AC-R01a Draft for WSPT comment_21jul15.pdf>

From: Michael Dunbavan <Michael.Dunbavan@coffey.com>
Sent: Monday, 27 July 2015 1:37 PM
To: Andrew Lau
Cc: Tim Ireson; George Henien (GHenien@hansenyuncken.com.au); Colee Quayle
Subject: WSPT Eastern Creek Business Hub - revised Phase 1 Early Works RAP
Attachments: ENAURHOD04683AC-R01b Final Draft.docx; ENAURHOD04683AC-R01b MARK UP version.docx

Andrew – thank you for your prompt review and comments on Coffey's draft RAP.

Coffey has carefully considered your comments, and provided responses below. We have also provided a Final Draft RAP (both as a marked up version and a clean version). We confirm no changes to the appendices.

Auditor Comment	Coffey Response
Section 4.1. Super lot 2 includes a playground for children. The NEPM land use listed in Table 1 (commercial/industrial) isn't appropriate for this use. In addition, if there are accessible soils as part of the playground, then the ecological receptor column will need to include plants.	The plan for Super Lot 2 indicates the potential for a children's playground in an area of approximately 700m ² (1.5% of Super Lot 2 area). This location is on an area of deep fill (>3m thick), which will be placed and compacted under geotechnical control. Coffey considers that any future development of a playground would require imported landscaping materials and surface covering. The potential for inclusion of a children's playground would be addressed in the Validation Report. Coffey has amended Table 1 in Section 4.1.
Section 8.2.1. The remediation works (or parts thereof) may constitute category 1 works under SEPP55 due to the Cumberland plain woodland and/or possible (?) flood status of parts of the site, so in the absence of more detailed justification in the RAP I'm unable to accept the statement that the works are category 2 remediation works. In any event, the classification of the works under sepp55 is largely irrelevant given that consent has already been granted for the works. Please include SEPP55 notification of completion requirements in the RAP as this applies to all remediation works, regardless of category 1 or 2.	Coffey agrees that the classification of remedial works as Category 1 or 2 is irrelevant, and the second paragraph of Section 8.2.1 has been amended. The requirement for submission of a Validation Report and Notice of Completion to satisfy both the Consent Conditions and SEPP 55 Planning Guidelines has been addressed by addition of this matter to paragraph 3.
Section 8.4. Please include an inspection requirement for visible ACM in any vegetation stockpiles being removed from site (or mulched for onsite reuse).	Coffey has amended Sections 8.4 and 8.6.1 to require inspection of dry vegetation during the raking and excavation processes.
Section 8.8. Please include contingency actions in the event that air monitoring trigger levels are exceeded.	Coffey has added another dot point to Section 8.8 addressing the incidence of unacceptable concentrations of air-borne asbestos fibres detected at the work zone boundary.
Section 9. Please include intra and inter lab duplicates for asbestos samples.	Coffey confirmed with the Site Auditor that intra-laboratory duplicates are not required. We have amended Section 9.3 to include collection of inter-laboratory duplicates at a frequency of 1 duplicate for 20 primary samples for the purpose of

	assessing laboratory accuracy. Preparation of the primary / duplicate sample pair is aimed at minimising sampling effects.
Section 10.3. If any impacted materials are stockpiled on site then validation of the stockpile footprints will be required based in the same approach outlined for the excavations (ie, visual for bonded, sampling/analyses of AF/FA and degraded ACM, naturally excluding wall samples for stockpile footprints).	Coffey has amended Section 10.3 by addition of a sentence at the end of that section which confirms that the footprint of any stockpile of asbestos impacted material will be validated.
Section 10.4. Please see previous comment about children's play area and amend criteria as appropriate.	Coffey considers that inclusion of the location for a potential children's playground in validation assessment for asbestos is not appropriate because the area is on an area of deep fill.
Section 10.5. Please ensure survey shows lateral extent of capping along with capping thickness.	Coffey has amended this section to state that the survey must be lateral and vertical.

Coffey trusts that these responses address your concerns. We wait your advice before finalising the Phase 1 Early Works RAP.

Regards

Dr Michael Dunbavan CP SAM
Senior Principal Consultant Environments

Level 19, Tower B, Citadel Towers
799 Pacific Highway
Chatswood NSW 2067

t: +61 2 9406 1206
m: +61 419 395 971



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Rita Sirianni

From: Andrew Lau
Sent: Monday, 27 July 2015 1:43 PM
To: Michael Dunbavan
Cc: Tim Ireson; George Henien (GHenien@hansenyuncken.com.au); Colee Quayle; Rita Sirianni; Andrew Lau
Subject: Re: WSPT Eastern Creek Business Hub - revised Phase 1 Early Works RAP

Hi Mike

Responses are accepted. Pls send through final version of report when it's ready.

Regards

Andrew

Andrew Lau

JBS&G

0412 512 614

www.jbsg.com.au

On 27 Jul 2015, at 13:37, Michael Dunbavan <Michael.Dunbavan@coffey.com> wrote:

Andrew – thank you for your prompt review and comments on Coffey's draft RAP.

Coffey has carefully considered your comments, and provided responses below. We have also provided a Final Draft RAP (both as a marked up version and a clean version). We confirm no changes to the appendices.

Auditor Comment	Coffey Response
Section 4.1. Super lot 2 includes a playground for children. The NEPM land use listed in Table 1 (commercial/industrial) isn't appropriate for this use. In addition, if there are accessible soils as part of the playground, then the ecological receptor column will need to include plants.	The plan for Super Lot 2 indicates the potential for a children's playground in an area of approximately 700m ² (1.5% of Super Lot 2 area). This location is on an area of deep fill (>3m thick), which will be placed and compacted under geotechnical control. Coffey considers that any future development of a playground would require imported landscaping materials and surface covering. The potential for inclusion of a children's playground would be addressed in the Validation Report. Coffey has amended Table 1 in Section 4.1.
Section 8.2.1. The remediation works (or parts thereof) may constitute category 1 works under SEPP55 due to the Cumberland plain woodland and/or possible (?) flood status of parts of the site, so in the absence of more detailed justification in the RAP I'm unable to accept the statement that the works are category 2 remediation works. In any event, the classification of the works under sepp55 is largely irrelevant given that consent has already been granted for the works. Please include SEPP55 notification of completion requirements in	Coffey agrees that the classification of remedial works as Category 1 or 2 is irrelevant, and the second paragraph of Section 8.2.1 has been amended. The requirement for submission of a Validation Report and Notice of Completion to satisfy both the Consent Conditions and SEPP 55 Planning Guidelines has been addressed by addition of this matter to paragraph 3.

the RAP as this applies to all remediation works, regardless of category 1 or 2.	
Section 8.4. Please include an inspection requirement for visible ACM in any vegetation stockpiles being removed from site (or mulched for onsite reuse).	Coffey has amended Sections 8.4 and 8.6.1 to require inspection of dry vegetation during the raking and excavation processes.
Section 8.8. Please include contingency actions in the event that air monitoring trigger levels are exceeded.	Coffey has added another dot point to Section 8.8 addressing the incidence of unacceptable concentrations of air-borne asbestos fibres detected at the work zone boundary.
Section 9. Please include intra and inter lab duplicates for asbestos samples.	Coffey confirmed with the Site Auditor that intra-laboratory duplicates are not required. We have amended Section 9.3 to include collection of inter-laboratory duplicates at a frequency of 1 duplicate for 20 primary samples for the purpose of assessing laboratory accuracy. Preparation of the primary / duplicate sample pair is aimed at minimising sampling effects.
Section 10.3. If any impacted materials are stockpiled on site then validation of the stockpile footprints will be required based in the same approach outlined for the excavations (ie, visual for bonded, sampling/analyses of AF/FA and degraded ACM, naturally excluding wall samples for stockpile footprints).	Coffey has amended Section 10.3 by addition of a sentence at the end of that section which confirms that the footprint of any stockpile of asbestos impacted material will be validated.
Section 10.4. Please see previous comment about children's play area and amend criteria as appropriate.	Coffey considers that inclusion of the location for a potential children's playground in validation assessment for asbestos is not appropriate because the area is on an area of deep fill.
Section 10.5. Please ensure survey shows lateral extent of capping along with capping thickness.	Coffey has amended this section to state that the survey must be lateral and vertical.

Coffey trusts that these responses address your concerns. We wait your advice before finalising the Phase 1 Early Works RAP.

Regards

Dr Michael Dunbavan CP SAM
Senior Principal Consultant Environments

Level 19, Tower B, Citadel Towers
799 Pacific Highway
Chatswood NSW 2067

t: +61 2 9406 1206
m: +61 419 395 971



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CILDISCL0005

<ENAU RHOD04683AC-R01b Final Draft.docx>

<ENAU RHOD04683AC-R01b MARK UP version.docx>

Rita Sirianni

From: Rose Cocks <Rose.Cocks@epa.nsw.gov.au> on behalf of EPA HIEH NSW Auditors Mailbox <nswauditors@epa.nsw.gov.au>
Sent: Thursday, 30 July 2015 3:32 PM
To: Rita Sirianni
Cc: Andrew Lau; EPA HIEH NSW Auditors Mailbox
Subject: RE: SAN 0503-1301 Rooty Hill Road South (Western Sydney Parklands)

Hi Rita

Acknowledging receipt of Andrew Lau's SAN above, EPA reference is DOC15/287227.

Regards,
Rose

Rose Cocks
Audit Officer, Contaminated Sites Section | **NSW Environment Protection Authority** |
e: nswauditors@epa.nsw.gov.au
☎: (02) 9995 5647 📠: (02) 9995 5930

From: Rita Sirianni [<mailto:RSirianni@jbsg.com.au>]
Sent: Monday, 27 July 2015 1:03 PM
To: EPA HIEH NSW Auditors Mailbox
Subject: FW: SAN 0503-1301 Rooty Hill Road South (Western Sydney Parklands)

Sorry Rose, please find attached the correct pdf document.

From: Rita Sirianni
Sent: Monday, 27 July 2015 1:02 PM
To: EPA HIEH NSW Auditors Mailbox <nswauditors@epa.nsw.gov.au>
Cc: Andrew Lau <ALau@jbsg.com.au>
Subject: SAN 0503-1301 Rooty Hill Road South (Western Sydney Parklands)

Hi Rose,

Please find attached the Site Audit Notification (Audit # 0503-1301) for Rooty Hill Road South (Western Sydney Parklands), Rooty Hills.

Please ring me if you have any queries.

Regards,



Rita Sirianni | Associate Environmental Consultant | JBS&G
Sydney | Melbourne | Adelaide | Perth | Brisbane
Level 1, 50 Margaret Street Sydney NSW 2000
T: 02 8245 0300 | M: 0413 594 773 | www.jbsg.com.au

Contaminated Land | Groundwater Remediation | Auditing and Compliance | Assessments and Approvals | Occupational Hygiene and Monitoring

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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. 0503-1301

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 Environmental Pty Ltd**
Address **Level 1, 50 Margaret Street**
SYDNEY NSW Postcode **2000**
Phone **02 8245 0300** Fax **02 8245 0399**

Site details

Address **Rooty Hill Road South (Western Sydney Parklands), Rooty Hill, NSW**
Postcode **2766**

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

- Part Lot 1 DP1103025
- Lot 100 DP882326
- Lots 2 & 3 Section A DP8681
- Lots 3 to Lot 5 Section B DP8681
- Lot 1 DP135665
- Lots 1 & 13 Section B DP8681
- Lots 1 to 10 DP830836
- Lots 2 & 3 DP1041487
- Lots A DP358346
- Lots 1, Lots 3 & 8 DP31130
- Lots 11, 12 and 50 DP1041487
- Part of Public Crown Subdivision Land
- Part of Public Crown Subdivision Road
- Part of Public Crown Reserved Road Easement for Gas Pipeline (Vide Q916928)
- Part of Road being the residue of Land in Certificate of Title Volume 147 Folio 41
- Part of Road being the residue of Land in Certificate of Title Volume 826 Folio 243

* **Strike out as appropriate**

Local Government Area **Blacktown City Council**

Area of Site (eg. hectares) **34 hectare** Current zoning **SEPP (WSP) 2009: UL-
Western Parklands**

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)

.....
.....

** Strike out as appropriate*

Site audit commissioned by

Name **George Henien**

Company **Hansen Yuncken Pty Ltd (on behalf of
Western Sydney Parklands Trust)**

Address **PO Box 409, Mascot NSW 2020**

Postcode **2010**

Phone **0419 535 103**

Fax **02 9770 7601**

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)~~

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])

- Commercial / industrial including bulk goods; storage and retail use;
- Part of the site to be used for an activity / playground for children;
- Health care services or aged care facilities;
- Detention basins and revegetation; and
- Roadways, utility easements, stormwater drainage and retention.

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)

**SSD 5175 Eastern Creek Business Hub, Minister for Planning and
Environment, consent granted 7 January 2015**

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

.....
.....

*** Strike out as appropriate**

Overall comments

.....

.....

.....

.....

.....

.....

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.

Signed:  Date 27 July 2015

Please send completed forms to:

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

Rita Sirianni

From: Andrew Lau
Sent: Tuesday, 28 July 2015 6:26 PM
To: Rita Sirianni
Subject: Fwd: Eastern Creek Business Hub - Phase 1 Early Works RAP: Final
Attachments: ATT00001.htm; ATT00002.htm; ENAURHOD04683AC-R01 ECBH Phase 1 Early Works RAP_July2015.pdf; ATT00003.htm

Andrew Lau
JBS&G
0412 512 614
www.jbsg.com.au

Begin forwarded message:

From: "Michael Dunbavan" <Michael.Dunbavan@coffey.com>
To: "Tim Ireson" <Tireson@hansenyuncken.com.au>, "George Henien" <GHenien@hansenyuncken.com.au>
Cc: "Andrew Lau" <ALau@jbsg.com.au>, "Colee Quayle" <Colee.Quayle@coffey.com>
Subject: Eastern Creek Business Hub - Phase 1 Early Works RAP: Final

Tim, George and Andrew – thanks for your fast responses in finalising this RAP.

Andrew – **please note that the subtitle has changed from Eastern Creek Retail Centre to Eastern Creek Business Hub.** The reason for change was to maintain consistency with existing planning document titles. Fortunately, this term was used only a couple of times in the RAP, so no major drama. I confirm that this is the only change from the R01b Final Draft version that you have reviewed and approved.

Please call if you have any questions.

Regards

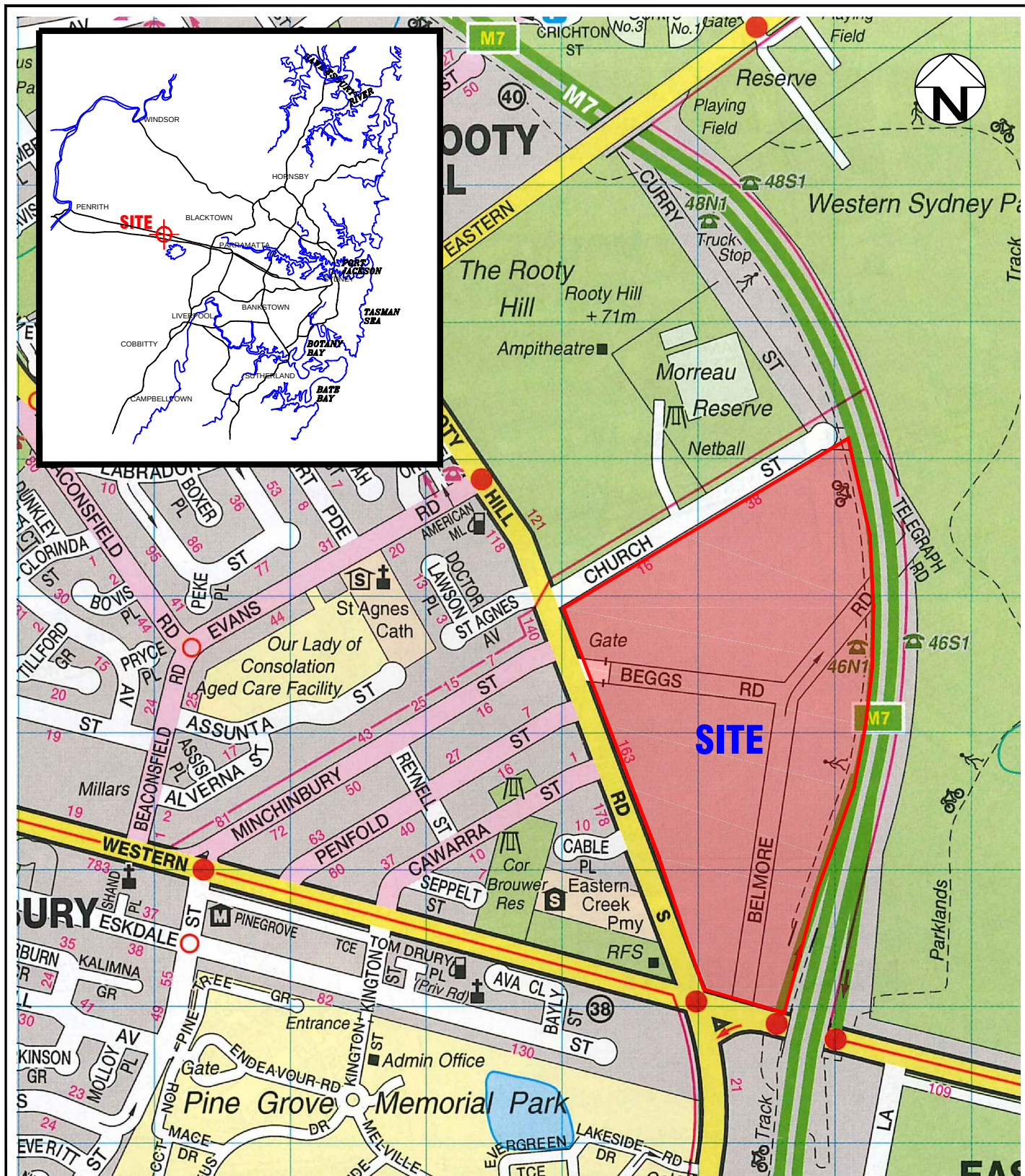
Dr Michael Dunbavan CP SAM
Senior Principal Consultant Environments

Level 19, Tower B, Citadel Towers
799 Pacific Highway
Chatswood NSW 2067

t: +61 2 9406 1206
m: +61 419 395 971

Appendix C: - Site Plan

PLOT DATE: 21/07/2015 11:44:32 AM DWG FILE: F:\ENV\PROJECTS\ENAU\HOD04683AC\WESTERN SYDNEY PARKLANDS TRUST\ENAU\HOD04683AC\DRAWINGS\COFFEY FIGURES\ENAU\HOD04683AC-R01-D02.DWG



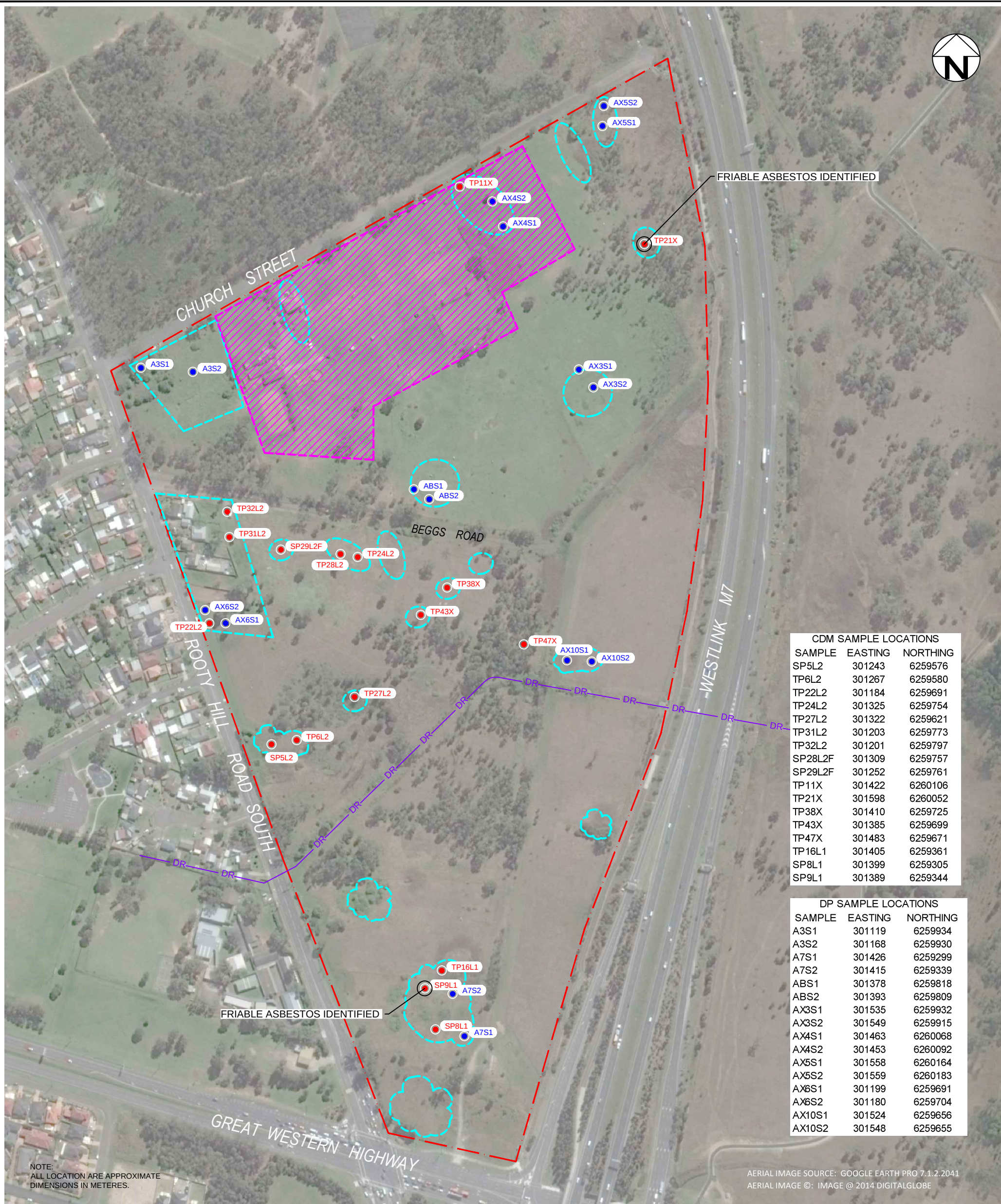
SOURCE: UBD STREET DIRECTORY GREGORYS SYDNEY & BLUE MOUNTAIN, NEW SOUTH WALES 48TH EDITION, 2015, MAP: 187



Scale (metres) 1:10 000

drawn	MV		client:	WESTERN SYDNEY PARKLANDS TRUST		
approved	MD		project:	REVISED EARLY WORKS REMEDIATION ACTION PLAN BETWEEN M7 MOTORWAY, ROOTY HILL ROAD SOUTH AND CHURCH STREET, EASTERN CREEK, NSW		
date	20/07/15		title:	SITE LOCALITY PLAN		
scale	AS SHOWN		project no:	ENAUHOD04683AC-R01	figure no:	FIGURE 1
original size	A4				rev:	A

PLOT DATE: 23/07/2015 11:05:26 AM DWG FILE: F:\ENV\PROJECTS\ENAU\HOD04683AC\DRAWINGS\COFFEY FIGURES\ENAU\HOD04683AC-R01-D02.DWG



revision	no.	description		drawn	approved	date
	A	ORIGINAL ISSUE				

03570105140175

SCALE1:3500 (A3)METRES

drawn

approved

date

scale

original size

MV

MD

20/07/15

AS SHOWN

A3

coffey

client:

project:

title:

project no:

figure no:

rev:

WESTERN SYDNEY PARKLANDS TRUST

REVISED EARLY WORKS REMEDIATION ACTION PLAN
BETWEEN M7 MOTORWAY, ROOTY HILL ROAD SOUTH AND
CHURCH STREET, EASTERN CREEK, NSW

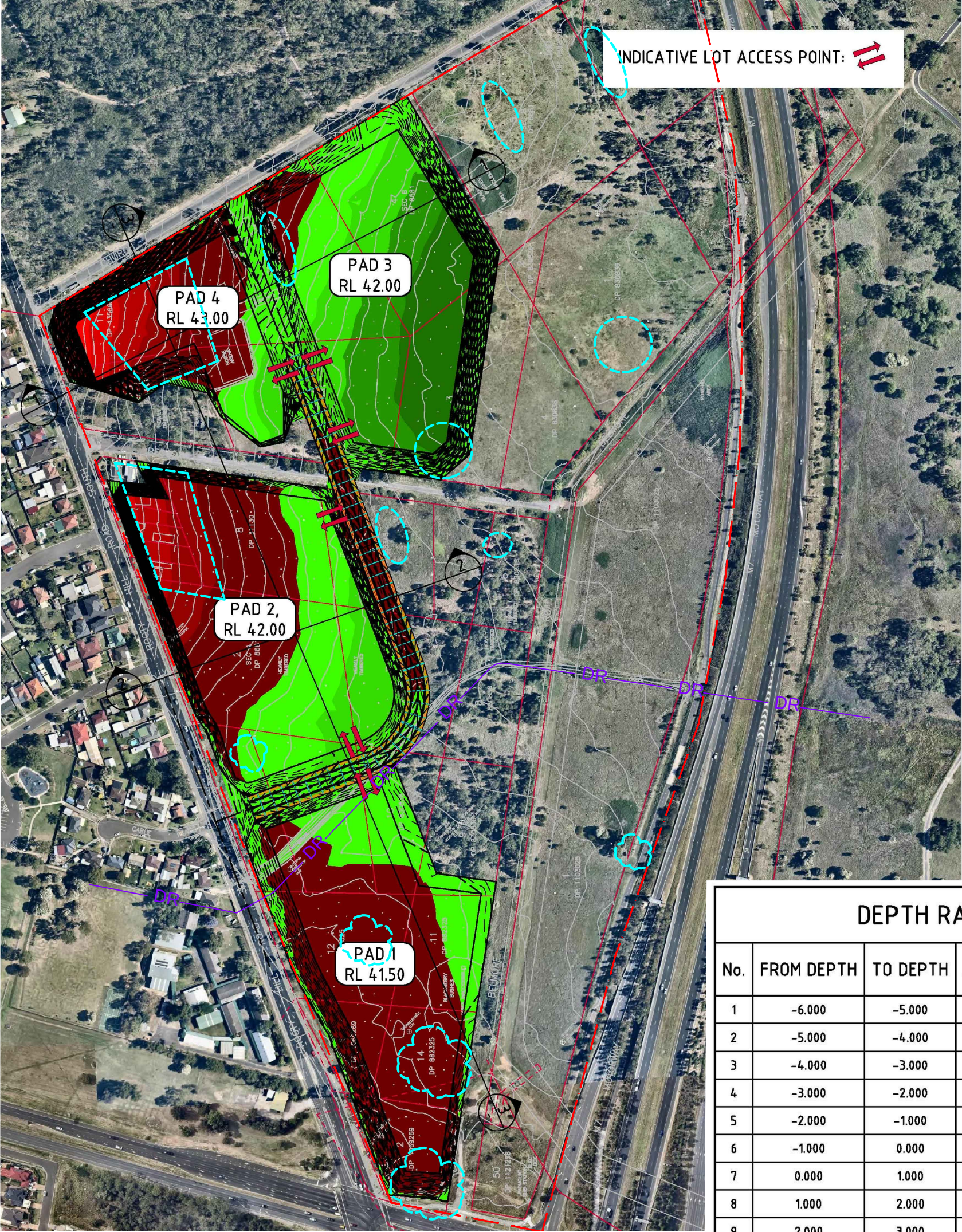
SITE LAYOUT PLAN

ENAUHOD04683AC-R01

FIGURE 2

A

PLOT DATE: 21/07/2015 12:10:32 PM DWG FILE: F:\ENV\PROJECTS\ENAU\HOD04683AC-R01-D02.DWG



SOURCE: COSTINROE CONSULTING, C012693.00-SKC11, 23.01.2015.

DEPTH RANGE				
No.	FROM DEPTH	TO DEPTH	COLOUR	DEPTH RANGE VOLUME
1	-6.000	-5.000		107m ³
2	-5.000	-4.000		1056m ³
3	-4.000	-3.000		3671m ³
4	-3.000	-2.000		9196m ³
5	-2.000	-1.000		19308m ³
6	-1.000	0.000		49237m ³
7	0.000	1.000		56480m ³
8	1.000	2.000		25578m ³
9	2.000	3.000		13661m ³
10	3.000	4.000		2925m ³

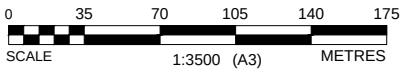
IMAGE SOURCE: HANSEN YUNCHEN, 12693.00-SKC31, 2015.

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

LEGEND

- APPROXIMATE SITE BOUNDARY
- SUSPECTED ASBESTOS IMPACT
- DR

STORM DRAINAGE CHANNEL



drawn	MV
approved	MD
date	20/07/15
scale	AS SHOWN
original size	A3



client:	WESTERN SYDNEY PARKLANDS TRUST		
project:	REVISED EARLY WORKS REMEDIATION ACTION PLAN BETWEEN M7 MOTORWAY, ROOTY HILL ROAD SOUTH AND CHURCH STREET, EASTERN CREEK, NSW		
title:	CUT AND FILL		
project no:	ENAUHOD04683AC-R01	figure no:	FIGURE 3
		rev:	A

Appendix D - Consultant's Figures



LEGEND

- ▼ Former structure remnants (footings)
- Sample from close to former structure remnants
- ★ Recent fly tipping
- ★ Remnant stockpile
- Stockpile test pit location
- Surface sample location
- 14-19 Area of Environmental Concern (AEC).
Approximate envelopes of former
structures (primarily houses and sheds)
- refer to historical aerial photographs.
- 20 AEC- Approximate area of former market garden.



Douglas Partners
Geotechnics . Environment . Groundwater

Sydney, Newcastle, Brisbane,
Melbourne, Perth, Darwin,
Wyang, Campbelltown, Canberra
Townsville, Cairns, Wollongong

TITLE: FIELDWORK LOCATIONS - SOUTHERN SECTION
ROOTY HILL ROAD SOUTH
DOONSIDE

CLIENT: Western Sydney Parklands Trust			
DRAWN BY: ALT	SCALE: 1:2500	PROJECT No: 71065.02	OFFICE: SYDNEY
APPROVED BY:		DATE: 9 November 2009	DRAWING No: 1.1