APPENDIX C
Site Audit

Site Audit Report
1 Grand Avenue, Camellia

Prepared for:

Billbergia Pty Ltd

Prepared by:
ENVIRON Australia Pty Ltd

Date:
April 2011

Project Number:
AS120752

Audit Number:
GN 268-1B

ENVIRON

21 April 2011 Our Ref: AS120752

Billbergia Pty Ltd
PO Box 7725
Baulkham Hills BC NSW 2153

Dear Eddie,

Re: Site Audit Report - 1 Grand Avenue, Camellia

I have pleasure in submitting the Site Audit Report for the subject site. The Site Audit Statement, produced in accordance with the NSW Contaminated Land Management Act 1997 follows this letter. The Audit was commissioned by Billbergia Pty Ltd to assess the suitability of the site for its intended commercial/industrial use.

This Site Audit Report is not currently required by regulation or legislation and is therefore a non-statutory audit.

Thank you for giving me the opportunity to conduct this Audit. Please call me on 9954 8100 if you have any questions.

Yours faithfully,
ENVIRON Australia Pty Ltd

Graeme Nyland
EPA Accredited Site Auditor 9808

NSW Site Auditor Scheme
SITE AUDIT STATEMENT

NSW GOVERNMENT | Environment, Climate Change & Water

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 1st June 2010. For more information about completing this form, go to Part IV.

PART I: Site audit identification

Site audit statement no. GN 268-1B

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:	Graeme Nyland	Company:	ENVIRON Australia Pty Ltd
Address:	Level 3, 100 Pacific Highway (PO Box 560)		
	North Sydney NSW	Postcode:	2060
Phone:	02 9954 8100	Fax:	02 9954 8150

Site details

Address: 1 Grand Avenue, Camellia NSW

Postcode: 2142

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

Lot 1 DP 226202, Lots 1 & 2 DP 579735, Lot 201 DP 669350 and Lot 102 DP 1146308

Local Government Area: Parramatta City Council

Area of site (e.g. hectares): Approximately 7.8 ha

Current zoning: Regional Enterprise Environmental Protection / Open Space

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

Declaration/Order/Agreement/Proposal/Notice* no(s): The site was subject to a former Agreed Voluntary Remediation Proposal (Ref: 26012) issued 5 Oct 2000, this was completed 14 May 2003.

Strike out as appropriate

Site audit commissioned by

Name: Eddie Lucas Company: Billbergia Pty Ltd

Address: Billbergia Pty Ltd, Locked Bag 1400, MEADOWBANK NSW

Postcode: 2114

Phone: 8878 6931 Fax: 8878 6995

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

NA

Purpose of site audit

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

Commercial/industrial

~~**OR**~~

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

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

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

.....

Information sources for site audit

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

- Consulting Earth Scientists Pty Ltd

Title(s) of report(s) reviewed:

- 'Targeted Environmental Site Assessment: 1 Grand Avenue, Camellia, NSW' dated 10 December 2007 by Consulting Earth Scientists (CES 2007).
- 'Remediation Action Plan: 1 Grand Avenue, Camellia, NSW' dated 26 March 2008 prepared by Consulting Earth Scientists (CES 2008a).
- '1 Grand Avenue Camellia NSW, Addendum to RAP' dated 3 July 2008 prepared by CES (CES 2008b).
- 'Groundwater Remediation within Area A, Part of 1 Grand Avenue, Camellia, NSW' dated 21 January 2010 prepared by CES (CES 2010).
- Asbestos Clearance Certificate dated 12 November 2008 prepared by Airsafe Occupational Health Consultants;
- Email dated 13 January 2011 from Eddie Lucas (Billbergia) with attached waste disposal dockets.

Strike out as appropriate

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

- Site Audit Report, Eastern Site, 1 Grand Avenue, Camellia. Ref: GN 268-1 dated 6 November 2006.

Site audit report

Title: Site Audit Report – 1 Grand Avenue, Camellia.

Report no. GN 268-1B (ENVIRON Ref: AS120752) Date: April 2011

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:**

'Site Management Plan, Eastern Portion Former James Hardie Site, Grand Avenue Camellia' dated 17 March 2004.

~~**OR**~~

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

Overall comments:

The site is contaminated with significant quantities of asbestos from the historical use of the site by James Hardie. The asbestos is being managed through implementation of the Site Management Plan (SMP), which requires that the site remains capped. There would be significant human health risks if the asbestos material were to be excavated and because of these risks, the former subsurface infrastructure, including underground storage tanks, pits, interceptors etc. are still present within the sub-surface associated with some localised

residual hydrocarbon impacts and metal impacted fill material. Whilst the hydrocarbon and metals impacts are not specifically mentioned within the SMP, the measures enforced through the SMP are considered sufficient to manage the residual contamination encountered at the site.

There is some localised groundwater contamination present at the site and groundwater should not be abstracted for use without an assessment for the required use and regulatory approval.

The zoning allows for a number of uses subject to development consent including a child care facility. It is noted that the site has been assessed as suitable for industrial/commercial uses only.

The SMP, which is appended to the Site Audit Report, is enforced through a positive public covenant on the title under s29 of the Contaminated Land Management Act 1997 and s88E(1) of the Conveyancing Act 1919.

At the time of completion of this audit, there were a number of temporary soil stockpiles on site which were not generated on the site. The Auditor was advised by the site owner, Billbergia, that all stockpiles will be removed from the site. The audit has not included assessment of any stockpiles for reuse or disposal.

~~Section B~~

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

.....

I certify that, in my opinion:

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

AND/OR

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

AND/OR

- ❑ **the site CAN BE MADE SUITABLE for the following uses** *(tick all appropriate uses and strike out those not applicable)*:
  - ❑ Residential, including substantial vegetable garden and poultry
  - ❑ Residential, including substantial vegetable garden, excluding poultry
  - ❑ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
  - ❑ Day care centre, preschool, primary school
  - ❑ Residential with minimal opportunity for soil access, including units
  - ❑ Secondary school
  - ❑ Park, recreational open space, playing field
  - ❑ Commercial/industrial
  - ❑ Other *(please specify)* .....

  if the site is remediated/managed* in accordance with the following remedial action plan/management plan* *(insert title, date and author of plan)*

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  .....

  subject to compliance with the following condition(s):

  .....

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

Strike out as appropriate

~~Overall comments~~

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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. 9808).

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.

Signed ..... Date 13/4/2011

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:

Department of Environment, Climate Change & Water (NSW)
Contaminated Sites Section
PO Box A290, SYDNEY SOUTH NSW 1232
Fax: (02) 9995 5930

AND

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

DECC 2009/03
March 2009

DECCW June 2010

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List of Abbreviations

AHD	Australian Height Datum
ALS	Australian Laboratory Services
ANZECC	Australian and New Zealand Environment and Conservation Council
BaP	Benzo(a)pyrene
BGL	below ground level
BTEX	Benzene, Toluene, Ethylbenzene & Xylenes (Monocyclic aromatic Hydrocarbons)
CN	Cyanide (total or free)
CT	Certificate of Title
DP	Deposited Plan
DQO	Data Quality Objectives
EPA	Environment Protection Authority (NSW)
ESA	Environmental Site Assessment
ha	Hectare
km	Kilometres
LOR	Limit of Reporting
m	Metres
MAH	Monocyclic Aromatic Hydrocarbons
Mercury	Inorganic mercury unless noted otherwise
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Fe: Iron, Ni: Nickel, Pb: Lead, Zn: Zinc, Hg: Mercury, Se: Selenium
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Litre
m BGL	Metres below ground level
µg/L	Micrograms per Litre
NATA	National Association of Testing Authorities
NC	Not Calculated
ND	Not Detected
ng/L	Nanograms per Litre
NEHF	National Environmental Health Forum
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
n	Number of Samples
OCPs	Organochlorine Pesticides
OH&S	Occupational Health & Safety
OPPs	Organophosphorus Pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PID	Photoionisation Detector
PQL	Practical Quantitation Limit
pH	a measure of acidity, hydrogen ion activity
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference
SILs	Soil Investigation Levels
SVOCs	Semi Volatile Organic Compounds
TPHs	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit
VENM	virgin excavated natural material
VOCs	Volatile Organic Compounds
-	On tables is "not calculated", "no criteria" or " not applicable"

1 Introduction

A site contamination audit has been conducted in relation to the site at 1 Grand Avenue, Camellia.

Details of the audit are:

Requested by:	Eddie Lucas on behalf of Billbergia Pty Ltd
Request/Commencement Date:	11 October 2007
Auditor:	Graeme Nyland
Accreditation No.:	9808

1.1 Previous Site Audits

The Auditor previously prepared a Site Audit Report (SAR) and Site Audit Statement (SAS) GN 268-1 dated 6 November 2006 on behalf of Sydney Water Corporation (SWC) for the purpose of determining whether the nature and extent of the contamination at the site had been appropriately determined.

Reports reviewed during the previous audit included:

- 'Phase 1 Environmental Audit Report on the James Hardie Property, Camellia' dated December 1994 by Woodward-Clyde Consultants (WCC).
- 'Phase 2 Audit Site Investigations, James Hardie – Camellia', final dated July 1995 by WCC.
- 'Soil Sampling and Groundwater Monitoring, former James Hardie Site, Camellia', dated June 2001 by Australian Water Technologies (AWT).
- 'Re-sampling of Groundwater Monitoring Wells, Former James Hardie Site, Camellia', final dated 19 July 2002 by Sydney Water.
- 'Re-sampling of Groundwater Monitoring Wells, Former James Hardie Site, Camellia', final dated 22 May 2003 by Sydney Water.
- 'Sampling and Analytical Quality Plan, Soil and Groundwater Investigation, Sydney Water Camellia site, NSW', draft dated 25 November 2005 by URS Australia Pty Ltd (URS).
- 'Phase 2 Environmental Site Assessment, Sydney Water Camellia, Eastern Site, 1 Grand Avenue', dated 19 May 2006 by URS.
- 'Phase 2 Environmental Site Assessment, Sydney Water Camellia, Eastern Site, 1 Grand Avenue', dated 21 August 2006 by URS.
- Review of clarification documentation by URS, including letter dated 27 July 2006 and email dated 11 October 2006, which were included in the site audit report.

The Auditor concluded that based on the information presented in reports and observations made on site, the nature and extent of the investigation [by URS] was adequate to determine

the nature of the impacts and allow a plan of remediation to be developed. If a child care centre were proposed, the Auditor considered that further sampling or discussion would be required to demonstrate that the proposed area had been adequately characterised for the contaminants of concern.

The key findings of the previous audit have been referenced in the current site audit where appropriate.

1.2 Scope of Current Site Audit

The current site audit was commissioned to provide an independent review by an EPA Accredited Auditor of whether the land is suitable for commercial/industrial use i.e. a "Site Audit" as defined in the NSW *Contaminated Land Management Act 1997* (the CLM Act).

The scope of the audit included:

- Review of the following reports:
  - 'Targeted Environmental Site Assessment: 1 Grand Avenue, Camellia, NSW' dated 10 December 2007 by Consulting Earth Scientists (CES 2007).
  - 'Remediation Action Plan: 1 Grand Avenue, Camellia, NSW' dated 26 March 2008 prepared by Consulting Earth Scientists (CES 2008a).
  - '1 Grand Avenue Camellia NSW, Addendum to RAP' dated 3 July 2008 prepared by CES (CES 2008b).
  - 'Groundwater Remediation within Area A, Part of 1 Grand Avenue, Camellia, NSW' dated 21 January 2010 prepared by CES (CES 2010).
- Asbestos Clearance Certificate dated 12 November 2008 prepared by Airsafe Occupational Health Consultants;
- Email dated 13 January 2011 from Eddie Lucas (Billbergia) with attached waste disposal dockets;
- Site visits on 26 October 2007 and 8 March 2011;
- Discussions with CES who conducted the targeted investigations, prepared the RAP and conducted the hydrocarbon remediation works.

1.2.1 Interim Audit Advice

During the progress of the audit interim audit advice was issued in accordance with guidance provided in section 3.6.2 of DEC (2006) as follows:

- 'Interim Advice No.1 – 1 Grand Avenue, Camellia, Remedial Action Plan' prepared by ENVIRON dated 22 April 2008. Ref: AS120752.
- '1 Grand Avenue Camellia – Audit Progress' prepared by ENVIRON dated 10 October 2008. Ref: AS120752.
- '1 Grand Avenue Camellia – Audit Progress' prepared by ENVIRON dated 6 July 2009. Ref: AS120752.

2 Site Details

2.1 Location

The site locality is shown on Attachment 1, Appendix A.

The site details are as follows:

Street address:	1 Grand Avenue, Camellia NSW 2142
Identifier:	Lot 1 DP 226202, Lots 1 & 2 DP 579735, Lot 201 DP 669350 and Lot 102 DP 1146308 (see Attachment 2, Appendix A).
Local Government:	Parramatta City Council
Owner:	Billbergia Group
Site Area:	approximately 7.8ha

The boundaries of the site are indicated by the fence line with the Clyde to Carlingford Railway line to the west, the banks of the Parramatta River to the north and fence lines with industrial properties to the east and south.

2.2 Zoning

CES (2008a) reported that most of the site is zoned as 'IN3 Heavy Industrial' under the Parramatta City Draft Local Environmental Plan (LEP) 2008. The Auditor has checked this information and notes that the site is subject to the Sydney Regional Environmental Plan No 28—Parramatta [1999-444] and the majority of the site is zoned 'Regional Enterprise'. The exceptions include: a strip along the boundary with Parramatta River which is zoned 'Environmental Protection' and an area at the northern end of the site known as Mackies Flat. The zoning is shown in Attachment 3, Appendix A.

The **Regional Enterprise Zone** allows a wide range of industrial and heavy industrial uses in Camellia to maintain long-term opportunities for the future investment in development of Camellia as an eco-industrial precinct. The zoning allows for improved public access along the waterways, where natural values will not be diminished, and in the case of contaminated land that is currently not suitable for public access, to ensure that opportunities are not lost for future potential foreshore access.

Development for any of the following purposes may be carried out, but only with development consent:

- advertisements (other than an advertisement on a site that contains a heritage item); brothels; business identification signs; car repair stations; child care centres; commercial premises that are ancillary to another permissible use on the land; commercial signs; demolition; depots; drainage; equipment hire centres; industries; kiosks; landscaping that is not exempt development; light industries; material recycling depots; motor showrooms; outdoor eating areas linked to kiosks; places of public worship; public buildings; public utility installations (other than gas holders and

generating works); recreation areas; recreation facilities; resource recovery facilities; restricted premises; road transport terminals; roads; service stations; telecommunication facilities; vehicle rental centres; warehouses or distribution centres; waste facilities; waste processing facilities.

Within the **Open Space zone**, development for the purpose of the following may be carried out, but only with development consent:

- amenity buildings; artworks; bicycle hire; boat hire and boat launching facilities; child care centres; community facilities; identifying or interpretive signage ancillary to another use allowed on the site; kiosks; outdoor eating areas linked to kiosks within the zone or restaurants in adjoining zones; recreation areas; utility installations (other than gas holders or generating works); water based entertainment facilities.

Within the **Environmental Protection zone**, development for the purpose of the following may be carried out with development consent:

- access ways for emergency vehicles; clearing; demolition; drainage works; landscaping that is not exempt development; pedestrian and other access ways; public utility installations (other than gas holders and generating works); remediation of land; stormwater management; works related to environmental investigations, incident management, fire management, ancillary infrastructure, energy supply, and other works that are required to meet the licensing requirements of the Protection of the Environment Operations Act 1997, any other development is prohibited.

2.3 Adjacent Uses

The site is located within an area of commercial and industrial uses.

- North: Parramatta River
- South: Railway line, and beyond Rosehill Racecourse. Beyond this, the area is used for commercial and industrial uses.
- East: Rosehill Business Park
- West: Railway line and beyond this, the area is used for commercial and industrial uses.

2.4 Site Condition

The site is the eastern portion of the former James Hardie & Co Pty Ltd (James Hardie) property. All above ground structures have been demolished to pavement and ground floor level.

CES undertook a site inspection on 25 September 2007 and confirmed previous URS observations (documented in GN268-1) that the site was largely covered with concrete and bitumen (95%). All other unsealed areas were well grassed as occasional small garden beds or covered with a gravel layer.

During an inspection for USTs by CES, only one fill/dip point was located for which the area was marked with yellow hash marks. The former pipe dipping tank was delineated by a low

kerb around the eastern, southern and western sides with some bitumen spills on the surface of the concrete within the kerb. CES noted that a circular impression to the south-east of the tank may be the remains of a tank bund that may be the source of a reported spill of white spirit. Evidence of a UST reported 30 m to the west of the tank was not located.

The Auditor conducted a site visit on 8 March 2011, accompanied by Eddie Lucas (Billbergia). The following was observed:

- Consistent with the CES observations buildings have been demolished to ground level and the site is paved with concrete/bitumen and some grassed areas;
- The southwest quadrant of the site is being utilised for container storage under a lease to a container refurbishing company (Development Consent No DA/726/2008);
- Some cranes and associated equipment (owned by Billbergia) are stored across the site, mainly in the northwestern quadrant of the site;
- A large stockpile of material was located in the northwestern quadrant of the site. Eddie Lucas (Billbergia) indicated that this material had been brought onto site from Homebush and was stockpiled temporarily on site;
- Diona Pty Ltd (an infrastructure civil engineering company) is leasing a portion of the eastern half of the site. Their activities include temporary stockpiling of excavated material won from off-site civil infrastructure projects. Material is understood to be brought onto the site in trucks for sorting and stockpiling. Several stockpiles of material were noted within and around the Diona compound;
- Grays Online are currently leasing a small area to the east of the Diona compound for use as a truck parking area.

The Auditor was advised by Billbergia that stockpiles currently on site are transient/temporary and will be removed. The audit has not included assessment of any stockpiles for reuse or waste disposal.

2.5 Proposed Development

CES (2008a) reported that it is proposed to develop the site for commercial use including warehousing and distribution and transport related activities. Extensive excavation of the site to form basements is not proposed. However, given the nature of the fill material, which is understood not to have been appropriately compacted, CES noted that it may be necessary to excavate to install piles and other foundation systems.

Following discussions with Eddie Lucas (Billbergia) on 8 March 2011, it is understood that an application to subdivide the site into three lots has been approved by Parramatta City Council (DA/635/2010). The subdivision approval is subject to a number of conditions which include a requirement that the terms of the public positive covenant currently registered on title are transferred to the newly created lots.

Billbergia are currently in discussions with Remondis regarding a 20year lease of two of the proposed new lots (within the central and eastern sections of the site) for use as an integrated recycling park. The development will consist of a commercial and industrial waste treatment facility, tunnel composting facility and ancillary infrastructure (weighbridge,

administrative offices, truck depot, parking and workshops) housed within a 12m high warehouse structure. A DA has been submitted by Remondis under Part 3A EP&A Act to NSW Department of Planning for the development (Application No 10_0028). The Director-General's requirements for the project include an Environmental Assessment, which includes consideration of the contamination present at the site. The proposed construction phase is understood to involve emplacement of 0.5m of fill over the existing site levels, to allow for installation of services. Billbergia indicated that a 40m setback along the foreshore and the area known as Mackies Flat will be retained as open space as these areas are considered to be flood prone land.

There are currently no proposals for development of the third lot within the western section of the site.

Details of the proposed development are provided in Attachment 4, Appendix A.

For the purposes of this audit, the 'commercial/industrial' land use scenario will be assumed.

3 Site History

The site history was reviewed during the previous site audit report (GN268-1) and a summary is provided below:

The site was acquired in 1917 by James Hardie & Company Pty Ltd (James Hardie), then trading as the Asbestos Slate and Sheet Manufacturing Company Limited, and development of the site is believed to have commenced at or around that time. Based on information available on the Parramatta City Council website (http://www.parracity.nsw.gov.au/) it is believed that prior to 1917 the main use of the area of the site was for agricultural or residential purposes.

Filling of the western portion of the site is believed to have commenced from the earliest occupation by James Hardie with that part of the site being progressively filled and developed between 1917 and the mid 1960s. The fill comprised mainly asbestos wastes but also included a significant volume of boiler ash. The asbestos waste comprised friable pulp waste from the manufacturing process as well as, presumably, out of specification and excess bonded asbestos products. Some of the products may have been coated with bitumen, zinc silicate and other paints. No records were found which mentioned imported fill being used on the site.

Other chemicals, mainly hydrocarbon-based (eg diesel, hydraulic oil and petrol) were extensively used and stored on the site and are believed potentially to have been disposed on site.

James Hardie continued production of fibrous cement products until 1993 when production ceased and the site was decommissioned. Between 1995 and 2001 the buildings were demolished to slab levels and building rubble was used to level some areas of the site where there were steps in the slabs. The site was acquired by Sydney Water Corporation (SWC) in 1996 but did not occupy the site.

In 1999 SWC formally notified NSW EPA under section 60 of the Contaminated Land Management Act 1997 that the site was contaminated and may have posed a Significant Risk of Harm. In 2000 SWC entered into a Voluntary Remediation Agreement (VRA) with NSW EPA to clean up surface asbestos contamination at the site and to improve surface seals (concrete and bituminous concrete pavements) to ensure that buried asbestos waste was isolated so that exposure pathways to humans and the environment were not present. The VRA also contained a Contamination Management Plan to ensure that remedial measures implemented were effective and maintained into the future. On 14 May 2003 the EPA gave notice that the terms of the VRA had been satisfactorily completed.

Details of the former site layout are provided in Attachment 5, Appendix A.

Billbergia purchased the site in 2007. Parts have been leased for activities such as those described in Section 2.4.

4 Contaminants of Concern

Based on a review of the previous investigative results and a detailed site inspection, CES identified contaminants of potential concern that were consistent with the previous investigations that include asbestos, petroleum hydrocarbons, metals and PAHs.

Additional potentially contaminating activities were identified through the review:

- The storage and use of bitumen for the impregnation of asbestos cement products (eg electrical backing boards, pipes)
- Storage and use of diesel oil as a mould release agent in the asbestos cement manufacturing process
- Use of pesticides under concrete slabs during development (entire site)
- Asbestos at the surface across the site

CES undertook additional investigations to target activities of concern referred to as Areas (Attachment 5 Appendix A):

- Area A – in the vicinity of the oil press and mould wash down facility to the north
- Area B – USTs in the southern central part
- Area C – vicinity of the pipe dipping tank in the south-east where fibrous cement pipes were coated with bitumen
- Area D – former railway spur extending north-south reported to have been oil stained prior to being covered with existing concrete pavements
- Targeted as E – in the vicinity of electrical transformers across the site
- Area F – UST used to store diesel at the western boundary
- Targeted as G – confirmation of URS results across the site
- Area H – surface locations where suspected asbestos containing materials were encountered due to washout from the former manufacturing processes.

The RAP identifies asbestos, petroleum hydrocarbons, metals and PAHs as current chemicals of concern which the Auditor considers to be appropriate.

5 Stratigraphy and Hydrogeology

The stratigraphy described by CES of bitumen and concrete overlying fill over natural silty sands or clays is consistent with previous observations as discussed in SAR GN268 - 1.

The overall groundwater flow direction is towards Parramatta River to the north. Groundwater was encountered between 1.4 and 5.4 m depths generally within the natural sands.

URS indicated that there was some mounding in the western portion of the site (in the vicinity of the oil press – Area A) with groundwater flowing away from this point to the north (Parramatta River), east and south. URS postulated that the cause was 'a leaking water pipe or the like' that was contributing to flow away from Parramatta River to the south-west.

CES groundwater contours also indicate that groundwater flows to the north-east towards Parramatta River rather than north from Area A.

Groundwater contours were mapped by CES that indicate a groundwater depression at Area C and flow to the south-east.

6 Evaluation of Quality Assurance and Quality Control

The Auditor has assessed the overall quality of the data by review of the information presented in the referenced reports, supplemented by field observations. The Auditor's assessment follows in Tables 6.1 and 6.2.

Table 6.1: QA/QC – Sampling and Analysis Methodology Assessment

Sampling and Analysis Methodology	Auditor Comments
Sampling Pattern, Locations and Density	**Soil Investigation:** – Asbestos fill: Confirmatory sampling was undertaken of buried fill below the concrete and any suspected asbestos containing materials at the surface above the concrete were also sampled. – Petroleum Hydrocarbons: Additional sampling undertaken by CES target areas of concern based on a review of past activities. Former USTs, sumps, tanks, transformers and equipment that contained hydrocarbons (lubricating and hydraulic oils, diesel and petrol) were targeted for sampling. – The Auditor notes that only a few potentially contaminating areas remained untargeted (former ASTs and small pits) that were noted on Attachment 5, Appendix A. – The density of sampling across the site was increased by CES for the areas targeted for analysis. The Auditor considers that the sampling pattern, density and locations were appropriate to: – Further delineate the extent and nature of impacts associated with activities of concern – Allow remedial options to be prepared. **Soil Validation**: Validation sampling was conducted in excavation pits A & B located within the Area A remediation area. Validation samples using a systematic sampling pattern from the walls of Pit A & B, although base samples were only collected from Pit B. CES noted significant groundwater impact was present in Pit A and base validation samples were not collected from Pit A. Groundwater was subsequently treated using in-situ chemical oxidation. The validation sampling was considered appropriate. **Groundwater:** Monitoring wells previously installed by URS extend along the southern, western and eastern boundaries with two wells positioned in Area A. A well installed by WCC is located at the northern boundary with the Parramatta River. Additional wells (12) were installed by CES in 2007 to target potential impacts at Areas A, B, C and F. Additional wells were installed in the vicinity of the contaminating activities. In consideration of the groundwater contours and the locations of the wells installed by WCC and CES, the Auditor considers that the sampling locations are adequate to: • Determine the nature of impacts to groundwater • Provide an indication of the potential magnitude of localised impacts. – The wells are generally positioned down-gradient of the main sources of concern, particularly Area A with MWCC down-gradient

Table 6.1: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling and Analysis Methodology	**Auditor Comments**
	of impacts at Area A rather than wells to the north (MWA07 and MWA09). – While the wells were installed mostly to the north of impacts some wells are located to the east and hence down-gradient. – CES do not discuss the positions of the groundwater wells with respect to the activities of concern. An additional four monitoring wells were installed in the vicinity of the oil press to assess the effectiveness of the groundwater remediation activities and these were considered acceptable.
Sample depths	Samples collected adjacent to USTs were collected at the suspected base depth. Some were also collected at the depth of the water table. In some instances, impacts were detected at a particular depth with no adjacent boreholes sampled at that depth such that the horizontal extent of contamination has not been determined.
Well construction	Wells installed by CES were constructed of 50 mm diameter PVC machine slotted screen. Wells were extended to 6 m depth and were screened over the final 2 - 3m above the depth of the water table at approximately 4m. The wells were mostly completed in silty sands at 6m depth.
Sample Collection Method	**Soil**: A push tube was used to excavate materials across the site with samples collected directly from the dual tube plastic liners. CES indicate that where refusal occurred (MWF05) that a solid flight auger was used. The auger was washed prior to sampling this borehole. Validation samples were collected by hand directly from the excavation or from the soil within the excavator bucket. All samples were collected with disposable latex gloves. **Groundwater**: Wells were installed by solid flight augers, developed with a Waterra foot valve and tubing. Low flow sampling was undertaken using a peristaltic pump and silicon tubing.
Decontamination Procedures	**Soil**: Dedicated sampling tubes were used during the drilling and validation was conducted direct from the excavation and no decontamination was required. **Groundwater**: Foot valves were decontaminated between sample locations by washing in a solution of phosphate free detergent followed by rinsing with distilled water. All tubing for development, purging and sampling were dedicated to the individual groundwater wells.
Sample handling and containers	All samples were placed into prepared and preserved sampling bottles provided by the laboratory and chilled during storage and subsequent transport to the labs. Samples to be analysed for heavy metals were field filtered.
Chain of Custody	Chain of custody forms were provided for primary samples.
Detailed description of field screening protocols including	Field screening for volatiles was undertaken using a calibrated PID. The results were noted on field sheets.

Table 6.1: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling and Analysis Methodology	**Auditor Comments**
calibration	PID readings were only reported above 0 at two locations in sand at 4.5m at B29 (194 ppm) and at B29a at 4.8m depth (117 ppm). These samples were submitted for analysis. CES reported that PID readings were not recorded during the validation works as all samples were sent for analysis. Groundwater field parameters were measured during well purging with a calibrated water quality meter. Wells were gauged with an oil/water interface probe (as indicated by detections of PSH).
Sampling Logs	The borehole logs indicate sample depth, lithology and well construction.

Table 6.2: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**Auditor Comments**
Field quality control samples	Field quality control samples including intra and inter-laboratory duplicates, trip blanks and trip spikes were undertaken at appropriate frequencies during he investigations. During the validation works only intra-laboratory duplicates were analysed, although his is not considered to be a significant deficiency. Rinsate blanks were not collected as all equipment (inner tubes and tubing) were dedicated.
Field quality control results	Intra: Lead RPD was reported at 106% with all other RPDs reported below CES acceptable ranges. Inter: Copper (174%) and zinc (131%) Given that all elevated RPDs were only marginally outside the acceptable ranges set by CES, CES conclude that the results are acceptable. The results from all other field quality control samples were within appropriate limits.
NATA registered laboratory and NATA endorsed methods	Laboratories used included: ALS (investigation primary), Labmark (investigation secondary), Envirolab (validation primary) and ASET (asbestos). All laboratory certificates were NATA stamped.
Analytical methods and holding times	ALS and Labmark outline the analytical methods used. Review of the COCs and laboratory certificates indicate that all holding times had been met.
Practical Quantitation Limits (PQLs)	Not all PQLs for the groundwater assessment were sufficiently low, with the following PQLs exceeding the relevant trigger values: Anthracene – 1 µg/L, trigger value 0.01µg/L Phenanthrene - 1 µg/L , trigger value 0.6 µg/L Benzo(a) pyrene - 1 µg/L, trigger value 0.1 µg/L These discrepancies are considered in the review of the groundwater

Table 6.2: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**Auditor Comments**
	results. The Auditor notes that these particular PAHs were not identified consistently at elevated concentrations in soil and PAHs are not expected to be a current contaminant of concern in groundwater other than naphthalene in association with diesel impacts.
Laboratory quality control samples	Laboratory quality control samples including laboratory control samples, matrix spikes, surrogates, blanks and laboratory duplicates were undertaken by the laboratory at appropriate frequencies.
Laboratory quality control results	ALS indicated that a dilution was required prior to analysis of two samples due to matrix interferences. Detections were reported for these samples so this was not of concern. Surrogates for TPH in one sample was marginally (121%) outside the control limits (120%) due to matrix interferences. Matrix spikes – OCPs and OPP in two samples the recovery was marginally outside the control limits due to the sample matrix which was confirmed by ALS by re-extraction and re-analysis. ALS indicates that insufficient sample was submitted for analysis for a sample that was collected from the base of the in-filled pit in Area C such that a higher PQL was required. This sample reported PAHs at elevated concentrations so adjustment of the PQLs is not of concern. Envirolab reported surrogates for p-terphenyl-d14 in one sample marginally (134%) outside the control limits. This is not considered to affect the overall useability of the data. The results from all other laboratory quality control samples were within appropriate limits.
Data Quality Objectives and Data Evaluation (completeness, comparability, representativeness, precision, accuracy)	Predetermined data quality objectives (DQOs) were outlined by CES. The DQOs were discussed with regard to the five category areas. CES concluded that the laboratory data is of acceptable quality and was useable for this assessment.

In considering the data as a whole the Auditor concludes that:

- The data is likely to be representative of the conditions at the targeted locations. Due to the asbestos impact, excavation at the site is problematic and the extent of some hydrocarbon impacts have not been fully characterised.
- The data is complete.
- There is a high degree of confidence that data is comparable to the URS work given the sampling techniques and the laboratories used
- The primary laboratory provided sufficient information to conclude that data is of sufficient precision.
- The data is likely to be accurate.

The Auditor concludes that the data as a whole is useable for the purpose of this audit.

7 Environmental Quality Criteria

The Auditor has assessed the soil data provided by URS and CES in reference to Soil Investigation Levels for Urban Redevelopment Sites in NSW (SIL Column 4 – 'commercial/industrial', in DEC (2006) *Guidelines for the NSW Site Auditor Scheme*.

EPA (1994) *Guidelines for Assessing Service Station Sites* have also been referred to for assessing TPH and BTEX results.

The Auditor has assessed the groundwater data in reference to ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. The receptor is Parramatta River, an upper estuary of Sydney Harbour. The river is influenced by a mix of freshwater and saltwater that has very different water quality characteristics and potential problems than freshwater streams. The guideline trigger values for marine waters have been used as recommended in ANZECC for estuarine environments. Trigger values (TVs) provided are concentrations that, if exceeded, indicate a potential environmental problem and 'trigger' further investigation.

There are no national or EPA-endorsed guidelines for asbestos in soil relating to human health. The EPA states that Auditors must exercise their professional judgement when assessing whether a site is suitable for a specific use. The EPA states that the position of the Health Department is that there should be no asbestos in surface soil.

The Auditor has considered the need for remediation based on the 'aesthetic' contamination as outlined in the NEPM (1999) Schedule B(1) *Guideline on the Investigation Levels for Soil and Groundwater* that states that 'there are no numeric Aesthetic Guidelines but the fundamental principle is that the soils should not be discoloured, malodorous (including when dug over or wet) nor of abnormal consistency. The natural state of the soil should be considered'.

The remediation acceptance criteria stated in the RAP are consistent with these guidelines with some qualifications:

- 'Aesthetics in currently undisturbed parts of the site will not be assessed as part of the remediation but will be managed in the CMP [Contamination Management Plan] that the Auditor refers to as an EMP (Environmental Management Plan).
- 'Limit of reporting for the C6-C9 (20 µg/L) and C10-C36 (200 µg/L) fractions were adopted as an assessment criteria screening tool and concentrations exceeding the LOR of which may trigger the need to obtain further data'.
- If the criteria are not met 'in a timely manner an assessment of risk that the remaining groundwater impacts may pose may be required'.

The Auditor considers the remaining qualifications to be reasonable.

8 Evaluation of Soil Analytical Results

Soil sampling was undertaken by URS (2006) with 76 boreholes and by CES (2007) with 46 boreholes completed across the site. WCC had previously also undertaken some sampling. Sampling locations are shown in Attachment 6, Appendix A.

8.1 Asbestos

Suspected asbestos containing materials, such as 'tiles and washouts', were collected by CES from the surface where encountered. Of the eleven samples submitted for analysis six (> 50%) contained asbestos. The details of the walkover were not provided however samples were collected from three main locations across the site.

Sub-surface investigations were undertaken mainly by URS with additional sampling undertaken by CES in conjunction with targeted excavations. Visual observations of asbestos were recorded on borehole logs. Ninety-five samples, including those with visual asbestos and without, were laboratory analysed with 49 positive detections. Visible asbestos as 'fibro sheeting' which in places was pulp textured loose asbestos was encountered over the western section of the site. The base of asbestos detections ranged from 0.3 m in the south to approximately 4 m adjacent to the railway. Laboratory analysis confirmed that the materials were asbestos containing.

Consistent with GN 268-1, the Auditor concludes that:

- The extent and distribution of asbestos in the sub-surface has generally been well established.
- There are uncertainties in the vertical extent of asbestos and the lateral extent in the shallow fill in the eastern side.
- CES conclude that the most appropriate remedial option for asbestos waste is to maintain it in place and ensure that it is appropriately managed to prevent uncontrolled or accidental exposure.

8.2 Other Contaminants

Soil samples were collected from the upper sand and gravel fill, fill containing fibro sheeting, natural clays and the natural mangrove muds. Soil samples were analysed for a variety of contaminants including petroleum hydrocarbons, PAHs, asbestos and heavy metals. As there was little variation in concentrations between the material types a summary of all data is shown as Table 8.1. The exception was one sample collected from bituminous material encountered in the pipe dipping tank, the results of which are discussed for Area C below however the results are not included in Table 8.1.

The combined results from URS and CES have been assessed against the environmental quality criteria relevant for commercial/industrial uses.

Table 8.1: Evaluation of Soil Analytical Results – Summary Table (mg/kg)					
Analyte	**n**	**Laboratory Detections**	**Maximum**	**n > EPA (1994)**	**n > SIL Column 4 (DECC 2006)**
Arsenic	154	54	705	-	**1**
Cadmium	154	16	1490	-	**2**
Total Chromium	154	151	102	-	0
Copper	154	126	734	-	0
Lead	154	136	769	-	0
Nickel	154	115	128	-	0
Zinc	154	140	1040	-	0
Mercury (inorganic)	154	16	0.8	-	0
TPH (C_6-C_9)	189	6	198	**1**	-
TPH (C_{10}-C_{36})	189	48	14450	**16**	-
Benzene	189	0	-	0	-
Toluene	189	2	0.7	0	-
Ethyl benzene	189	3	1	0	-
Xylene	189	6	10	0	-
Total PAHs	189	21	727	-	**3**
Benzo(a)Pyrene	189	8	50	-	**3**
PCBs	40	0	-	**-**	0
Azinphosmethyl	40	1	0.3	**-**	-
Other OPPs	40	0	-	**-**	-
OCPs	40	-	-	**-**	0

n *number of samples*
- *No criteria available/used*

A number of underground tanks, sumps and pits were not targeted for sampling and analysis by URS or previous investigations. CES undertook additional sampling to target activities of concern such as USTs, in-filled pits, transformers and particularly to areas of previously reported elevated concentrations of TPH C10-C14 as reported by URS. CES referred to these as Areas A to D and Area F.

Area A (Petroleum Hydrocarbons)

Of the 19 boreholes excavated by URS or CES (marked 'A') within approximately 30 m of the oil press, acid wash or mould wash areas, TPH was detected at elevated concentrations at two locations as follows:

- Adjacent to pits (marked as two horizontal lines) in the oil press area TPH C10-C36 was reported at 11730 mg/kg in soil at 0.8m and 1700 mg/kg at 5 m (CES 2007). An

adjacent sample (WCC, 1995) reported TPH C10-C36 at 9900 mg/kg at approximately 1.5 m and 4300 mg/kg at approximately 2 m.

The nearest URS (2006) samples were collected 20 m to the north and north-east adjacent to other pits. CES (2007) collected an additional sample approximately 15 m away where the other marked footings were. TPH was only detected in one sample at 530 mg/kg at 4.4 m by URS (2006).

- In the vicinity of the mould wash down area CES reported TPH C10-C36 at 4450 mg/kg and PAHs at 723 mg/kg in soil at 0.4-0.5m. All other results within 15 m were consistently not reported above the PQLs.

Area B (Petroleum Hydrocarbons)

Boreholes were spaced approximately 15 m apart with two positioned directly adjacent to the former underground unleaded and leaded petrol tanks. The most elevated concentrations of petroleum hydrocarbons were reported at approximately 4.5 m depth in these two boreholes (maximum of 2280 mg/kg) and at the surface (maximum of 4000 mg/kg). Elevated PID readings had also been reported at depth in both boreholes. CES refer to the impacts as a potential TPH hotspot. The nearest sample collected at this depth was 30 m to the north-east (C37) where TPH was non-detect. No other samples were collected at these depths and the extent of impact is not known. The vertical extent is also not known as deeper samples were not collected.

- Low concentrations of TPH and PAHs were reported in all other samples collected in the vicinity. TPH was reported at 520 mg/kg at 0.3m in close proximity to an oil sump
- Within the former boiler house at 0.2 and 0.5 m depth TPH was reported by URS at 1190 mg/kg and 14450 mg/kg respectively. The vertical extent of impact has not been delineated. CES note that the contamination is ‘thought to be associated with fill material and not the USTs’.

Area C (Petroleum Hydrocarbons)

CES targeted the pipe dipping tank with boreholes positioned in and out of the former tank footprint. Intrusive work indicated that the former tank footprint appeared to be an in filled pit. At the base of the pit fill consisted of bituminous coated concrete asbestos sheeting. This material was sampled and reported significantly elevated concentrations of TPH C6-C9 (90100 mg/kg), TPH C10-C36 (320900 mg/kg), ethylbenzene (2560 mg/kg) and total xylene (21860 mg/kg) (not included in Table 7.1).

Samples collected outside the tank footprint were generally non-detect with petroleum hydrocarbons only reported in samples collected between 0.8 and 1.2m to the east of the former tank. TPH C10-C36 was at a maximum of 290 mg/kg and low concentrations of ethylbenzene and xylene were reported. No other samples were collected at this depth in the vicinity.

One borehole was located adjacent to a former ‘underground tank’ however petroleum hydrocarbons were not reported above the PQLs.

Area D (Petroleum Hydrocarbons)

A former railway spur that extended north-south was formerly reported to contain oil stained sleepers prior to covering with concrete. CES indicate that heavy oils and grease would be expected. Detections of petroleum hydrocarbons were reported in all three sample locations with TPH C10-C6 at a maximum of 1590 mg/kg, ethyl benzene at 1.2 mg/kg and total xylene at 10.5m. The detections were reported in fill materials (gravels, ash and bitumen) located in the upper 1m. The boreholes were extended to 4 m into natural materials.

Area F (Petroleum Hydrocarbons)

An underground diesel tank at the western boundary was targeted by WCC (1995). The samples were collected at 0.5 m and 1.75 m. TPHs were not detected above the PQLs. It is not clear whether these samples are deep enough to intercept potential impacts. URS (2007) reported TPH C10-C36 at 790 mg/kg at 1 m which was non-detect at 2.5m.

An additional sample was collected by CES in the near vicinity to the north-east (15m distance) that did not report petroleum hydrocarbons above the PQLs at 1.8-2m. A further three boreholes immediately adjacent to the UST reached refusal in the asbestos cement fill at 0.9m depth.

Petroleum Hydrocarbons (Remainder of the Site)

Detections of petroleum hydrocarbons that were investigated by URS (without further investigation by CES) include the following:

- URS reported TPH at an elevated concentration either side of the sewage discharge point at a maximum of 6990 mg/kg at 0.1-0.2 m. Previous samples collected at 4.5 and 5 m by WCC (1995) from one borehole in the vicinity did not report TPH > PQLs which may indicate that the impacts are limited to the shallow materials.
- Total xylene was reported at low concentrations well below the criteria in the eastern half. There is no apparent source. TPH C6-C9 at 5 mg/kg and toluene were also reported in a sample at the eastern boundary.
- Low concentrations of TPH C10-C36 were reported to the west of the rail line at or marginally above 1000 mg/kg. The detections are thought to be associated with fill materials.

PAHs and Metals (Entire Site)

PAHs (123 mg/kg) and benzo(a)pyrene (12 mg/kg) were reported above the SILs in one sample at 0.5 m in the western half of the site. This was located over the former grease trap. Lead was reported at slightly elevated concentrations that were below the SILs. Other elevated concentrations of PAHs were associated with the former oil press area (729 mg/kg) (Area A) and low detections in the parking area (northern tip) and adjacent to the UST (Area B) as naphthalene (13 mg/kg). Particularly elevated concentrations of PAHs at 5949 mg/kg (mainly naphthalene) were reported in the bituminous materials.

URS concludes that the fill is the most likely source of PAH concentrations in the parking area and the grease trap area. There is no discussion of the past uses of these areas. The fill materials are similar to those reported across the site and the Auditor notes that there were no indications of impact elsewhere.

Metals were generally reported below the SILs except for arsenic in the south-west corner (ESB13) (705 mg/kg), cadmium adjacent to the oil sump in Area B (B35) (1490 mg/kg) and cadmium in the north-west corner (ESB6a) (110 mg/kg). Cadmium was not detected or was detected at low concentrations in the adjacent samples (35 m distance) and was only detected in 14 other samples across the site at low concentrations. Arsenic was detected at maximum of 20 mg/kg in the adjacent samples with only low concentrations reported over the site.

URS indicate that the source of metals is likely the result of fill however the fill materials are similar to those encountered over the site. Other contaminants of concern were reported at low concentrations or were not detected above the PQLs in these samples.

PCBs, OPPs and OCPs (Entire Site)

Six boreholes were targeted to six former electrical transformers (six) (referred to as Area H) that were reported to have contained PCB containing oils. Two of these refused on concrete at 0.6m in the vicinity of the railway spur. Samples collected from various depths (0.15 – 4 m) did not report PCBs above the PQLs. One of these was not collected in the underlying fill, rather in natural silt at 3.9 m depth.

Given the presence of concrete at all locations, no visual impacts in the borehole logs and the consistent non-detection of PCBs the Auditor considers that the risk of more elevated concentrations of PCBs is low.

Only a low concentration of an OPP in one sample was reported with all other OCPs and OPPs not reported above the PQLs.

8.2.1 Conclusion

The Auditor concludes that the nature of impacts at the site is understood however the knowledge of the extent is limited in some cases as follows:

- TPH impacts are known to be associated with the area in the vicinity of the sewage discharge point, the former oil press, mould wash down area, acid tank, former USTs, pipe dipping tank and the former boiler house. The lateral and vertical extent of impacts has not been determined. CES and URS reported that the validation methodology would require ‘chasing out’ of the impacted materials. Subsequent to this CES noted that excavation of the site was problematic due to the extensive asbestos impacts across the site and the remediation strategy was amended to include only excavation of the significant contamination associated with Area A. Currently the site is managed through a Site Management Plan (SMP) which is recorded on a positive covenant on the property lodged by the EPA under section 88E(3) of the Conveyancing Act 1919. This is further discussed in section 10.

- In a limited number of other samples PAHs, arsenic and cadmium impacts were reported above the criteria. The metals have been attributed to the fill materials and PAHs to nearby activities or fill. However, fill has been adequately characterised for inorganic and organic contaminants. Therefore in the Auditor's opinion, any impacts are more likely to be associated with specific historical activities.
- A limited number of potential contaminating activities (above ground tanks and small pits) were not targeted. Given that these activities are minor in the scale of the larger site, the risk of gross impact requiring remediation, remaining undetected is considered to be low.

Details of the remediation strategy are discussed in section 10.

9 Evaluation of Groundwater Analytical Results

Groundwater samples were collected by URS from 11 wells in January 2006 and by CES from 16 wells in November 2007 including five wells previously installed by URS and WCC. Sampling locations are shown in Attachment 6, Appendix A and the analytical results are tabulated below in Table 9.1.

Table 9.1: Evaluation of Groundwater Analytical Results – Summary Table (μg/L)

Analyte	Detections URS n=11 (January 06)	Maximum URS n=11 (January 2006)	Maximum CES n=16 (November 2007)	n >ANZECC Marine (2000) URS (January 2006)
Arsenic	5	2	8	0
Cadmium	0	-	2	0
Total Chromium	0	-	-	0
Copper	10	4	5	**8**
Lead	1	1	5	0
Mercury (inorganic)	0	-	-	0
Nickel	10	10	47	**1**
Zinc	11	249	93	**9**
TPH (C_6-C_9)	1	160	20	NA
TPH (C_{10}-C_{36})	4	**1752 mg/L**	**109 mg/L**	NA
Benzene	1	1	-	0
Toluene	0	-	-	0
Ethylbenzene	1	5	-	0
Total Xylene	1	9	-	0
Benzo(a) Pyrene	0	-	-	0
Naphthalene	1	1140	126	**1**
Anthracene	0	-	-	0
Fluoranthene	0	-	3	0
Phenanthrene	2	1170	52	**2**

n *number of samples*
- *No criteria available/used*

Groundwater across the site is characterised by **metals**, copper and zinc at concentrations that exceed the trigger values. The most elevated concentration of zinc was reported at the eastern down-gradient boundary. The metals results are consistent with those reported in previous investigations where copper, lead and zinc were reported at slightly elevated concentrations.

The close proximity of the site to the Parramatta River indicates that there is likely to be connectivity between surface water and groundwater.

TPH C6-C9 was detected in groundwater at only three locations with the concentrations considered to be minor with benzene reported at a maximum of 1 μg/L:

- Within Area A (EMW01) where TPH C6-C9 was reported at 20 μg/L.
- At the northern boundary (MWWC) where TPH C6-C9 was reported at 30 μg/L.
- At the eastern boundary (MB20) where TPH C6-C9 was reported at 90 μg/L.

Petroleum hydrocarbons as **TPH C10-C36** were detected above the PQLs generally in close proximity to areas of elevated concentrations in soil encountered at:

- Area A which includes an oil press, pits, hydraulic conveyor and an acid wash area.
- Area B, specifically in association with the UST.
- Area F which is located to the south-west of a UST.

Area A is an arbitrary boundary to the east of the former railway spur that included potentially contaminating activities such as oil pressing, associated pits, the use of hydraulic oils and acid washing.

Groundwater wells sampled by URS (2006) and CES (2007) are positioned in the general vicinity of these activities of concern. Groundwater sampling results are discussed in consideration of local groundwater flow contours prepared by CES in Table 9.2.

Table 9.2: Groundwater Results Discussion for Area A

Area A	Position in relation to Area A	Activity	URS (2006) Results	CES (2007) Results	Auditor Comments
MW/A14	Up-gradient	Hydraulic conveyor	NA	TPH C10-C36 was reported at 1580 μg/L	Consistent with other contaminant levels in Area A
EMW02	Down-gradient (D/g) of MWA14	D/g of hydraulic conveyor	TPH C10-C36 was reported at 24410 μg/L. Chromatogram indicated an oil source.	TPH C10-C36 was reported at 500 μg/L. CES noted a 1-3mm layer of **PSH**.	The specific source of the particularly elevated concentrations of petroleum hydrocarbons is not known.
EMW01	Up-gradient boundary	Oil press and acid tank	TPH C10-C36 at **1752 mg/L** and naphthalene at 1140 μg/L. Chromatogram indicated a diesel source.	TPH C10-C36 at **109 mg/L** and naphthalene at 95 μg/L. Elevated, although reduced concentrations. A strong hydrocarbon	Sands underlying concrete in this area had reported hydrocarbon odours, staining and TPH C10-C36 at 1700 mg/kg. These are the most elevated concentrations reported by CES or URS in Area A.

Table 9.2: Groundwater Results Discussion for Area A					
Area A	**Position in relation to Area A**	**Activity**	**URS (2006) Results**	**CES (2007) Results**	**Auditor Comments**
				odour was noted and 5 mm of **PSH**. TPH **C6-C9** reported at 20 μg/L	
MWWC	Down-gradient	D/g of oil press and acid tank	NA	TPH **C6-C9** was reported at 30 μg/L and **PSH** at 1-3mm layer	The groundwater contours indicate that groundwater flows to the river in a north-easterly direction. This indicates that impacted groundwater at Area A has been intersected by MWWC that reported free phase rather than wells to the north (MWA07 and MWA09) that did not report petroleum hydrocarbons above the PQLs. The magnitude and suite of contaminants detected is not consistent between the wells at Area A indicating a number of sources.
MWA09	Down-gradient	D/g of 'oil', oil press and acid tank	NA	Consistent with earlier findings by WCC, TPH was not reported above the PQLs.	These two wells (MWA09 and MWA07) are located between petroleum contaminated groundwater and the Parramatta River in a northerly direction. Groundwater contours indicate that these are more cross rather than down-gradient
MWA07	Cross-gradient	Mould washdown area	NA	Consistent with earlier findings by WCC, TPH was not reported above the PQLs.	

n *number of samples*
- *No criteria available/used*

The Auditor agrees with CES that the specific sources of hydrocarbon contamination is not clear.

Area B is an arbitrary boundary around potentially contaminating activities including a power house, boiler house, USTs (unleaded, leaded and kerosene) and diesel oil tanks. To the north is an oil sump.

Well MW29 is positioned directly adjacent to some of the former diesel oil tanks and USTs. Elevated concentrations of TPH C10-C36 (5780 μg/L) and naphthalene (126 μg/L) were reported by CES. This corresponds to elevated concentrations of TPH at 4.5m in sand at this location. Strong hydrocarbon odours were noted in the field with PSH measuring 5mm with the oil-interface probe and a surface sheen noted in the sampling beakers.

The groundwater contours indicate mounding in the vicinity of MWE30 near the power house. The flow direction is therefore not clear as it appears to flow to the south-west away from Parramatta River which is not consistent with regional flow to the north and north-east.

All other wells to the north, north-east and south did not report TPH above the PQLs. These wells had targeted other diesel tanks and the oil sump.

Area C is located directly adjacent to Area B and targets the pipe dipping tank.

- TPH and PAH impacts in bituminous material were encountered at the base of an infilled pit at 1-1.4m. Groundwater, encountered at 4.5 m, was sampled outside the boundaries of the pit. No hydrocarbons were detected in groundwater by the laboratory.
- While impacts are likely to be confined to the concrete wall lined pit with a base of stiff clay, CES noted a 1-3mm layer of PSH in a well (MWC46) directly down-gradient (non-detect in the laboratory). This is inconsistent with the results that were non-detect.

Area F is located directly adjacent to an underground diesel tank based on the site plan (it is understood that there were difficulties locating its position in the field). Minor concentrations of TPH were detected in soil at some distance from a UST with three other boreholes in closer proximity refusing on concrete.

- MB9 at the western boundary and 25 m to the south of the UST location reported TPH C10-C36 at 1000 μg/L in groundwater by CES (previously non-detect by URS). Groundwater is understood to flow in a northerly direction to the Parramatta River however the contours in this location indicate flow from the UST to the south-east. In any case MB9 is still located cross-gradient to the impacts.

The increase in concentration reported by CES may be due to the use of low flow sampling (CES), compared to the URS use of bailers. However, at Area A concentrations of TPH were reported at higher concentrations by URS.

Overall, given the time since the site was in operation, the Auditor considers that hydrocarbon impacts to groundwater are localised. The nature of other impacts to groundwater has been established as being regional, i.e. copper and zinc impacts which are consistent with those previously reported.

URS indicate that as previous investigations did not indicate migration to Parramatta River, 'that the potential risk has not been fully assessed but would be removed with remediation of the source'.

In the Auditor's opinion, there are numerous potential sources of groundwater contamination onsite but there has been sufficient investigation to conclude that significant impact to groundwater is likely to be only associated with a limited number of potentially impacting activities. Remedial works to address these impacts are discussed in Section 10. The finding of localised rather than widespread impacts, except for regional metal concentrations, is consistent with a surface sealed site and a flat topography.

10 Evaluation of Remediation

10.1 Remediation Strategy and Methodology

CES prepared a RAP (2008a) which identified excavation of tanks sumps, and contaminated soils. However following a careful consideration of the risks associated with excavation of the asbestos impacts and following discussions between EPA/Billbergia, CES issued an addendum to the RAP (2008b) which provided updated remedial strategies. The Auditor contacted DECCW (Andrew Mitchell) on 17 June 2008. DECCW confirmed that a meeting had taken place between Billbergia and DECCW to discuss the proposed remediation strategy. During this meeting DECCW expressed a wish that disturbance of asbestos waste and asbestos impacted soil be kept to a minimum and that the merits of any proposed remediation should be carefully weighed against the increased risks associated with excavation of the asbestos impacted material.

The extent of impacts identified by CES and the preferred remedial approach is discussed in Table 10.1. Areas referred to are shown on Attachment 6.

Table 10.1: Preferred Remediation Approach

Description	Extent	Preferred Approach
Hydrocarbons in groundwater		
All Areas	In the addendum to the RAP CES identified two areas of groundwater contamination: – Area A in the northern central portion of the site; – Area B in the southeastern part of the site. The remaining areas which were to be investigated will now be left undisturbed, due to the high risks associated with disturbance of the asbestos fill.	Area B: CES provided simple groundwater velocity calculations which indicate that the risk to the Parramatta River is relatively low. Considering the risks associated with excavating asbestos contaminated fill in the area, CES concluded that remediation of the source area in Area B is not indicated. Area A: CES proposed that remediation of groundwater in Area A should be completed in general accordance with the relevant sections of the RAP (2008a). This involved removal of tanks, sumps and contaminated soil as follows: - off-site disposal of contaminated water entering the pit -if pumping not successful then dosing the base and walls with an oxygen release compound before backfilling - if dosing unsuccessful then in-situ oxidation down-gradient of the former source following further delineation.
Hydrocarbons in soil		
Area A	Elevated concentrations of TPH C10-C36 were reported from 0.4m to 5m (maximum extents of testing) in close vicinity to the pits in the oil press area and in the vicinity of the mould wash down area. Elevated concentrations of	Remove concrete pavement in the vicinity of EMW01 (most elevated concentration of TPH in soil and groundwater) Excavate hydrocarbon impacted soil based on observations (odour, PID, staining).

Table 10.1: Preferred Remediation Approach		
Description	**Extent**	**Preferred Approach**
	PAHs were also reported. CES conclude that the contamination in Area A is considered to be associated with industrial processes however the specific source is not clear. The RAP notes the following limitations and assumptions: The volume of contaminated soil/fill is 'difficult to estimate' Actual subsurface conditions can be fully assessed by excavation during removal of soil i.e. not currently delineated. The extent of the impacts are marked as circles around three separate borehole locations and labelled as 'groundwater contamination' and/or 'soil contamination' which do not indicate that a good conceptual model has been established.	Confirmation through validation sampling. Backfill with 'clean fill' including fill containing asbestos, directly below the concrete paving. The Auditor notes that the specific source is not clear given the numerous potentially contaminating activities and the lack of a pattern of contamination. Given this, the potential success of the remedial works would be based on good visual documentation of the works confirmed by validation sampling.
Area B	Petroleum hydrocarbon impacts to soil at 0.1m and 4.5m and groundwater were detected in association with a UST. The extent of the petroleum hydrocarbon impacts has not been determined. It is not known whether the UST has been decommissioned or abandoned and information on associated pipe work and pumps was not available.	Initially CES proposed removal of the UST, excavation of hydrocarbon impacted soil based on observations (odour, PID, staining), validation sampling and backfilling. However, the revised remediation strategy in the addendum to the RAP was identified as: – Cap and contain – Management through implementation of long term EMP. The Auditor considers that the works are appropriate given the high risks associated with disturbance of the asbestos contaminated fill material.
Area C	Bituminous material at the base of a concrete wall lined pit with a clay base reported particularly elevated concentrations of hydrocarbons. Given that hydrocarbons were not detected in groundwater by the laboratory (although PSH was noted to the north) CES estimate that the extent of impacted material (believed to be asbestos cement sheets impregnated with bitumen) is limited to the boundaries of the pit. The vertical extent is estimated based on the one borehole to be between 0.4m and 1m depth. Two USTs are located in the vicinity of the former pipe dipping tank. CES notes that the contents of the USTs have not	Initially CES proposed removal of the dipping sump and UST, excavation of hydrocarbon impacted soil based on observations (odour, PID, staining)., validation sampling and backfilling. However, the revised remediation strategy in the addendum to the RAP was identified as follows: – Cap and contain – Management through implementation of long term EMP. The Auditor considers that the works are appropriate given the high risks associated with disturbance of the asbestos contaminated fill material.

Table 10.1: Preferred Remediation Approach		
Description	**Extent**	**Preferred Approach**
	been determined. No impacts in soils in the vicinity were reported.	
Area D	The former railway spur is known to have consisted of oil stained sleepers prior to being sealed with concrete. The RAP assumes that heavy oil residue is present however indicates that the residue 'is unlikely to have [a] significant impact on groundwater'. The extent is assumed to be the length of Area D as indicated on Attachment 5, Appendix A.	Management is required as discussed in the first sections of the RAP and in relation to the various options. A preferred approach was not discussed.
Area F	A UST was located in this location however it is not known whether it was abandoned or removed. Hydrocarbon impacts were only detected in groundwater 30m to the south-east (cross-gradient). Closer boreholes had refused on concrete fill. The extent is not discussed in the RAP.	Initially CES proposed removal of the UST, excavation of hydrocarbon impacted soil based on observations (odour, PID, staining), validation sampling and backfilling. However, the revised remediation strategy in the addendum to the RAP was identified as follows: – Cap and contain – Management through implementation of long term EMP. The Auditor considers that the works are appropriate given the high risks associated with disturbance of the asbestos contaminated fill material.
Asbestos		
Surface Impacts	Asbestos containing materials (ACM) are located at the surface of the site as floor tile debris or 'embedded in the concrete surface but exposed and open to abrasion'. CES indicates that a 'detailed investigation' was undertaken and that ACM are 'in limited areas' and over a total of '150 m^2'. The Auditor notes that although the investigation flags the presence of asbestos at the surface that the investigation approach was not systematic and that remedial works would need to compensate for this to validate that the surface is free of ACM.	'will be removed or isolated by an asbestos removal contractor'. Validation of removal is a visual inspection with sampling as necessary. Validation of isolation is 'recording of the method of isolation' using a GPS and listing its location in the EMP for the isolation option. No further details provided. The Auditor notes that a systematic approach has not been adequately demonstrated for the removal and validation of surface impacts. It is understood from 'Asbestos Waste Options' and previous discussions with CES that the surface is likely to be isolated by placing a layer of clean fill over the surface and sealing with concrete. The details of the cap and validation of this are not provided. CES indicates that cement pipes embedded in concrete would be placed to

Table 10.1: Preferred Remediation Approach		
Description	**Extent**	**Preferred Approach**
		50 mm below the surface of pavements. Disposal of removed asbestos was on or off-site disposal. The Auditor considers that these are adequate options.
Sub-surface	Visible asbestos containing materials and associated fibres as determined by the laboratory are located throughout the fill over the entire site at depths up to 4m. There are a number of uncertainties regarding the vertical extent and the lateral extent in shallow fill in the eastern side however CES notes that 'some degree of asbestos contamination can reasonably be expected to be present in the subsurface in all areas of the site'.	Retain existing pavements and cover with a layer of fill and seal with concrete pavements. Prepare a Contamination Management Plan. All excavation works are to be undertaken under the supervision of a licensed asbestos removal contractor.
Undiscovered Contamination		
Across the Site	Any potentially contaminating activities that have not been directly investigated. CES note that the site is not suitable for the proposed land uses as 'the potential exists for undiscovered contamination to be present in areas of the site that have not been directly investigated'. The RAP indicates that undiscovered and unexpected contamination would be managed during development and operation through the EMP.	Adequate

10.2 Evaluation of Remedial Action Plan

The Auditor assessed the RAP (CES, 2008) and addendum to the RAP (CES, 2008b) by comparison with the checklist included in "Guidelines for Consultants Reporting on Contaminated Sites". The RAP was found to address the required information as detailed in Table 10.2, below.

Table 10.2: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Comments**
Remedial Goal	That the site is suitable for the proposed commercial/industrial uses. In the Auditor's opinion, this goal is considered appropriate.
Discussion of the extent of remediation required.	Discussed in Table 10.1.
Remedial Options	**Hydrocarbon contaminated areas:** Area A - Excavation and removal of sources; – Removal of free product

Table 10.2: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Comments**
	– In-situ chemical treatment of dissolved phase impacts. Areas B – F Cap and contain strategy and management through implementation of a long term EMP. **Asbestos:** - Surface impacts: excavate and off-site disposal - Sub-surface: management of the waste in-situ ensuring complete and permanent seal is present and maintained through implementation of EMP. **Undiscovered Contamination** - Management through the EMP
Selected Preferred Option	Preferred option was discussed within the RAP (refer sections above)
Rationale	Rationale for the preferred options was provided
Proposed Validation Testing	UST Excavations: 2 samples per tank from base, representative samples from the walls at > 1 per 30m wall (assume pit is 3m deep), one per 10 m at the wall, one per 10m of pipeline and two samples per tank of backfill sands. Where chased out 1/30m^2 on base and 1 per 10 m on wall. The Auditor notes that representative soils should be collected based on visual, odour and PID screening results and the previous depth of elevated results. Excavation: 10 m spacing on base and vertical walls of the excavations. Collected at surface (upper 0.15m) Stockpile: 1 per 25m^3 or 1 per 100m^3 depending on homogeneity of the materials. Collected from up to 300mm in surface of the stockpiles. A PID would be used to screen the samples. Results should be documented. Sample logging is proposed. Logs of the excavations walls should also be provided. Groundwater: Dependent on 'the final remedial programme which depends on the results of further investigations to delineate the plume and/or the results of the RDOP' (Remedial Design Optimisation Program). Asbestos: A discussion on criteria indicates that 'validation that the asbestos impacts have been appropriately managed will depend on there being no asbestos at the surface and that buried asbestos is securely isolated by a complete and permanent seal with appropriate management procedures in place'. Validation would be in the form of observations following removal of the ACM.
Treatment of Contaminated Soil	CES proposed that prior to off-site disposal material may require ex-situ treatment (bioremediation). The Auditor notes that during remediation works, excavated material was classified as waste without pre-treatment being required.

Table 10.2: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Comments**
Interim Site Management Plan (before remediation)	Not discussed however the site is fenced.
Site Management Plan (operation phase) including stormwater, soil, noise, dust, odour and OH&S	A site management plan provides a good outline of procedures to be followed
Contingency Plan if Selected Remedial Strategy Fails	Within the original RAP CES stated that additional volumes of soil and groundwater may require remediation. The contingency was to keep digging and dispose of the material where possible either on-site or off-site depending on the risk to human health. The addendum to the RAP, did not provide an updated contingency, based on the revised remediation program.
Contingency Plans to Respond to site Incidents. Site Management Plan for the Operation Phase.	Not provided
Remediation Schedule and Hours of Operation	Not discussed
Licence and Approvals	Asbestos to be removed 'by an appropriately licensed asbestos removal contractor'. Waste would be sent to an appropriately licensed landfill. The works are classified as Category 2 under SEPP 55. No other approvals were discussed. Part 3A permit is required under the Rivers and Foreshores Improvement Act 1948 if land is < 40m from the top of the bank of shore of protected waters.
Contacts/Community Relations/	Contacts not provided but will be displayed on signs located at the site access gates.
Staged Progress Reporting	Not proposed
Long term site management plan	In the RAP, CES (2008a) indicate that a Contamination Management Plan (CMP) would be prepared to ensure maintenance of the seal. An outline of the requirements was provided that is considered adequate. CES note that EMPs are typically recorded on the Section 149 Certificate. CES did not provide details of the CMP in the addendum to the RAP.

10.3 Remediation Works Undertaken

10.3.1 Soil Remediation - Area A

The following remediation works were undertaken:

- Excavation of pit A and pit B. (Attachment 7 & 8, Appendix A);

- Classification of stockpiled material and disposal off-site;
- Validation sampling of the excavations;
- Air monitoring of asbestos fibres during excavation works.

In the Auditor's opinion, remediation works undertaken were generally appropriate and in accordance with the amended RAP. It is noted that the UST within area A, which was previously documented by CES was not located.

Soil samples were collected from the walls and base of the excavation (Attachment 8, Appendix A). CES reported visual observations during the site works as follows:

- Pit A: CES reported no visual evidence of hydrocarbon contamination at the extent of the excavation although contaminated groundwater and free phase hydrocarbon product was noted in the base of the excavation.
- Pit B: CES reported no significant contamination observed within the pit during the excavations.

A summary of the validation results have been tabulated in Table 10.3.

Table 10.3: Evaluation of Validation Analytical Results – Area A (mg/kg)

Analyte	n	Detections	Maximum	n > SIL Column 4 (DEC 2006)	NSW EPA (1994)
BTEX	12	<PQL	<PQL	-	None
TPH (C_6-C_9)	15	<PQL	<PQL	-	None
TPH (C_{10}-C_{36})	15	8	15,100	-	8
Total PAHs	12	7	34.6	None	-
Benzo(a)pyrene	12	<PQL	<PQL	None	-

Impacts in the form of TPH (C10-C28) were reported in Pit A along the northern, western and southeastern walls at depths ranging between 3-6mbgs. Base samples were not collected as impacted groundwater was observed and required remediation.

Within Pit B TPH (C10-C28) to a maximum 6,100mg/kg were reported along the northern wall and base of the excavation at depths ranging between 2.5-6.6m.

In the Auditor's opinion, the main source of impact has been removed from Area A although some residual soil impact is still present within the area.

10.4 Groundwater Remediation – Area A

CES reported that the centre bund between Pit A and Pit B was removed to create a natural sump and free flowing water was encountered at approximately 5.5m. CES reported that four pump and dispose events were conducted between 27 October 2008 and 3 December 2008 with an average of 10-15tonnes of liquid waste being disposed during each event. The

Auditor conducted a check of the waste disposal documentation and notes that disposal dockets and waste tracking forms were only provided for 13.34 tonnes disposed on 4 December 2008.

Following groundwater extraction and disposal, in-situ remediation was conducted using chemical oxidation. Regenox a proprietary compound was dispersed through the excavation as a slurry, which was allowed to settle overnight. The excavation was then backfilled with (non-impacted) excavated soil/fill and a concrete slab laid. CES did not provide details of how the non-impacted fill was classified but as it is capped with concrete and subject to the EMP this is not significant.

10.4.1 Groundwater Monitoring

Four groundwater monitoring wells were installed in February 2009 and the locations are shown in Attachment 7, Appendix A).

The monitoring wells were sampled quarterly over a 12 month period to assess the effectiveness of the remediation. The results indicate that concentrations of TPH C6-C9 and C29-C36 were reported below the LOR and TPH C10-C14 ranged from below LOR to 470ug/L. No obvious trends were observed in the groundwater data, although a significant increase in pH was noted at monitoring well MWA101 indicating breakthrough of the chemical oxidant.

The extent of the soil remediation and subsequent groundwater monitoring did not include areas within the vicinity of EMW02 and MWWC which had previously been identified to contain PSH.

10.5 Surface Asbestos Remediation

Details of the surface asbestos remediation have not been provided, however Airsafe (2008) provided a clearance certificate (Appendix B) which indicates that asbestos cement sheet debris was removed from the surface of exposed areas of concrete slabs. Asbestos cement conduit was cut back below pavement level and then encapsulated with cement.

Airsafe reported that asbestos cement sheeting remains in-situ in Area A and was to be sealed at a later dated. However CES later reported that the excavated area in Area A had been sealed with a concrete slab and this was confirmed during a site inspection by the Auditor on 8 March 2011.

Airsafe reported that a detailed visual site inspection was conducted (although the exact details of how the inspection was carried out were not provided) and certified that asbestos material had been removed in accordance with NOHSC: 2002(2005) and that no visual evidence of asbestos debris remains on the site surface.

The Auditor conducted a brief site inspection on 8 March 2011 and did not observe asbestos fragments on the site surface.

10.6 Areas Requiring On-going Management

The Auditor notes that there are a number of areas that require on-going management as follows:

Soil:

All areas – asbestos contaminated fill with some localised metal impacts associated with historical site uses.

Area A – hydrocarbon impact within the oil press area and mould wash down area;

Area B – hydrocarbon impact associated with the boiler house, UST and oil sump;

Area C – hydrocarbon impact associated with bituminous material at the base of a clay lined pit;

Area D – Hydrocarbon impact associated with oil stained sleepers along the railway spur;

Area E – UST with potential for some localised soil impact.

Groundwater:

Area A - Although gross impacts around EMW01 have been excavated, there is still some residual hydrocarbon impacts (both dissolved phase and PSH within the vicinity of EMW02 and MWWC);

Area B - dissolved phase and PSH in the vicinity of MWB29;

Area C – PSH within MWC46 downgradient of the pipe dipping tank;

Area F – Dissolved phase hydrocarbon impact associated with a UST.

11 On going Site Management

The Auditor has reviewed the site management plan (SMP) currently in force at the site as listed below. The review is presented in Table 11.1.

- 'Site Management Plan, Eastern Portion Former James Hardie Site, Grand Avenue Camellia' dated 17 March 2004.

A copy of the SMP is provided in Appendix C.

Table 11.1: Assessment of the SMP

Item	Auditor Comments
Site Specific stand alone document	Appropriate
Plan Objectives The plan objectives relate to: – maintenance of adequate seal over areas of fill known to contain asbestos and – to provide a detailed site management plan which addresses all human health and environmental issues related to the on-going presence of contaminated soils at the site.	These objectives are relevant to the residual soil contamination (asbestos contaminated fill). The plan does not specifically identify management of impacts other than asbestos in the soil; however, the Auditor is satisfied that there is a mechanism in place which, if correctly implemented, will adequately manage contaminated fill at the site including residual impacts associated with asbestos, hydrocarbons and metals.
When does the SMP apply? The CMP includes current and anticipated land uses at the site and any emergency contingencies that may arise in relation to servicing or repair of underground services that may be present on the site.	Considered appropriate
Contamination Issues The CMP identifies asbestos contaminated fill as the main contamination issue and identifies: – Management strategies – maintenance of cover – Inspection schedule including checklists	The contamination issues, with respect to asbestos are adequately defined, however discussion of the extent of hydrocarbon impact within soil and groundwater and consideration of the likely exposure pathways has not been included. The Auditor has reviewed the management strategies detailed in the SMP and notes that whilst the residual impacts are not all specifically listed in the SMP, the management strategies are appropriate to manage the potential exposure scenarios.
Extent of Capping and Specification of the Cap Site is capped with – 95% concrete and bitumen; and – 5% soft surfaces such as road verges and occasional small garden beds which are well covered with topsoil and grassed.	Although the SMP does not include details of the extent of hydrocarbon impact and locations of infrastructure such as USTs and pits, the SMP ensures that capping is maintained across the entire site area. In consideration of this, the extent of capping is considered sufficient to manage the residual impacts at the site.

Table 11.1: Assessment of the SMP	
Item	**Auditor Comments**
The SMP applies to the entire site area and a map is provided showing the extent and indicative depths of asbestos impacted fill.	
Responsibilities The terms of the public positive covenant require the site owner to maintain remediation of the property in line with the terms of the SMP.	Considered appropriate
Timeframe Details of actions and timeframes to manage on-site hazards are provided in section 4.2 of the SMP and require annual reporting to the EPA. Management and reporting will be required in perpetuity whilst the contamination remains in-situ.	Considered appropriate.
Long-term engineering security of works: Maintenance of hard surfaces requires “ensuring that bitumen and concrete surfaces are in sound condition”. Grassed areas must be maintained with a mimimum of 50mm grass and clearly signposted as a buried hazard.	Considered appropriate
Compliant with Relevant Documentation? Approved by EPA and registered as a positive public covenant on title.	Considered appropriate
Occupational Health and Safety (OH&S) Safe work plan required for all excavation at the site. Example attached as Appendix A to the SMP.	Considered appropriate
Public notification mechanisms to ensure potential purchasers or other interested parties are aware of the restrictions: The SMP is currently enforced through a positive public covenant on the title under s29 of CLM Act 1997 and s88E(1) of the Conveyancing Act 1919.	The positive covenant applies to Lot 1, DP226202, Lots 1 & 2, DP 579735, Lot 201, DP669350 and Lot 1 DP721503. Lot 1, DP721503 has since been subdivided into three separate lots, of which Lot 102, DP1146308 is consistent with the current site area. The certificate of title for Lot 102 DP1146308 has been reviewed and the title indicates that the positive public covenant is enforced on the lot. Overall the SMP is considered appropriate and legally enforceable.

The following conditions for the implementation of an Environmental Management Plan (described as a SMP for the purposes of this audit) stated under Section 3.4.6 of DEC (2006) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Ed.) have been met, namely:

- The SMP has been reviewed by the Auditor.
- Public notification of restrictions applying to the site and the provisions of the SMP are currently legally enforced through a positive public covenant under Section 88E(1) of the Conveyancing Act 1919;

Based on the above, the Auditor considers that the SMP will provide an adequate framework for the management of residual impacts at the site.

12 Compliance with Regulatory Guidelines And Directions

Guidelines currently approved by the EPA under section 105 of the NSW *Contaminated Land Management Act 1997* are listed in Appendix E. The Auditor has used these guidelines.

A review of the investigation and remediation activities with respect to current national and NSW regulatory guidelines and directions and has been conducted and a summary is provided in Table 12.1 below:

Table 12.1: Compliance with Regulatory Guidelines and Directions

Details	Auditor Comments
EPA (1997) *Guidelines for Consultants Reporting on Contaminated Sites*.	The investigation and remediation was generally reported in accordance with these guidelines.
Appropriate licences and consents for installation of a groundwater bore obtained from NSW Office of Water.	No details provided.
Extracted groundwater must be disposed of in accordance with the POEO Act.	No details provided.
OH&S Regulation 2001 and Workcover requirements: CES reported in the RAP that excavation of asbestos material will be conducted by an AS1 contractor.	Work was conducted by Alkene Contracting Pty Ltd an AS1 licensed contractor. Details of notification to Workcover were not provided. During remediation works air monitoring was conducted by Airsafe in accordance with NOHSC:2003 (2005). Results were <0.01fibres/mL air.
SEPP55	Details confirming Category 2 remediation works and council notification and response were provided.
Protection of the Environment Operations (Waste) Regulation 2005 The transport of wastes, meaning any soils contaminated with substances or wastes referred to in Schedule 1, need to be tracked. The producer of the waste needs to hold a consignment authorisation, needs to obtain and give a waste transport certificate to the transporter and ensure that the waste facility is legally able to accept the waste.	A copy of the waste tracking form for oily water (J120) from the sump was provided. CES conducted a waste classification of excavated soil in accordance with NSW DECC (2009). Disposal dockets were provided showing disposal of 81.14 tonnes of material to Blacktown Waste as general solid waste and 96.48tonnes to SITA Kemps Creek as restricted solid asbestos waste.
Rivers and Foreshores Improvement Act 1948	A Part 3A permit from the NSW Maritime Authority under the Rivers and Foreshores Improvement Act 1948 was not required as excavations were not within 40 m of the top of the bank of Parramatta River.

13 Contamination Migration Potential

Providing the SMP is appropriately implemented the potential for off-site migration of contaminants via surface water or dust is considered low.

With respect to the migration of groundwater, there are a number of areas where residual groundwater impact still remains, namely:

- Area A - Although gross impacts around EMW01 have been excavated, there is still some residual hydrocarbon impacts (both dissolved phase and PSH within the vicinity of EMW02 and MWWC);
- Area B - dissolved phase and PSH in the vicinity of MWB29;
- Area C – PSH within MWC46 downgradient of the pipe dipping tank;
- Area F – Dissolved phase hydrocarbon impact associated with a UST.

Consistent with the findings in GN268-1, the Auditor considers the main significant impact to groundwater is considered to be the oil press area.

The Auditor notes that within Area A (oil press):

- The gross impact (soil and groundwater) has been removed from the immediate vicinity of the oil press area; and
- Groundwater within the excavation has been treated using chemical oxidation. Groundwater monitoring results indicate only residual low concentrations of TPH in the groundwater;

On this basis, significant off-site migration of hydrocarbons from the former oil press area is considered to be unlikely.

The groundwater impact within areas B, C and F appears to be localised, URS (2006) calculated groundwater velocity to be less than 1m/year (0.002m/day) at the site and considering natural attenuation, which would have an overall effect of retarding concentrations, CES concluded that the risk to the Parramatta River would be considered low.

The Auditor agrees with this conclusion and overall, considering that the main area of groundwater impact (Area A) has been remediated, significant migration of contamination from the site is unlikely.

14 Assessment of Risk

The site contains large quantities of asbestos which would be a risk to site users if there was an exposure pathway. Currently, the risk is low because the site is managed through implementation of the SMP (ie maintenance of a concrete or bitumen surfacing).

There are residual hydrocarbon impacts in the soil and groundwater across the site. The risk to site users via direct contact (ingestion/dermal absorption) is considered low because the site is managed through implementation of the SMP (ie maintenance of a concrete or bitumen surfacing);

With respect to inhalation risks to site users, CES (2008b) reported that "*The hydrocarbons encountered in the soil comprise heavy fractions and as such the risk to human health from TPH contamination in soil is not required.*" The Auditor has reviewed the data presented by CES with respect to potentially volatile compounds and notes that:

- One soil sample (out of a total 189 samples analysed) was found to exceed the soil assessment criteria (198mg/kg) for C_6-C_9. Groundwater analytical results reported relatively low concentrations of C_6-C_9 ranging between 20-30ug/L.
- Soil and groundwater BTEX concentrations were low and did not exceed the site assessment criteria.
- Some elevated naphthalene concentrations (at depths of 4-5mbgs) were detected in groundwater within Area A (95ug/L) and Area B (126ug/L). Remediation of the main significant impacts in Area A has since been conducted.
- Some bituminous coated asbestos sheeting is located in the base of the pipe dipping tank (Area C) with elevated concentrations of C_6-C_9 and naphthalene. The extent of the impact is localised and contained within the dipping tank footprint. Soil naphthalene concentrations in the remaining areas were relatively low.

Overall, within the context of the proposed industrial use inhalation risks to site users is considered to be low.

There is a risk that groundwater is not suitable for beneficial uses, due to localised and regional contamination.

15 Conclusions and Recommendations

Based on the information presented in the URS and CES reports and observations made on site, and following the Decision Process for Assessing Urban Redevelopment Sites in DEC (2006) Guidelines for the NSW Site Auditor Scheme, the Auditor concludes that the site is suitable for commercial/industrial purposes subject to compliance with the following site management plan:

- 'Site Management Plan, Eastern Portion Former James Hardie Site, Grand Avenue Camellia' dated 17 March 2004.

There is some localised groundwater impact present at the site and groundwater should not be abstracted for use without an assessment for the required use and regulatory approval.

The zoning allows for a number of uses subject to development consent including a child care facility. It is noted that the site has been assessed as suitable for industrial/commercial uses only.

16 Other Relevant Information

This Audit was conducted on the behalf of Billbergia for the purpose of assessing whether the land is suitable for the proposed commercial/industrial uses i.e. a “Site Audit” as defined in Section 4 (1) (b) (iii) of the CLM Act.

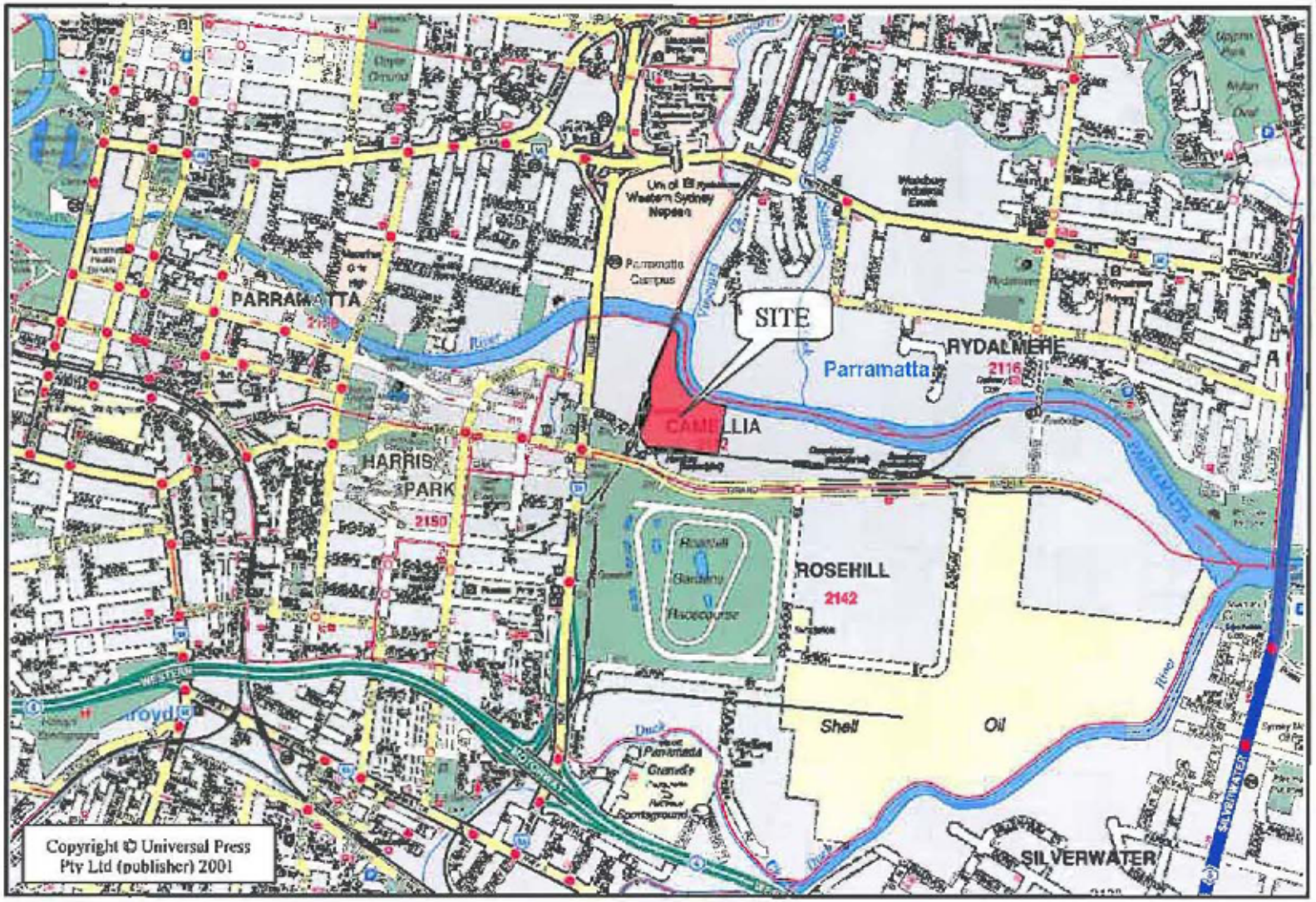
This summary report may not be suitable for other uses. CES included limitations in their report. The audit must also be subject to those limitations. The Auditor has prepared this document in good faith, but is unable to provide certification outside of areas over which he had some control or is reasonably able to check.

The Auditor has relied on the documents referenced in Section 1 of the Site Audit Report in preparing his opinion. If the Auditor is unable to rely on any of those documents, the conclusions of the audit could change.

It is not possible in a Site Audit Report to present all data which could be of interest to all readers of this report. Readers are referred to the referenced reports for further data. Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice in respect to, their situation.

Appendix A: Attachments

Attachment 1: Site Location
Attachment 2: Lot and DP Details
Attachment 3: Zoning Map
Attachment 4: Proposed Development
Attachment 5: Former Site Layout
Attachment 6: Investigation Sample Locations
Attachment 7: Excavations Pit A
Attachment 8: Excavations Pit B



TITLE	CES PROJECT ID	SCALE	SIZE
Figure 1: Site Location Map 1 Grand Avenue, Camellia, NSW	CES070901-BIL	Not to scale	A4

CONSULTING EARTH SCIENTISTS
Jones Bay Wharf 19-21, Lower Deck Suite 121,
26-32 Pirrama Road Pyrmont, NSW 2009
ph: 02 8569 2200 fax: 02 9552 4399

DATE	PREPARED BY	CHECKED BY
8/10/2007	BCF	MP

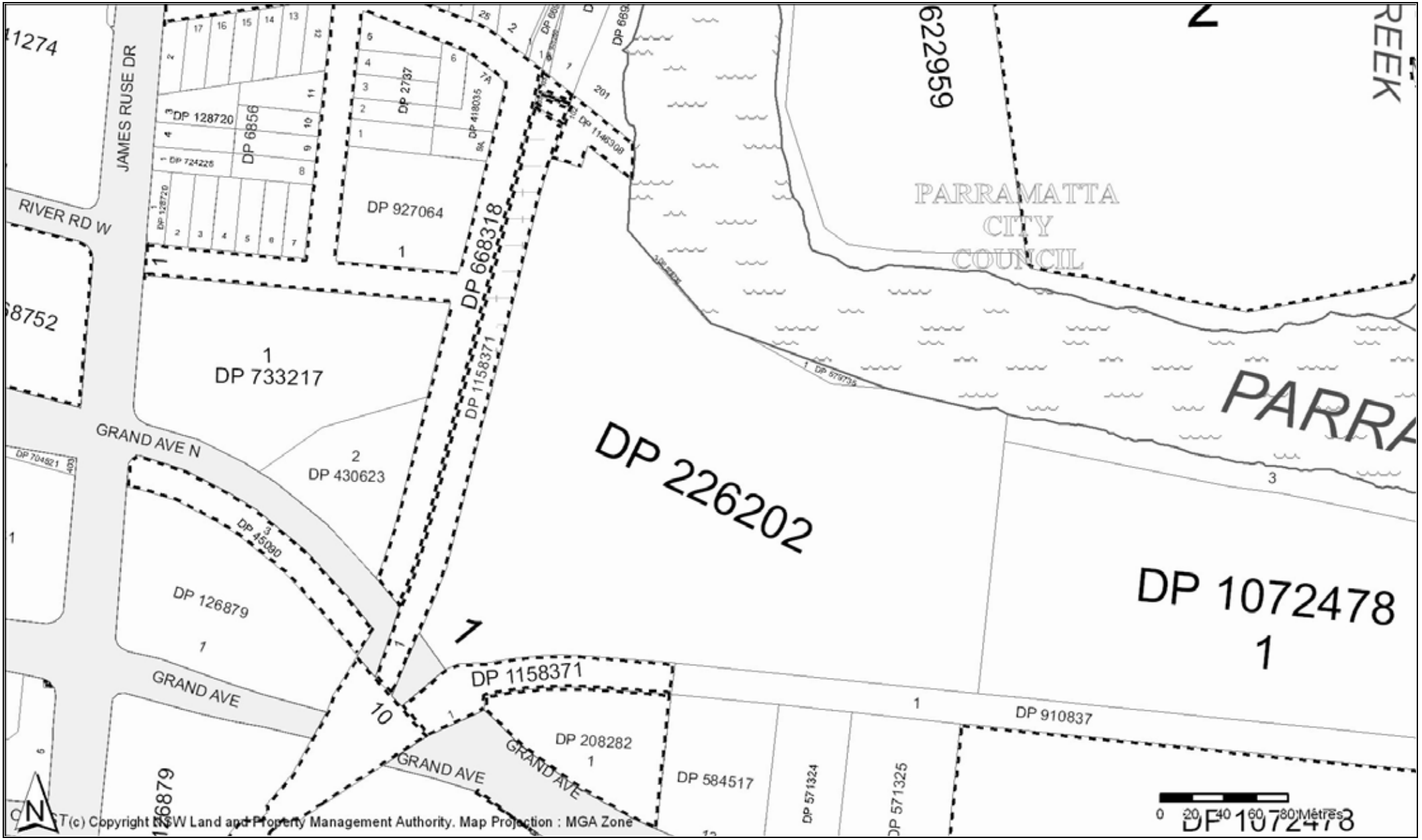
Attachment 1: Site Location

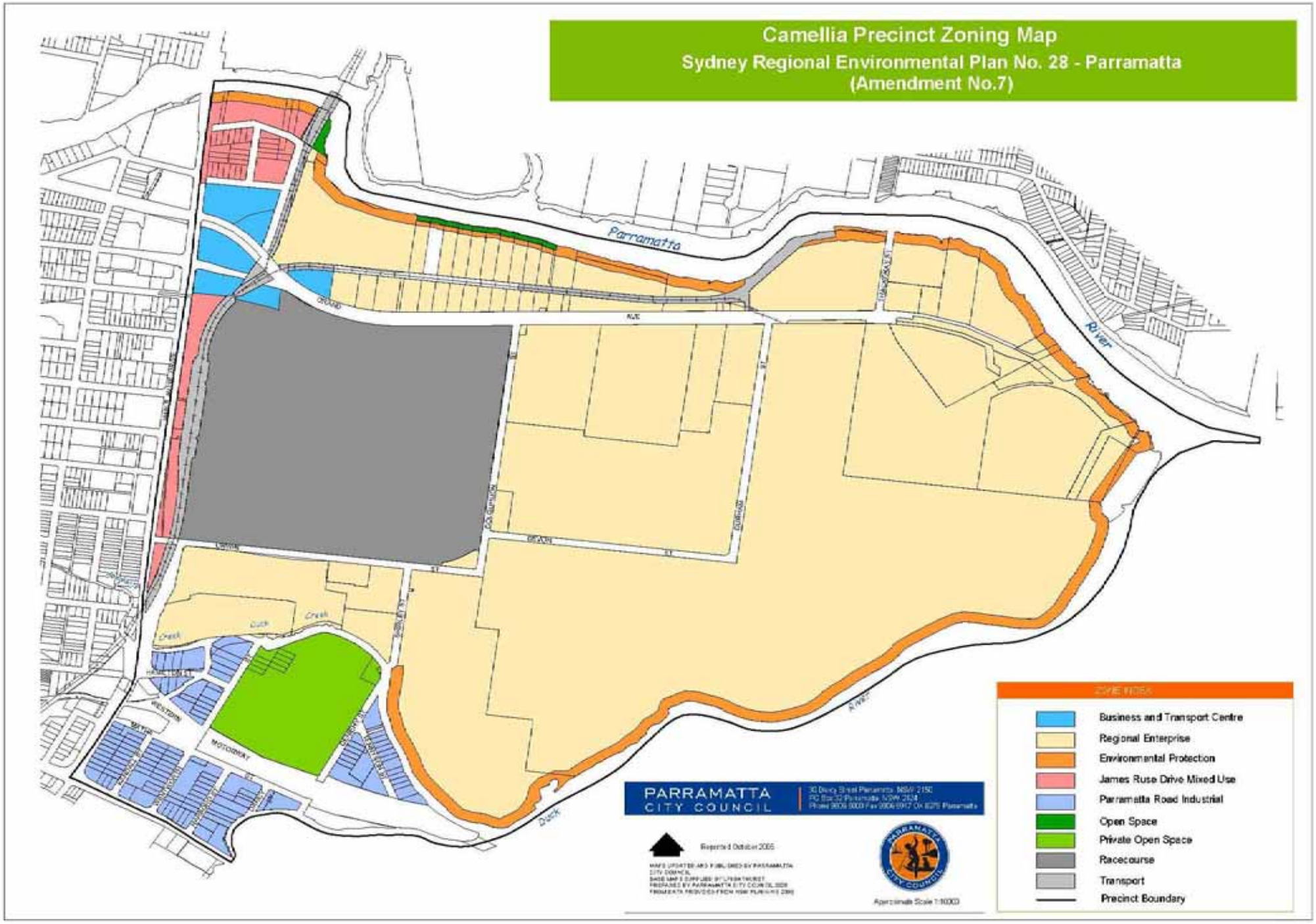
Land & Property Management Authority
Land & Property Information

Cadastral Records Enquiry Report

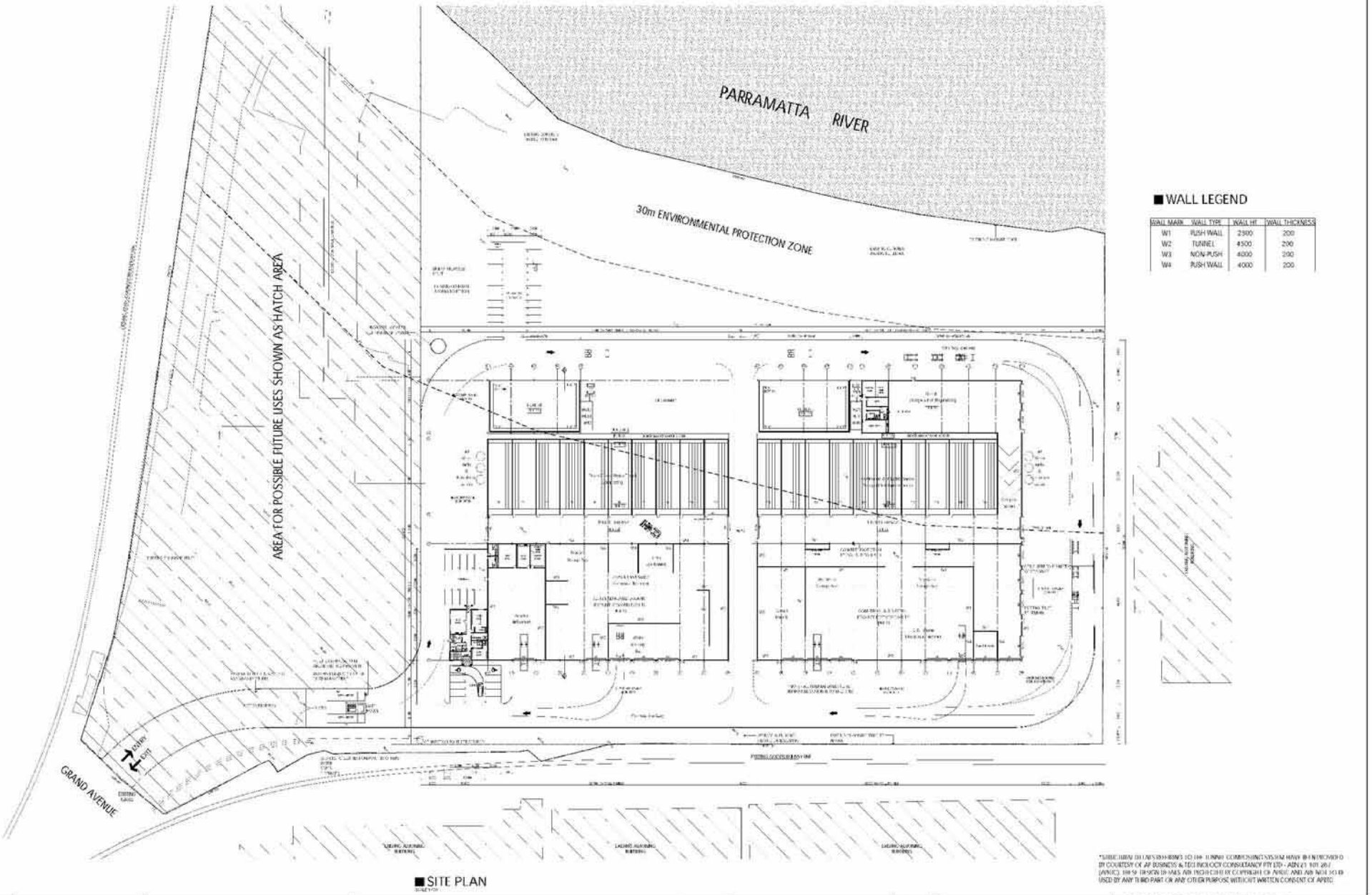
Requested Parcel : Lot 1 DP 226202 **Identified Parcel :** Lot 1 DP 226202

Locality : CAMELLIA **LGA :** PARRAMATTA **Parish :** ST JOHN **County :** CUMBERLAND





Attachment 3: Zoning Map



SITE PLAN

*STRUCTURAL DETAILS SHOWN TO THE TUNNEL COMMISSIONING SYSTEM HAVE BEEN PROVIDED BY COURTESY OF AP BUSINESS & TECHNOLOGY CONSULTANCY PTY LTD - ABN 21 101 267 (APBTC). THESE DESIGN DETAILS ARE THE SOLE COPYRIGHT OF APBTC AND ARE NOT TO BE USED BY ANY THIRD PART OR ANY OTHER PURPOSE WITHOUT WRITTEN CONSENT OF APBTC

AP Business & Technology Consultancy Pty Ltd
PO Box 79 Blackburn, Victoria, 3130

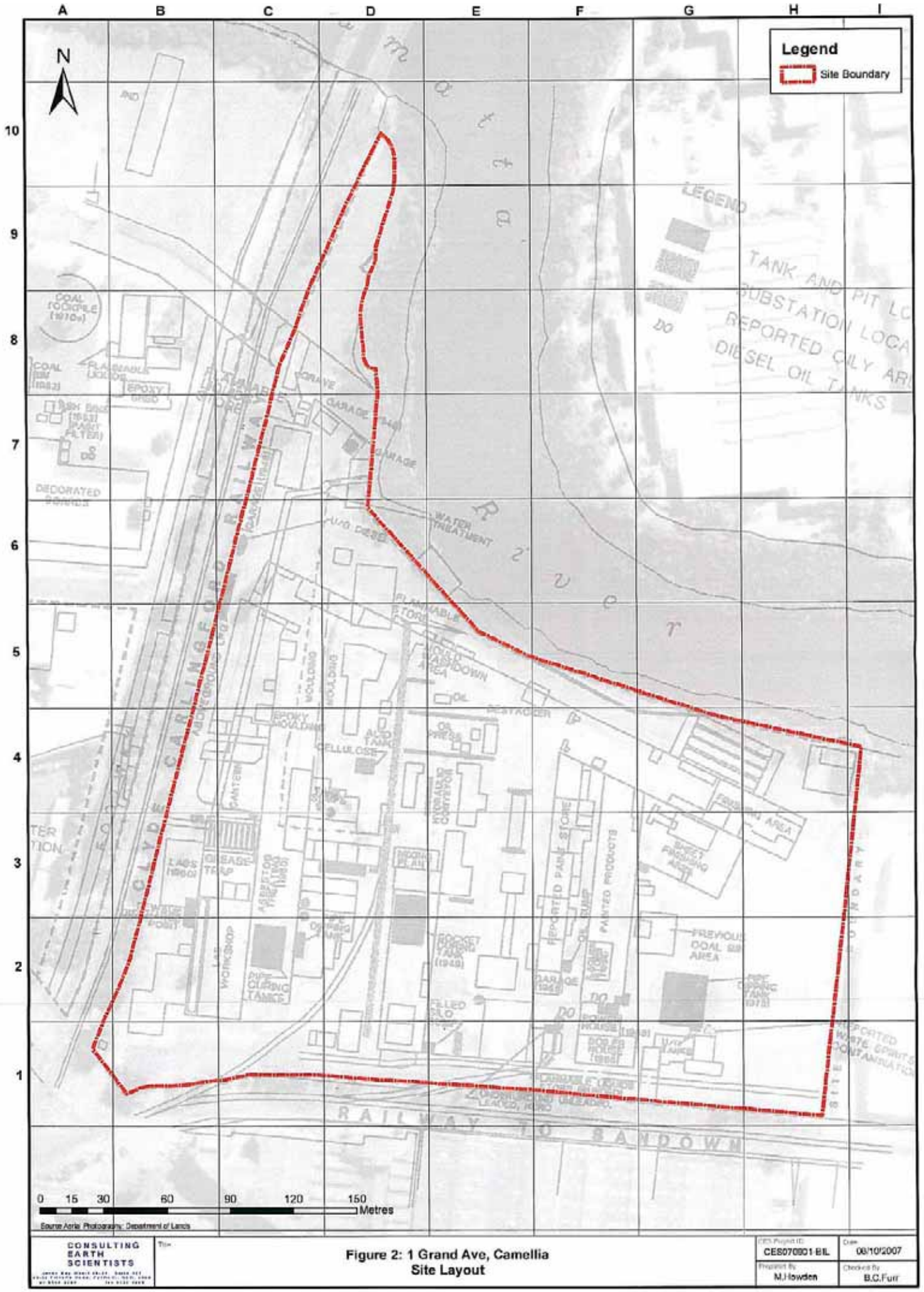
ALGORRY ZAPPIA & ASSOCIATES PTY. LTD.

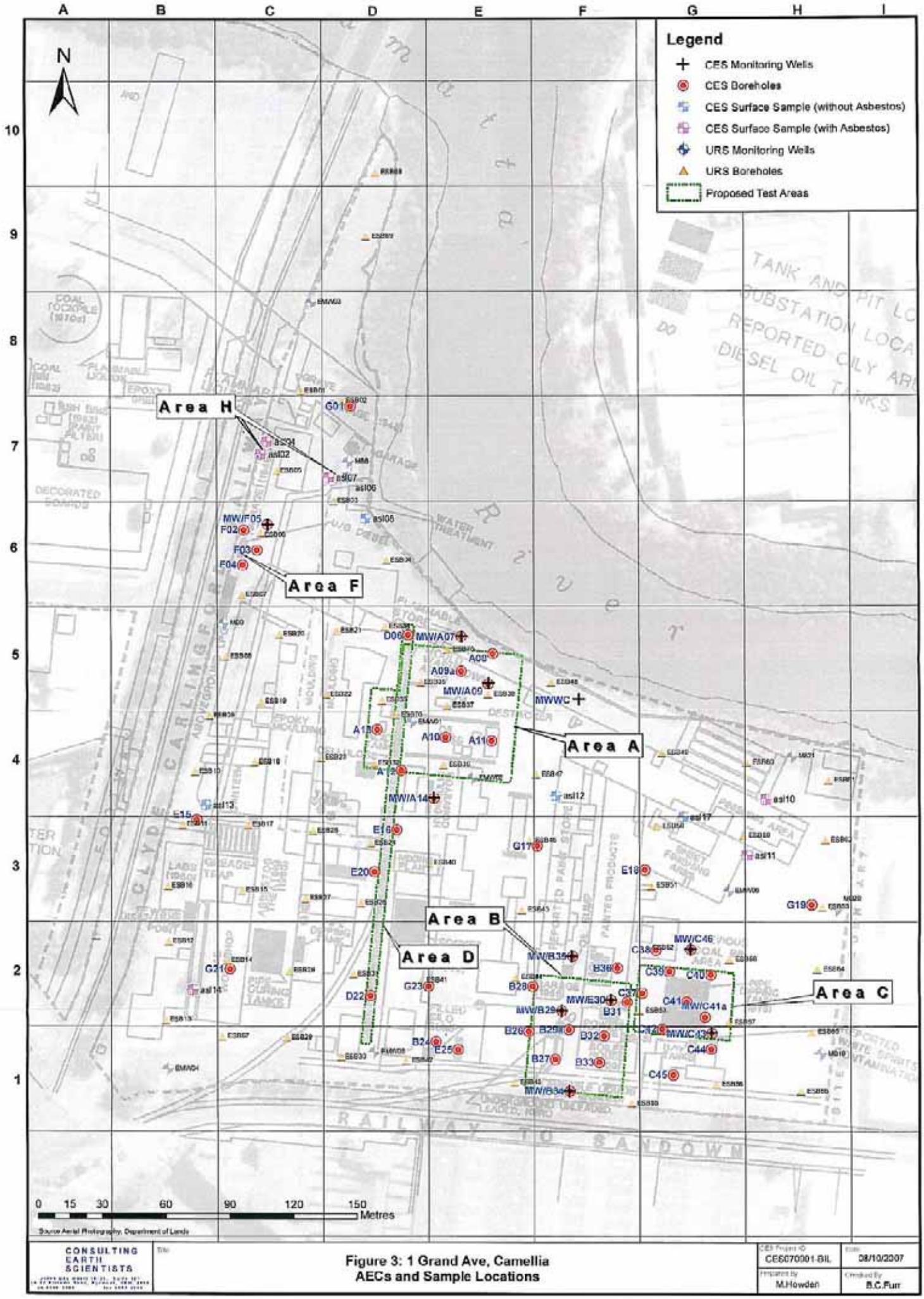
REMONDIS INTEGARTED RECYCLING PLANT
LOT 1B GRAND AVENUE
CAMELLIA
REMONDIS PTY LTD
P3268

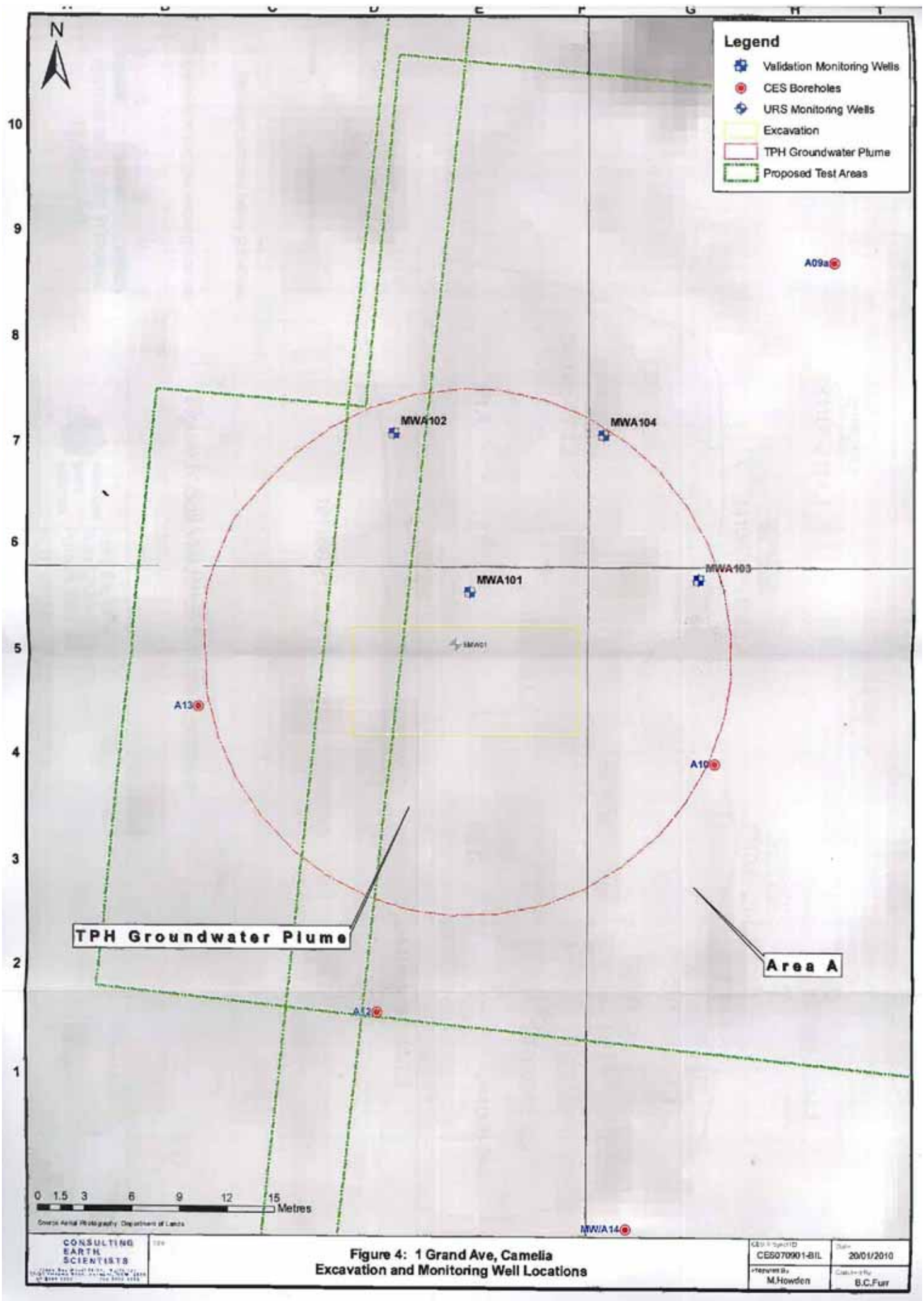
SITE PLAN | DA | 1097-10 | A01 | A

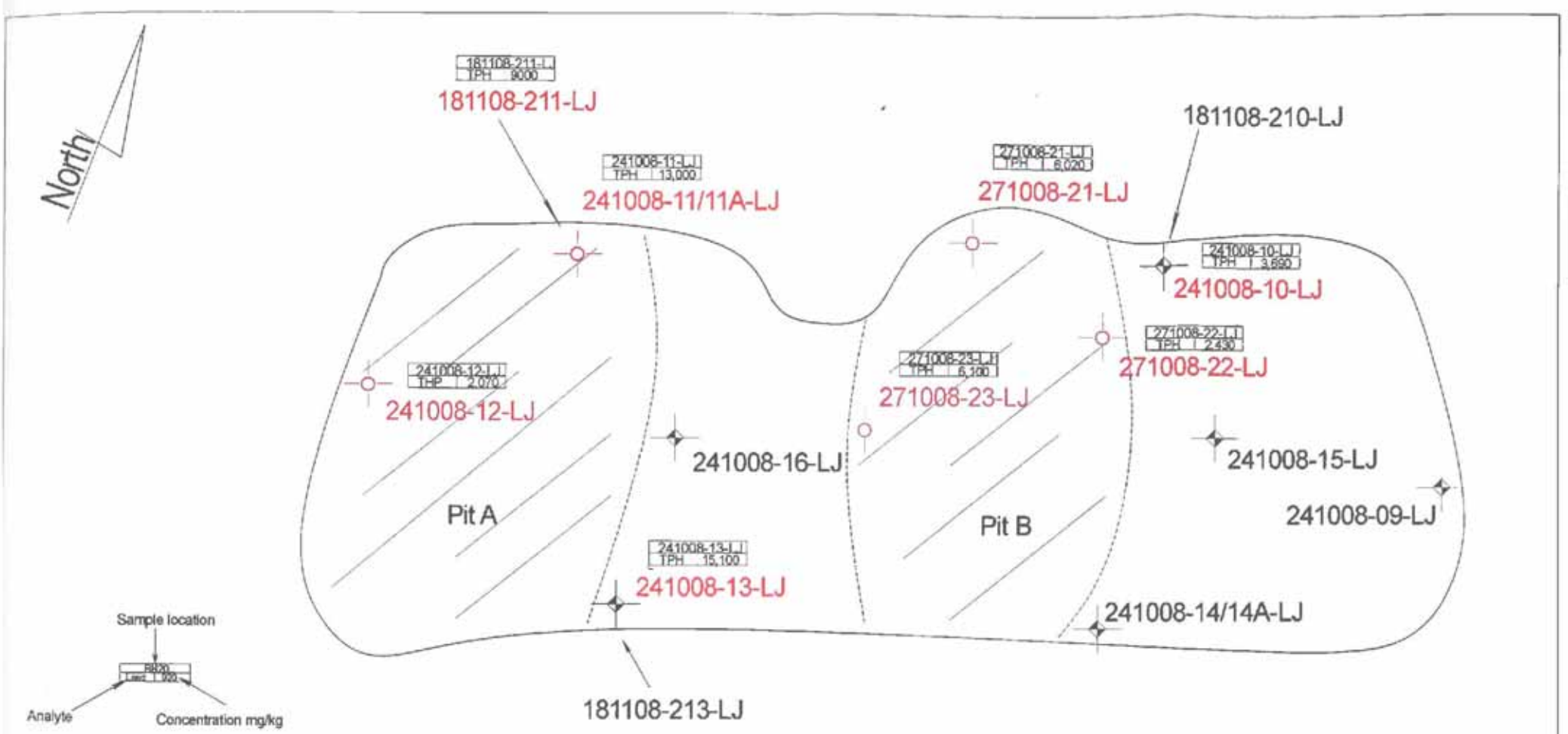
Attachment 4: Proposed Development

Attachment 5: Former Site Layout




Legend
CES Monitoring Wells
CES Boreholes
CES Surface Sample (without Asbestos)
CES Surface Sample (with Asbestos)
URS Monitoring Wells
URS Boreholes
Proposed Test Areas
N
Area H
Area F
Area A
Area B
Area D
Area C
0 15 30 60 90 120 150 Metres
CONSULTING EARTH SCIENTISTS
Figure 3: 1 Grand Ave, Camellia
AECs and Sample Locations
CES Project ID
CE5070001-BIL
Date
08/10/2007
Prepared By
M.Howden
Checked By
B.C.Furr


N
Legend
Validation Monitoring Wells
CES Boreholes
URS Monitoring Wells
Excavation
TPH Groundwater Plume
Proposed Test Areas
A09a
MWA102
MWA104
MWA101
MWA103
MW01
A13
A10
A12
MWA14
TPH Groundwater Plume
Area A
0 1.5 3 6 9 12 15 Metres
CONSULTING EARTH SCIENTISTS
Figure 4: 1 Grand Ave, Camelia
Excavation and Monitoring Well Locations
CES070901-BIL
20/01/2010
M.Howden
B.C.Furr



Title	CES Project ID	Scale	Paper size
Figure 5: Soil Validation Sample Locations	CES070901-BIL	1:400	A4

CONSULTING EARTH SCIENTISTS
Jones Bay Wharf 19-21, Lower Deck
Suite 12126-32 Pirrama Road
Pyrmont NSW 2009
ph: 02 8569 2200 fax: 02 9552 4399

Date	Prepared by	Figure number
20/01/2010	LJ	5
	Checked by SB	

Attachment 8: Excavations Pit B

Appendix B:
Airsafe Asbestos Clearance Certificate

AIRSAFE
OCCUPATIONAL HEALTH CONSULTANTS A.B.N. 46 126 980 672

93 Beattie Street, Balmain NSW 2041 Tel: (02) 9555 9034 Fax: (02) 9555 9035
Email: airsafe@bigpond.net.au

CLEARANCE CERTIFICATE

November 12, 2008

Alkene Contracting Pty Ltd
Unit 4/17 Norman Street
PEAKHURST NSW 2210

Your Reference: 1 Grand Avenue Camellia
Job Number: 11061

Attention: Bill Snell

Dear Bill,

In accordance with your instructions, Airsafe carried out a visual inspection of an asbestos work area prior to the resumption of normal work in the area by unprotected personnel to confirm that the asbestos removal work has been completed.

The inspection was carried out on the date indicated.
Date of Inspection: 12/11/08

The inspection details are contained in the following pages of this report.

Should you have any queries regarding this report please contact the undersigned.

Yours faithfully
AIRSAFE OCCUPATIONAL HEALTH CONSULTANTS

Katarina Oresic B. Env. Sc.
Airsafe Occupational Health Consultants

PROJECT: 1 Grand Avenue, Camellia **JOB NO:** 11061

Scope:

The scope of work involved the removal of asbestos cement sheet debris from the surface of exposed areas of the concrete slabs at the above address. Any asbestos cement conduit protruding from the concrete slabs were cut back below the pavement level and then encapsulated with cement.

Asbestos cement sheeting remains in situ within Area A of the site and will be sealed at a later date. Any grassed areas and building rubble are to be regarded as contaminated with asbestos.

Inspection:

A detailed inspection of the above area revealed the asbestos material specified has been removed in accordance with the Code of Practice for the Safe Removal of Asbestos [NOHSC: 2002 (2005)] and that no visual evidence of asbestos debris remains on the ground surface.

Limitations:

This inspection report covers the area stated above. Airsafe takes no responsibility for any asbestos or other contamination found within demolition debris, the soil, inaccessible areas, the sub-surface or other areas of the property not stated above.

Although the surface has been found to be free of visible asbestos debris, sub surface pieces or "pockets" of asbestos material may be encountered during further excavation. Should asbestos materials be encountered during future works, appropriate action should be taken in accordance with WorkCover regulations and the Code of Practice for the Safe Removal of Asbestos [NOHSC:2002(2005)].

Appendix C:
Site Management Plan

Form: 13PC
Release: 1
www.lpi.nsw.gov.au

POSITIVE COVENANT

New South Wales
Section 88E(3) Conveyancing Act 191

AA746158Y

PRIVACY NOTE: this information is legally required and will be

(A) **TORRENS TITLE**

See Annexure "A"

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODE
1W	Environment Protection Authority DX 11587 Sydney Downtown Reference: HO 9120/62 ph: 9995 6102	PC

(C) **REGISTERED PROPRIETOR**

SYDNEY WATER CORPORATION

(D) **LESSEE MORTGAGEE or CHARGEE**

Of the above land agreeing to be bound by this positive covenant

Interest	Number	Name of lessee, mortgagee or chargee

(E) **PRESCRIBED AUTHORITY**

Within the meaning of section 88E(1) of the Conveyancing Act 1919
ENVIRONMENT PROTECTION AUTHORITY

(F) The prescribed authority having imposed on the above land a positive covenant in the terms set out in annexure "B" hereto applies to have it recorded in the Register and certifies this application correct for the purposes of the Real Property Act 1900.

DATE

(G) **Execution by the prescribed authority** **SEE ANNEXURE "C"**

I certify that the authorised officer of the prescribed authority signing below who is personally known to me or as to whose identity I am otherwise satisfied signed this application in my presence.

Signature of witness:

Name of witness:

Address of witness:

Signature of an authorised officer:

Name of authorised officer:

Position of authorised officer:

(G) **Execution by the registered proprietor**

I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Certified correct for the purposes of the Real Property Act 1900 by the authorised officer named below.

Signature of witness:

Name of witness:
Address of witness:

Signature of authorised officer:

Authorised officer's name:
Authority of officer:
Signing on behalf of:

(H) **Consent of the**

The under No. agrees to be bound by this restriction.
I certify that the above who is personally known to me or as to whose identity I am otherwise satisfied signed this application in my presence.

Signature of witness:

Name of witness:

Address of witness:

Signature of

Annexure "A"

This is Annexure "A" to the Positive Covenant

dated 23 June 2004

Torrens Title

Folio Identifier 1/226202

Folio Identifier 1/579735

Folio Identifier 2/579735

Volume 7534 Folio 153 NOW BEING 201/669350

Folio Identifier 1/721503

Annexure "B"

This is Annexure "B" to the Positive Covenant

dated 23 June 2004

1. The owner for the time being of the Burdened Lot must maintain remediation in relation to the Burdened Lot by complying with the requirements specified in the Site Management Plan.

2. This public positive covenant is imposed by the EPA.

3. For the purposes of this public positive covenant:

Burdened Lot means the land contained in the titles referred to in Annexure "A".

EPA means the Environment Protection Authority constituted by the *Protection of the Environment Administration Act* 1991 (NSW).

Site Management Plan means the Site Management Plan - Eastern Portion Former James Hardie Site Grand Avenue Camellia dated 17 March 2004 contained in Annexure "D".

A copy of the Site Management Plan is held on the EPA's file number HO1202/03. In this copy, colour copies of the following pages are available:

(a) Figure 2. Service Location Plan, Eastern and Western Portions of former James Hardie site, Camellia;

(b) Figure 3. Surface Cover - Eastern Portion;

(c) Appendix A: Example of a Safe Work Plan - Figure 1. Areas of Suspected Contamination, Former James Hardie Site; and

(d) Appendix C - Survey Plan and Property Titles: Former James Hardie, Camellia - Eastern Portion.

Annexure "C"

This is Annexure "C" to the Positive Covenant

dated 23 June 2004

SIGNED for and on behalf of the

Environment Protection Authority by

Vivienne Ingram

Acting Executive Director Legal Services

Environment Protection Authority

(by delegation)

M McCarthy

Signature of Witness

Maryanne McCarthy

Name of Witness

59 Gaulburn St
Sydney

Address of Witness

Annexure "D"

This is Annexure "D" to the Positive Covenant

dated 23 June 2004

Sydney WATER

SITE MANAGEMENT PLAN

EASTERN PORTION FORMER JAMES HARDIE SITE
GRAND AVENUE CAMELLIA

17 March 2004

Foreword

The following Site Management Plan ("the SMP") has been developed to address the maintenance of remediation at the Eastern Portion of the former James Hardie site, Grand Ave, Camellia, which has been undertaken to contain and control contamination on the site. The EPA intends to register a public positive covenant on the titles of the Eastern Portion properties under s 29 of the Contaminated Land Management Act 1997 and s 88E of the Conveyancing Act 1919. The SMP identifies the required management of the site in order to maintain remediation across the site, and outlines the measures to be taken to maintain the objectives of the covenant.

The SMP identifies the hazards associated with the site in its current condition and outlines management strategies to mitigate these hazards. The SMP also outlines a timetable for reporting to the EPA and includes a process to enable monitoring and review of the SMP.

TABLE OF CONTENTS

1 Introduction

The objective of this Site Management Plan ("the SMP") is to ensure that all environmental and occupational health and safety (OH&S) issues in relation to potential contaminants are addressed and safeguards are developed and implemented for the Eastern Portion of the former James Hardie site, Grand Ave, Camellia. Sydney Water plans to divest the site and must provide the SMP to prospective purchasers.

The SMP applies to all of the properties forming part of the former James Hardie site (Eastern Portion) located at Grand Avenue, Camellia as identified in Appendix C (by their deposited plan and lot number current as at March 2004). Those properties are referred to collectively as "the site" throughout this document. A separate site management plan has been prepared in relation to the Western Portion of the former James Hardie Site located at Grand Avenue, Camellia. The Western Portion of the former James Hardie Site located at Grand Avenue, Camellia is referred to as the "Western Portion" throughout this document.

1.1 Background

The site is located in Camellia, 18 km from the Sydney CBD. The site boundaries are the main Clyde-Carlingford Railway line to the west, a spur rail line to the south, industrial premises to the east, and the Parramatta River to the north (Fig.1). It was purchased by Sydney Water in 1996 and consists of an area of approximately 7.78 hectares, zoned Regional Enterprise under Sydney Regional Environmental Plan No.28 – Parramatta.

Prior to Sydney Water acquiring the site, the site was utilised by James Hardie for the manufacture of fibrous cement and related products, and chemical manufacturing. The site consisted mainly of warehouse buildings which have been demolished down to slab level.

Large quantities of fill have been used to level the various parts of the site. Asbestos cement waste and friable asbestos have been identified within this fill and so all of this fill is assumed to be contaminated with asbestos (Fig.1). Approximately 95% of the site is covered with 'hard' surfaces, mostly concrete and bitumen. All other unsealed areas, such as road verges and occasional small garden beds, are well grassed (Fig. 3).

In 2000, the EPA declared that the site represented a significant risk of harm. A Voluntary Remediation Agreement (Agreement No. 26012) (VRA) was entered into between Sydney Water and the EPA under s 26 of the Contaminated Land Management Act 1997 ("the CLM Act").

1.2 Remediation works completed

During 2001 and 2002, Sydney Water undertook works on the Western Portion that were required as part of the VRA for the site and Western Portion combined, as well as demolition works which were considered necessary to make the site fit for purpose by Sydney Water, as well as a potential future owner. The buried asbestos waste on the site was well covered with hardstand providing an effective barrier to human contact, and so no further remedial work on the site was considered necessary under the VRA. The following actions have been implemented:

- A drainage easement exists near the Clyde-Carlingford railway line (Fig.3). A Safe Work Plan (SWP) must be followed in the event of a need to undertake any excavation to maintain the service or in response to a service failure. An example of a Safe Work Plan which has been developed for the site is contained in Appendix A.

- Prominent warning signs prohibiting un-authorised excavations and advising of buried hazardous material have been distributed across the site.

- Regular inspections of the site are undertaken to monitor the condition of the surface cap. The site is vacant and secured and so surface cap deterioration is minimal.

- Regular monitoring of groundwater was undertaken at the site in 2001, 2002, and 2003. This has confirmed that no significant levels of groundwater contaminants above natural background levels are migrating from the site. No further groundwater monitoring is required at this stage.

- A Contamination Management Plan (CMP) was developed in 2000 for the site and copies provided to (former) lessees who occupied portions of the site. There are no current lessees on the site.

- This Site Management Plan (including an example of a Safe Work Plan) replaces the former Contamination Management Plan to provide management of the contamination issues on the site.

1.3 Completion of VRA

After the completion of the capping and demolition works on the Western Portion, and the groundwater monitoring program for the site and the Western Portion combined, the EPA re-assessed its "significant risk of harm" determination under the CLM Act in the light of the works undertaken as part of the VRA.

After inspecting the site, the EPA determined (14 May 2003) that the VRA had been satisfactorily completed, and that the EPA considered that contamination at the site (and the Western Portion) no longer presented a significant risk of harm to human health or the environment. In accordance with s 26(5) of the CLM Act, the EPA is satisfied that the terms of the of the VRA have been carried out.

1.4 Public Positive Covenant

The EPA intends to register a public positive covenant on the titles of the site under s 29 of the CLM Act and s 88E of the Conveyancing Act 1919. The terms of the covenant require the site owner(s) to maintain remediation of the properties in line with the terms of the SMP.

2 Principal Contamination Issues

The main risks to human health or the environment arising from on-site contaminants relate to the following issues:

- Maintenance of sealed or grassed surfaces over buried asbestos containing materials - mainly in the form of bonded fibro-cement sheeting but also including some non-bonded material - with depths ranging from 0.1 to 5.0 metres below ground level (Fig.1). All asbestos fill is beneath concrete or bitumen surfaces or well grassed road verges (Fig.3). All asbestos fill is considered to be protected from casual contact or erosion and so does not represent a significant health hazard for non-intrusive activities on the site.

- Excavation for sole purpose of repair or maintenance of underground services – may expose contaminated soils.

- Any other required excavation - may expose contaminated soils.

3 Plan Objectives

The objectives of the SMP are to:

- Ensure an adequate seal is maintained over the areas of fill known to contain asbestos waste to ensure physical isolation of the waste from casual human contact, restrict infiltration of rainwater, and prevent erosion or movement of the waste.

- To provide a detailed site management plan which addresses all human health and environmental issues related to the on-going presence of contaminated soils at the site. In particular, procedures that will control any future intrusive activities that could result in exposure to, or disturbance of, the buried contaminated waste on site.

The SMP covers aspects of the environment (including site worker safety procedures) that could be impacted by the contaminated media on the site (i.e. soils/fill). It includes current and anticipated land uses at the site and any emergency contingencies that may arise in relation to servicing or repair of underground services that may be present on the site.

The procedure for managing the impacts of contamination at the site as outlined in this document is presented below.

3.1 Management of Key Issues

An ongoing system of management has been developed which attempts to mitigate the potential impacts associated with the site on human health and the environment. Management of the key issues involves the following components:

- development of safeguards considered necessary to protect on-site workers when undertaking routine and emergency maintenance of infrastructure located on the site, through implementation of a Safe Work Plan (an example of a Safe Work Plan is contained in Appendix A);

- establishing a requirement for obtaining approval from the EPA for any other form of excavation; and

- development of an ongoing site monitoring program to assess the effectiveness of measures taken to manage and reduce the impacts of identified contamination on the surrounding environment, including provision to the EPA of an annual report in accordance with the SMP.

3.2 Review of the Site Management Plan

To assess the effectiveness of the SMP a system of review has been established which ensures the management steps adopted are being undertaken and are meeting the SMP objectives. This review establishes protocols for any follow-up action based on the findings of the review phase. The components of the review phase include:

- utilising the results from the monitoring program to revise the aims and objectives and, if necessary, re-assess potential hazards as more information is gathered regarding associated risks;

- auditing of maintenance works at the site to assess the effectiveness of safeguards established during the management phase; and

- forms for reporting on land use, excavation, monitoring of surface cover, incidents and complaints (Site Management Checklist and Site Inspection Template, Appendix B).

For further details of the review and reporting process see Section 8 below.

4 Management of Contamination Issues

The on-site hazards associated with the contamination are primarily related to the potential disturbance of the existing cap materials and the exposure of the underlying contaminated fill. Such exposure could arise from the maintenance of service infrastructure currently traversing the site or similar undefined activities that might result in the disturbance of the cap and underlying fill. Exposure of site workers to fill contaminated by asbestos is considered the most significant on-site risk. The purpose of the Safe Work Plan is to ensure that protocols are established for site safety and infrastructure maintenance requirements taking into consideration the likely tasks of maintenance crews working at the site. Minimum standards must be established for intrusive and non-intrusive work. As well, protocols must be established for the protection of the environment during these works through the Safe Work Plan.

Other on-site issues include potential effects of known contaminants on existing flora and fauna at the site. In its current state, the contamination is not likely to pose a significant risk to any fauna, as the site is principally comprised of hardstand surfaces. Asbestos waste has no adverse impact on plants.

On-going management of the existing soft and hard surface coverings must be achieved by regular maintenance inspections to identify any deterioration of the surface cover. This must be followed by appropriate repair/maintenance of the surface. The following sections in this part set out requirements in relation to excavation, inspection of the surfaces at the site and repair of surfaces at the site. To assist with the management of site contamination issues and reporting to the EPA (see Section 8 below which sets out requirements in relation to reporting to the EPA), a Site Management Checklist (SMC) and Site Inspection Template (SIT) have been provided in Appendix B. Note that it is a requirement of this Plan that the site owner provides to the EPA, by the 31 January in each calendar year, a written report in relation to the site in the form set out in the template contained in Appendix B of the Plan which is in respect of the previous calendar year (see Section 8 below).There are also reporting requirements in relation to notifying the EPA of disturbance or likely disturbance of the asbestos waste at the site (see Section 8 below).

4.1 Surface Cover

There are essentially two types of surface at the site (Fig.3). These are:-

- Approximately 95% of the Eastern Portion consists of hard surfaces such as concrete and bitumen; and
- Small areas of soft surfaces such as road verges and occasional small garden beds. These areas are covered with topsoil and are well grassed.

The following sections outline requirements for maintenance of these surfaces.

4.1.1 Hard surfaces

The concrete and bitumen over most of the site is underlain by fill containing asbestos waste (affected areas are shown on Figures 1, surface type is shown in Fig. 3).

Maintenance

The site owner must ensure the following are undertaken:

1. **An annual visual inspection (by 31 December in each calendar year) to ensure the bitumen and concrete surfaces are in sound condition. Action must be taken to repair any surface that is not in sound condition.**

2. **Carry out any excavation which is for the sole purpose of repair or maintenance of existing underground services, or connection or reconnection to existing underground services, where that connection or reconnection does not involve the provision of additional infrastructure in order to connect or reconnect to the existing underground services, only in accordance with a Safe Work Plan approved by an appropriately qualified person (an example of a Safe Work Plan is provided in Appendix A). The site owner must ensure that the surfaces of the site are adequately restored once the excavation works have been completed.**

   For the purposes of this clause the following have the following meanings:

   "Safe Work Plan" means a written document which states the requirements and procedures that must be followed by persons carrying out excavation covered by this clause in order to maintain a safe and healthy working environment and establishes protocols for the protection of the environment when the excavation is being carried out.

   "services" includes, without limitation, pipes, wires, cables, drains, ducts, conduits and other equipment and things for the transmission, disposal and supply of water, gas, electricity, telephone, data and communication of any kind, sewerage, sullage and other waste of any kind.

3. **Carry out any excavation other than that referred to in clause 2 above for any purpose and to any depth, only with the prior written approval of the EPA.**

   Note: the EPA has indicated that:

   (a) **The EPA will grant approval to the excavation if it is satisfied that it will not pose a significant risk of harm within the meaning of the CLM Act; and**

   (b) **The EPA may attach conditions to the approval if it is of the opinion that those conditions are necessary to ensure that the excavation will not pose a significant risk of harm within the meaning of the CLM Act.**

4. **A visual inspection at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that there are an adequate**

number of signs advising of the buried hazard which are clearly visible in areas of the contaminated waste and are not damaged (ie. signs are in tact, wording is clearly legible, and colour maintained). The site owner must ensure that the wording of the signs is as follows: "Caution. Excavation Prohibited Anywhere on Site Without Approval of [name of site owner]. Hazardous Waste Buried Below Surface Capping. Contact [name of site owner] 24 Hours - Phone [current phone number on which to contact site owner]". (As at March 2004 the Sign Wording is: "Caution. Excavation Prohibited Anywhere on Site Without Approval of Sydney Water. Hazardous Waste Buried Below Surface Capping. Contact Sydney Water 24 Hours - Phone 132090"). Damaged signs must be repaired or replaced as required.

4.1.2 Soft surfaces

Includes narrow grassed and treed strip along the boundary fence of the Clyde-Carlingford railway line (Area 'C', Fig.3) - including the grassed area surrounding the heritage grave site - and other small grassed areas.

<u>Maintenance</u>

The site owner must ensure the following are undertaken:

1. **A Visual inspection of all grassed areas (Area 'C', Fig. 3) at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that continuous grass cover is maintained and the surface is not eroded. Effective thickness of grass cover is to be maintained at a minimum of 50mm. Any areas of poor grass cover must be re-turfed to restore the 50mm thickness of grass cover.**

2. **Grassed areas are mown on a regular basis to allow easy identification of any areas of poor grass cover.**

3. **A visual inspection at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that there are an adequate number of signs advising of the buried hazard which are clearly visible in areas of the contaminated waste and are not damaged (ie. signs are in tact, wording is clearly legible, and colour maintained). The site owner must ensure that the wording of the signs is as follows: "Caution. Excavation Prohibited Anywhere on Site Without Approval of [name of site owner]. Hazardous Waste Buried Below Surface Capping. Contact [name of site owner] 24 Hours - Phone [current phone number on which to contact site owner]". (As at March 2004 the Sign Wording is: "Caution. Excavation Prohibited Anywhere on Site Without Approval of Sydney Water. Hazardous Waste Buried Below Surface Capping. Contact Sydney Water 24 Hours - Phone 132090"). Damaged signs must be repaired or replaced as required.**

4. **Carry out any excavation which is for the sole purpose of repair or maintenance of existing underground services, or connection or reconnection to existing underground services, where that connection or reconnection does not involve the provision of additional infrastructure in order to connect or reconnect to the existing underground services, only in accordance with a Safe Work Plan approved by an appropriately qualified person (an example of a**

Safe Work Plan is provided in Appendix A). The site owner must ensure that the surfaces of the site are adequately restored once the excavation works have been completed.

For the purposes of this clause the following have the following meanings:

"Safe Work Plan" means a written document which states the requirements and procedures that must be followed by persons carrying out excavation covered by this clause in order to maintain a safe and healthy working environment and establishes protocols for the protection of the environment when the excavation is being carried out.

"services" includes, without limitation, pipes, wires, cables, drains, ducts, conduits and other equipment and things for the transmission, disposal and supply of water, gas, electricity, telephone, data and communication of any kind, sewerage, sullage and other waste of any kind.

5. **Carry out any excavation other than that referred to in clause 4 above for any purpose and to any depth, only with the prior written approval of the EPA.**

   Note: the EPA has indicated that:

   (a) **The EPA will grant approval to the excavation if it is satisfied that it will not pose a significant risk of harm within the meaning of the CLM Act; and**

   (b) **The EPA may attach conditions to the approval if it is of the opinion that those conditions are necessary to ensure that the excavation will not pose a significant risk of harm within the meaning of the CLM Act.**

4.1.3 Drainage and Proposed Railway Access Easements near Carlingford Railway line

An easement for water drainage services runs near the main railway line (Fig.3) and passes through areas of potential asbestos fill. The drain is covered by hardstand for most of its length, before emerging into a narrow concrete channel that enters some sediment retention pits before discharging to the Parramatta River.

An easement has been proposed for vehicle access in favour of the Rail Infrastructure Corporation for a strip of land alongside the rail line (Fig. 3). This easement is expected to be registered in the near future.

These easement areas would normally be excavated by the service providers under controlled conditions (ie. proper environmental and OH&S planning as outlined in the attached example of a Safe Work Plan, Appendix A). Copies of the Safe Work Plan that has been approved for the site must be provided to all current and future easement stakeholders (see the requirements in Section 7 below).

<u>Maintenance</u>

The site owner must ensure the following are undertaken:

1. **An annual visual inspection (by 31 December in each calendar year) to ensure the bitumen and concrete surfaces in the easement areas are in sound condition. Action must be taken to repair any surface that is not in sound condition.**

2. **A Visual inspection of all grassed areas (Area 'C', Fig. 3) at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that continuous grass cover is maintained. Effective thickness of grass cover is to be maintained at a minimum of 50mm. Any areas of poor grass cover must be re-turfed to restore the 50mm thickness of grass cover.**

3. **Grassed areas are mown on a regular basis to allow easy identification of any areas of poor grass cover.**

4. **A visual inspection at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that there are an adequate number of signs advising of the buried hazard which are clearly visible in areas of the contaminated waste and are not damaged (ie. signs are in tact, wording is clearly legible, and colour maintained). The site owner must ensure that the wording of the signs is as follows: "Caution. Excavation Prohibited Anywhere on Site Without Approval of [name of site owner]. Hazardous Waste Buried Below Surface Capping. Contact [name of site owner] 24 Hours - Phone [current phone number on which to contact site owner]". (As at March 2004 the Sign Wording is: "Caution. Excavation Prohibited Anywhere on Site Without Approval of Sydney Water. Hazardous Waste Buried Below Surface Capping. Contact Sydney Water 24 Hours - Phone 132090"). Damaged signs must be repaired or replaced as required.**

5. **Carry out any excavation which is for the sole purpose of repair or maintenance of existing underground services, or connection or reconnection to existing underground services, where that connection or reconnection does not involve the provision of additional infrastructure in order to connect or reconnect to the existing underground services, only in accordance with a Safe Work Plan approved by an appropriately qualified person (an example of a Safe Work Plan is provided in Appendix A). The site owner must ensure that the surfaces of the site are adequately restored once the excavation works have been completed.**

   For the purposes of this clause the following have the following meanings:

   "Safe Work Plan" means a written document which states the requirements and procedures that must be followed by persons carrying out excavation covered by this clause in order to maintain a safe and healthy working environment and establishes protocols for the protection of the environment when the excavation is being carried out.

   "services" includes, without limitation, pipes, wires, cables, drains, ducts, conduits and other equipment and things for the transmission, disposal and supply of water, gas, electricity, telephone, data and communication of any kind, sewerage, sullage and other waste of any kind.

6. **Carry out any excavation other than that referred to in clause 4 above for any purpose and to any depth, only with the prior written approval of the EPA.**

Note: the EPA has indicated that:

(a) The EPA will grant approval to the excavation if it is satisfied that it will not pose a significant risk of harm within the meaning of the CLM Act; and

(b) The EPA may attach conditions to the approval if it is of the opinion that those conditions are necessary to ensure that the excavation will not pose a significant risk of harm within the meaning of the CLM Act.

4.2 Summary of Actions and Timetable to Manage On-site Hazards

The following table presents in summary the management control strategies to be implemented in order to mitigate on-site hazards. Note that it is a requirement of this Plan that the site owner provides to the EPA, by the 31 January in each calendar year, a written report in relation to the site in the form set out in the template contained in Appendix B of the Plan which is in respect of the previous calendar year (see Part 8 below). There are also reporting requirements in relation to notifying the EPA of disturbance or likely disturbance of the asbestos waste at the site (see Part 8 below).

Summary of On-site Hazard Management Strategies

On-site Hazard	Management Control	Timetable
Hard Surfaces including easement areas (concrete and bitumen, including roads and slabs overlying fill).	1. Implement annual visual inspection to ensure surfaces are in sound condition. 2. Take action to repair surface if evidence of deterioration.	Inspection annually (undertaken by 31 December in each calendar year) – complete SIT form, Appendix B.
Soft Surfaces including easement areas (Grassed verges along roadways – Area 'C', Fig.3).	1. Mow grass regularly. 2. Implement six-monthly visual inspection to ensure minimum of 50mm of grass cover is maintained and surface is not eroded. 3. Replace grass cover if inspection indicates any erosion/break in surface cover.	Mow grass on a regular basis to allow easy identification of any areas of poor grass cover. Surface inspection minimum 6 monthly (undertaken by 30 June and 31 December in each calendar year). Complete SIT form, Appendix B.
All areas of buried fill	1. A visual inspection at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that there are an adequate number of signs advising of the buried hazard which are clearly visible in areas of the contaminated waste and are not damaged (ie. signs are in tact, wording is clearly legible, and colour maintained). The site owner must ensure that the wording of the signs is as follows: "Caution. Excavation Prohibited Anywhere on Site Without Approval of [name of site owner]. Hazardous Waste Buried Below Surface Capping. Contact [name of site owner] 24 Hours - Phone [current phone number on which to contact site owner]". (As at March 2004 the Sign Wording is: "Caution. Excavation Prohibited Anywhere on Site Without Approval of Sydney Water. Hazardous Waste Buried Below Surface Capping.	Six Monthly inspections (undertaken by 30 June and 31 December in each calendar year)– complete SIT form, Appendix B.

	Contact Sydney Water 24 Hours - Phone 132090"). Damaged signs must be repaired or replaced as required.	
Excavation for maintenance or repair or connection/ reconnection (no additional infrastructure) to existing underground services (all areas)	1. Follow Safe Work Plan (example provided in Appendix A) approved by appropriately qualified person. 2. Ensure surfaces of site are adequately restored.	At all times. Complete Site Management Checklist, Appendix B.
Any other excavation works (all areas)	1. Must obtain EPA approval prior to carrying out any other excavation.	At all times. Complete Site Management Checklist, Appendix B.

5 Off-Site Hazard Management

5.1 Parramatta River boundary

The fill along the Parramatta River boundary on the Eastern Portion is mostly contained behind a vertical concrete retaining wall, with only a small portion of embankment near the railway bridge covered by thick mangrove and other vegetation (Fig.3). There are no signs of active erosion.

The present risk of erosion of the fill along this section is considered minimal.

The whole of the site has been classified as 'strategically significant' with respect to State Environmental Planning Policy 56 (Sydney Harbour Foreshores and Tributaries). The implications of this are that any future redevelopment of the site would have to incorporate the principles of the SEPP which include increasing public access to the Parramatta River.

Any further isolation or landscaping of the buried asbestos waste along this foreshore section could be incorporated as part of the eventual re-development process.

Maintenance

The site must ensure the following are undertaken:

1. **An annual visual inspection (by the 31 December in each calendar year) of the embankment along the Parramatta River boundary for visible evidence of erosion (and also after flood events).**

2. **A visual inspection at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that there are an adequate number of signs advising of the buried hazard which are clearly visible in areas of the contaminated waste and are not damaged (ie. signs are in tact, wording is clearly legible, and colour maintained). The site owner must ensure that the wording of the signs is as follows: "Caution. Excavation Prohibited Anywhere on Site Without Approval of [name of site owner]. Hazardous Waste Buried Below Surface Capping. Contact [name of site owner] 24 Hours - Phone [current phone number on which to contact site owner]". (As at March 2004 the Sign Wording is: "Caution. Excavation Prohibited Anywhere on Site Without Approval of Sydney Water. Hazardous Waste Buried Below Surface Capping. Contact Sydney Water 24 Hours - Phone 132090"). Damaged signs must be repaired or replaced as required.**

5.2 Summary of Actions to Manage Off-site Hazards

The following table presents in summary the management control strategies to be adopted in order to mitigate existing off-site hazards. Note that it is a requirement of this Plan that the site owner provides to the EPA, by the 31 January in each calendar year, a written report in relation to the site in the form set out in the template contained in Appendix B of the Plan which is in respect of the previous calendar year (see Section 8 below). There are also reporting requirements in relation to notifying the EPA of disturbance or likely disturbance of the

asbestos waste and notifying the EPA of visible evidence of erosion along embankments of the Parramatta River adjoining the site boundary (see Section 8 below).

Off-site Hazard Management Strategies

Off-site Hazard	Management Control	Timing
Whole Parramatta River embankment along boundary.	1. Undertake annual inspection for visible evidence of erosion (and after flood events).	Undertake annual visual inspection (by 31 December in any calendar year) Undertake visual inspection after flood events Complete SIT form, Appendix B.
Parramatta River boundary	1. A visual inspection at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that there are an adequate number of signs advising of the buried hazard which are clearly visible in areas of the contaminated waste and are not damaged (ie. signs are in tact, wording is clearly legible, and colour maintained). The site owner must ensure that the wording of the signs is as follows: "Caution. Excavation Prohibited Anywhere on Site Without Approval of [name of site owner]. Hazardous Waste Buried Below Surface Capping. Contact [name of site owner] 24 Hours - Phone [current phone number on which to contact site owner]". (As at March 2004 the Sign Wording is: "Caution. Excavation Prohibited Anywhere on Site Without Approval of Sydney Water. Hazardous Waste Buried Below Surface Capping. Contact Sydney Water 24 Hours - Phone 132090"). Damaged signs must be repaired or replaced as required.	Six Monthly inspections (undertaken by 30 June and 31 December in each calendar year) – complete SIT form, Appendix B.

6 New programmed works

The site owner must ensure that any excavation other that that which is for the sole purpose of :

(a) repair or maintenance of existing underground services; or

(b) connection or reconnection to existing underground services, where that connection or reconnection does not involve the provision of additional infrastructure in order to connect or reconnect to the existing underground services

is only carried out if the prior written approval of the EPA has been obtained.

The nature and extent of any further remediation of the site would be dependant on, and carried out in association with, the future re-development of the site. At that time all of the health and environmental issues must be addressed in accordance with the regulatory approval processes including Development Applications and provisions of any relevant State Environmental Planning Policies (SEPPs).

The purpose of the SMP is to ensure that any contaminants in the soil are adequately contained and pose no adverse human health or environmental health risk until such further re-development and/or remediation is affected

7 Maintenance of Service Infrastructure or other Site Excavation Works

7.1 General

The only known underground service lines are a water drainage easement parallel to the Carlingford rail line (Fig.3), and telephone lines (Fig.2). Decommissioned subsidiary water, sewerage and power lines to the various former buildings are presumed to be present and may be located in or underneath a layer of potentially contaminated fill. It must be noted that the plans obtained from the various service organisations do not include all levels of service lines. A new easement for access along the rail line is being implemented with the Rail Infrastructure Corporation.

Maintenance work or emergency repair work that may be performed on these service lines will require excavation of potentially contaminated soil material and possible contact with potentially contaminated groundwater. Although there is no current evidence of contaminated groundwater near existing services, it would be prudent to ensure that any contact with groundwater is minimised

The principal contaminant, asbestos, is present across most of the site. It is considered a risk to human health if it becomes airborne as this increases the possibility of inhalation. To minimise the risks to human health for personnel undertaking excavation works for the repair or maintenance of underground services or other site excavation works a Safe Work Plan must be prepared (see the requirements set out above and below). An example of a Safe Work Plan has been provided (Appendix A). The example of a Safe Work Plan addresses the potential contaminants, the states in which they are considered a risk to human health, and the safeguards required to minimise this risk. Copies of the example of a Safe Work Plan have been provided to all current stakeholders with easements that cross the site.

The site owner must ensure that:

1. **All excavations for maintenance or repair of existing underground services or connection or reconnection to existing underground services (where that connection or reconnection does not involve the provision of additional infrastructure in order to connect or reconnect to the existing underground services) are undertaken in accordance with all legislative and regulatory requirements and that the provisions of a Safe Work Plan approved by an appropriately qualified person are adopted as a minimum standard. The site owner must ensure that the surfaces of the site are adequately restored once the excavation works have been completed.**

   For the purposes of this clause:

   "Safe Work Plan" means a written document which states the requirements and procedures that must be followed by persons carrying out excavation covered by this clause in order to maintain a safe and healthy working environment and establishes protocols for the protection of the environment when the excavation is being carried out.

2. **Copies of the SMP (including the example of a Safe Work Plan) must be provided and are to be made available to all future stakeholders (including owners, leasees and easement holders) who acquire interests in the site.**

3. **A visual inspection at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that there are an adequate number of signs advising of the buried hazard which are clearly visible in areas of the contaminated waste and are not damaged (ie. signs are in tact, wording is clearly legible, and colour maintained). The site owner must ensure that the wording of the signs is as follows: "Caution. Excavation Prohibited Anywhere on Site Without Approval of [name of site owner]. Hazardous Waste Buried Below Surface Capping. Contact [name of site owner] 24 Hours - Phone [current phone number on which to contact site owner]". (As at March 2004 the Sign Wording is: "Caution. Excavation Prohibited Anywhere on Site Without Approval of Sydney Water. Hazardous Waste Buried Below Surface Capping. Contact Sydney Water 24 Hours - Phone 132090"). Damaged signs must be repaired or replaced as required.**

7.2 Stakeholders

Details of organisations which own underground services at the site as at March 2004 are listed below. Any excavation required by service providers must adhere to the relevant Safe Work Plan (see the requirements set out above). An example of a Safe Work Plan is provided in Appendix A).

Services identified at former James Hardie site, Camellia

Type of Service	Organisation	Contact Details
Easement - vehicle access	Rail Infrastructure Corporation	Mr Barry Palmer Property Administrator
Telephone	Telstra	Ananda Waniganayake Corporate OHS&E (Melb) (03) 9634 33940
Water Drainage	Tuck Hing Ho Pty Ltd	c/o Mr John Horsburgh H.T. Bawden Real Estate 28 Ross St Parramatta 9630 8000

7.3 Likely Tasks

Major stakeholders have their own field manuals, work instructions or requirements for repair/maintenance or construction/development work on or near underground services or any other excavation works. The general procedures for repair or maintenance of underground service lines is to excavate, complete work and then backfill. General tasks for each procedure are presented below.

Excavation

Excavation works may be required for either services maintenance/repair or for the purposes of site activities. Prior to excavation, the service line must be located as accurately as possible at the ground surface. Excavation may begin by machine and is always completed by hand. The type of excavation (hand or machine) is dependent upon the type of service line and the proximity of the excavation to the service line.

Requirements for placement of excavated material also exist in some of the work instructions reviewed. Excavation often produces dust and generally involves dermal contact with the material being excavated. Excavation may also result in contact with surface water and/or groundwater.

7.4 Safe Work Plan

An example of a Safe Work Plan has been prepared to specifically address working with asbestos contaminated material at this site. This example of a Safe Work Plan is included as Appendix A and has been prepared in accordance with WorkSafe Guidelines. The modified level D protection specified in the example of a Safe Work Plan for protection from asbestos

will provide protection for workers from potential contact with any other contaminants that may be present on the site.

8 Reporting Requirements and Review Of Management Strategies

The site owner or the EPA may request amendment of the SMP, for example, if circumstances change. Any amendment of the SMP must be approved by the EPA The following requirements are designed to review the implementation and effectiveness of the SMP and ensure that where the asbestos waste has been or is likely to be disturbed that the EPA is notified.

The site owner must ensure the following are undertaken:

1. **The site owner provides to the EPA, by the 31 January in each calendar year, a written report in relation to the site in the form set out in the template contained in Appendix B of the SMP which is in respect of the previous calendar year.**

2. **The site owner notifies the EPA as soon as practicable, but in any event not later than 48 hours, after the person becomes aware that the monitoring of the site required by the SMP shows that the asbestos waste has been or is likely to have been exposed.**

3. **The site owner notifies the EPA as soon as practicable, but in any event not later than 48 hours, after the person becomes aware that the monitoring of the site required by the SMP shows that there is visible evidence of erosion along the embankments of the Parramatta River which adjoin the site.**

4. **The site owner provides to the EPA by 31 May every five (5) calendar years, with the first such year being 2009, a written audit of the SMP which has been conducted and prepared by an appropriately qualified and independent person. The scope of the audit must include:**

   (a) **an analysis of the effectiveness of the Safe Work Plan for repair or maintenance of existing underground services or connection or reconnection to existing underground services across the site (including any feedback from stakeholders on the site);**

   (b) **undertaking a site inspection in accordance with the provisions of the SMP and completing the Site Inspection Template contained in Appendix B;**

   (c) **a review of the annual and six-monthly reports generated as part of the SMP;**

   (d) **an evaluation of the impact, in terms of disturbance, that any excavation works carried out on the site may have had on the asbestos waste;**

   (e) **an assessment of the effectiveness of the site inspection program to identify and maintain the surface cap in good condition; and**

   (f) **any recommendations for improving the SMP.**

5. **Amendment of the SMP if requested to do so by the EPA. Any amendment of the SMP, whether or not the amendment is at the request of the EPA, must be approved by the EPA.**

9 References

Australian Standards, 1998. AS2161.2-.5, *Industrial safety gloves and mittens excluding electrical and medical gloves.*

Australian Standards, 1997. AS1801, *Occupational Protective helmets.*

Australian Standards, 1994. AS1715, *Selection, use and maintenance of respiratory protection devices.*

Australian Standards, 1994. AS1716, *Respiratory protection devices.*

Australian Standards, 1988. AS1270, *Acoustics – hearing protection*, (Draft 98347).

Australian Standards, 1988. AS1940, The Storage & Handling of Flammable and Combustible Liquids.

National Environment Protection Measure *(Assessment of Site Contamination),* 1999.

New South Wales Environment Protection Authority, 1989. *Asbestos Wastes Chemical Control Order,* Chatswood.

New South Wales Environment Protection Authority, 1994. *Guidelines for Assessing Services Station Sites.*

New South Wales Environment Protection Authority, 1998. *Guidelines for the NSW Site Auditor Scheme.*

New South Wales Environment Protection Authority, 1999. *Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report.*

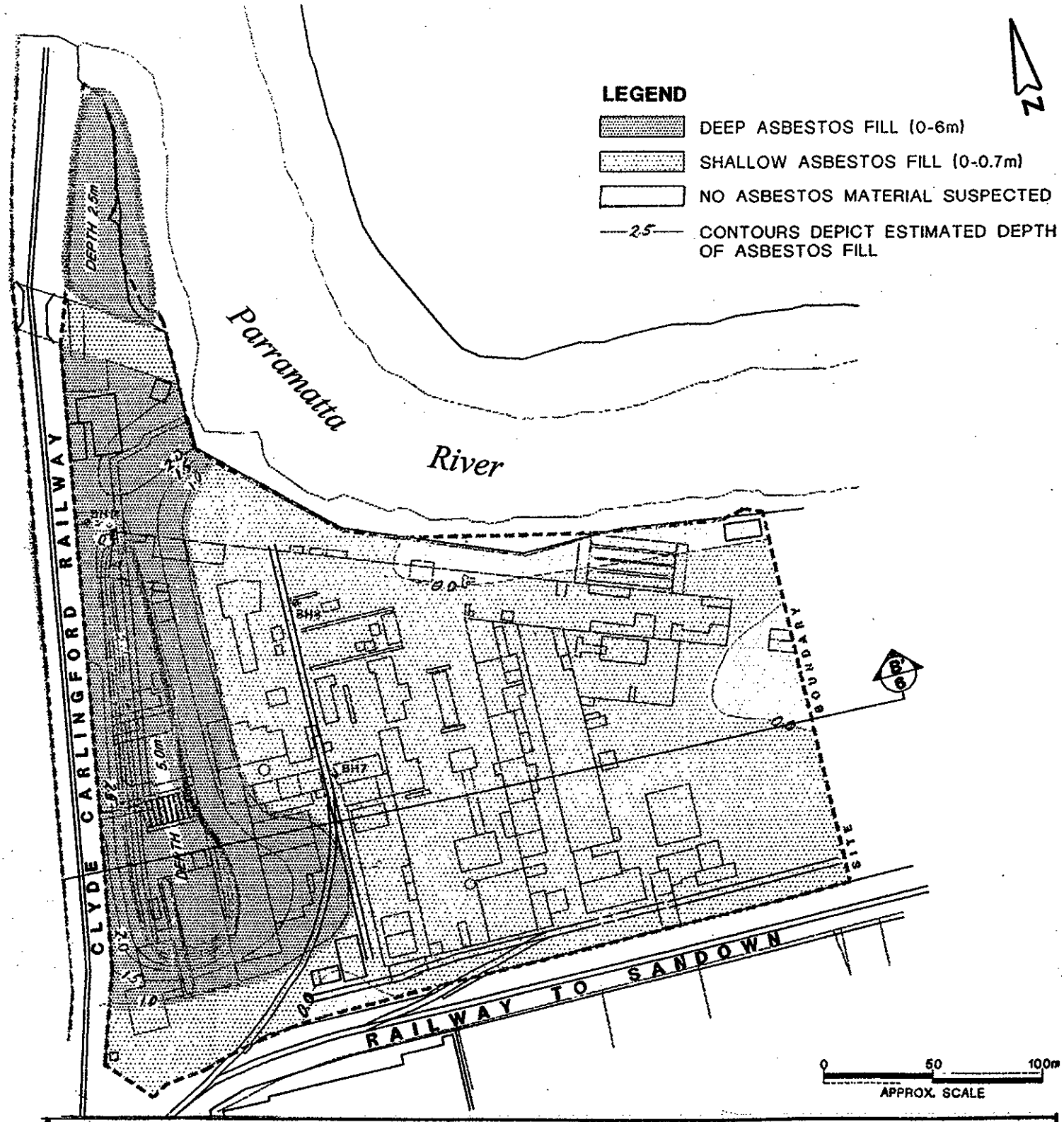
Sydney Water (2000) *Voluntary Remediation and Contamination Management Plan, Former James Hardie Site Grand Avenue Camellia.* 16 August 2000.

Woodward Clyde, 1994. *Phase I Environmental Audit Report James Hardie Camellia.*

Woodward Clyde, 1995. *Phase II Audit, Site Investigations, James Hardie, Camellia.*

Worksafe Australia, 1988. *Asbestos code of practice and guidance notes* Australian Government Publishing Service, Canberra.

Figures



Woodward-Clyde Engineering & sciences applied to the earth & its environment AGC Woodward-Clyde Pty Ltd Level 6, 486-494 Pacific Highway St Leonards, NSW, Australia 2065 Tel (02) 436 4666 Fax (02) 436 4110	REVISION B SCALE AS SHOWN DRAWING 3607C.004 FIGURE	**PHASE II AUDIT FOR JAMES HARDIE, CAMELLIA** TITLE: INDICATIVE DEPTH OF ASBESTOS CONTAMINATED FILL

Figure 1. Indicative depth of asbestos contaminated fill, Eastern Portion of former James Hardie site (source: Woodward Clyde 1995)

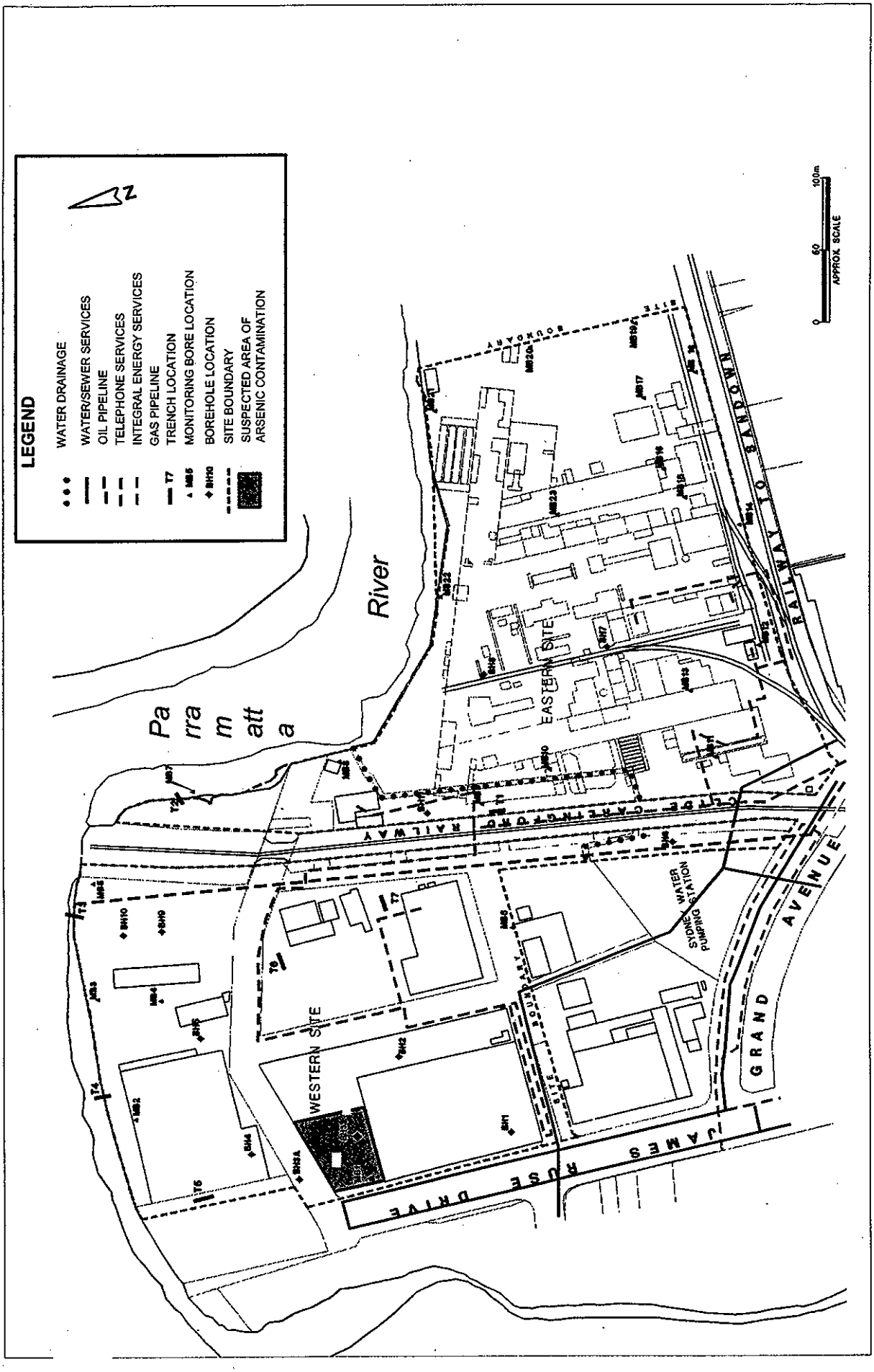


Figure 2. Service Location Plan, Eastern and Western Portions of former James Hardie site, Camellia.

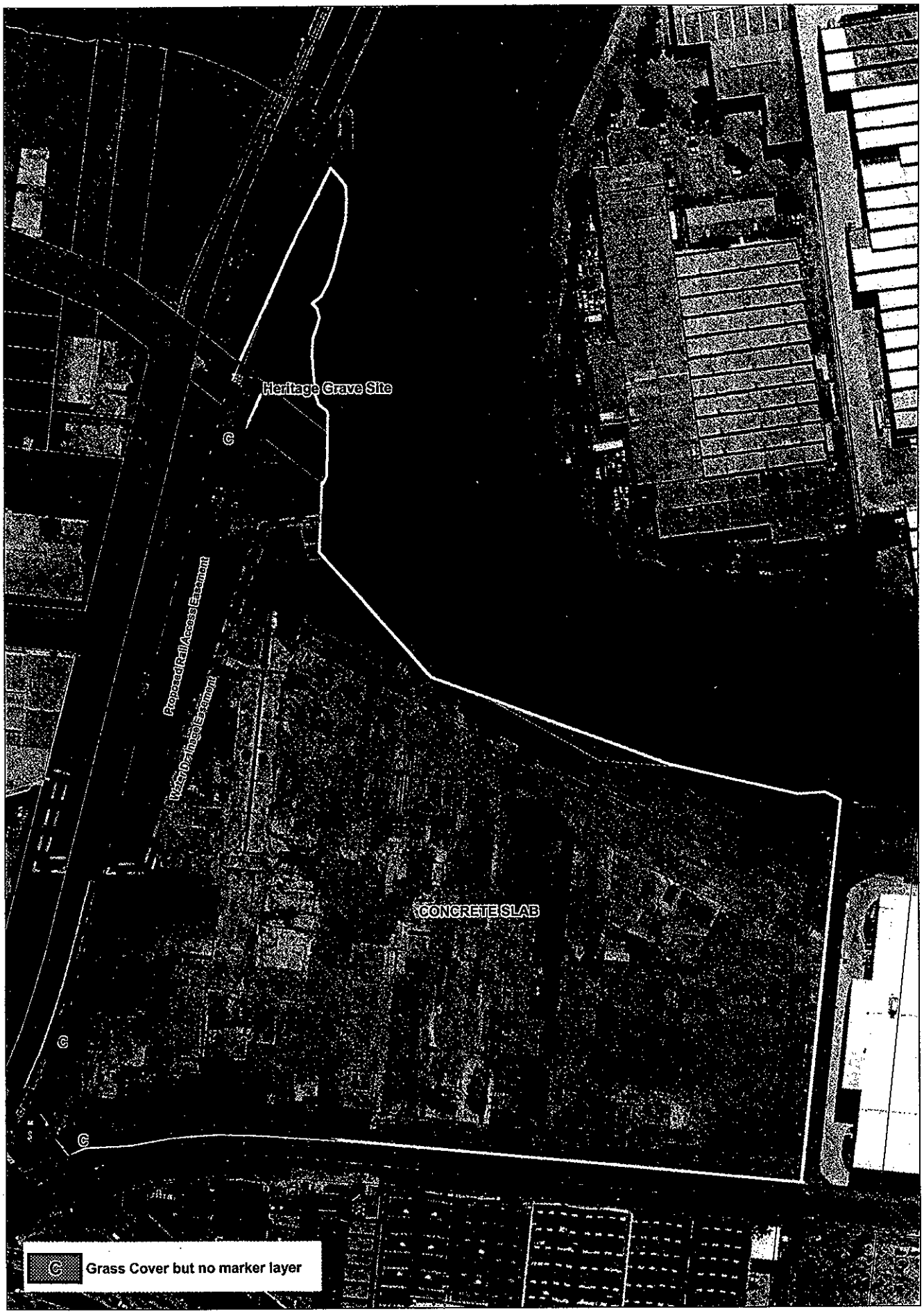


Figure 3. Surface Cover - Eastern Portion

Regina. McCarthy.

Appendix A

Example of a

Safe Work Plan

Sydney WATER

Safe Work Plan

Repair and Maintenance Works on Infrastructure within the Former James Hardie Site at Grand Avenue Camellia

For

Group Property

December 2002

Sydney
WATER

Sydney Office
115 – 124 Bathurst Street
PO Box A53 Sydney South NSW Australia 1232
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facsimile +61 2 9350 6814
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Contents

List of Figures

1 Introduction

This Safe Work Plan has been written specifically for the undertaking of possible works relating to the repair and/or maintenance of any underground services located at the Sydney Water property at the former James Hardie Site, Grand Avenue Camellia. The fill material over nearly the entire site is known to be contaminated with asbestos. Small areas of the site contain elevated levels of petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAH's) and heavy metals. Therefore, Sydney Water has prepared this Safe Work Plan to outline the appropriate procedures for the protection of site workers involved in any emergency repair or maintenance work. Areas of suspected contamination at the former James Hardie site are presented on Figure 1.

All site surfaces of the James Hardie site have been covered with either concrete, asphalt and/or clean fill and associated landscaping to remove the potential exposure of the identified contamination to site occupants undertaking normal non intrusive site operations and activities.

The Safe Work Plan describes the procedures to be followed and the protective equipment to be used by personnel working both on and offsite during the proposed work activities. The primary objective of the Safe Work Plan is to establish the health and safety requirements and protection procedures to minimise the potential for exposure and injuries to repair and maintenance personnel and to minimise any health risks to the public or the local environment. The health and safety requirements presented are based on information available at the time of writing and are subject to revision upon subsequent discoveries regarding potential hazards at the site.

The Safe Work Plan is based on the following field tasks and assumptions:-

Field Tasks

- Excavation of soil above and around infrastructure or any other excavations on the site;
- Maintenance and/or replacement of faulty parts; and
- Backfilling of the excavations.

Assumptions

The primary contaminant of concern at the site is asbestos, with some lesser contamination from metals, PAH's and petroleum hydrocarbons. As asbestos contaminated fill material covers nearly the entire site this Safe Work Plan describes the measures considered appropriate for protection of workers from asbestos.

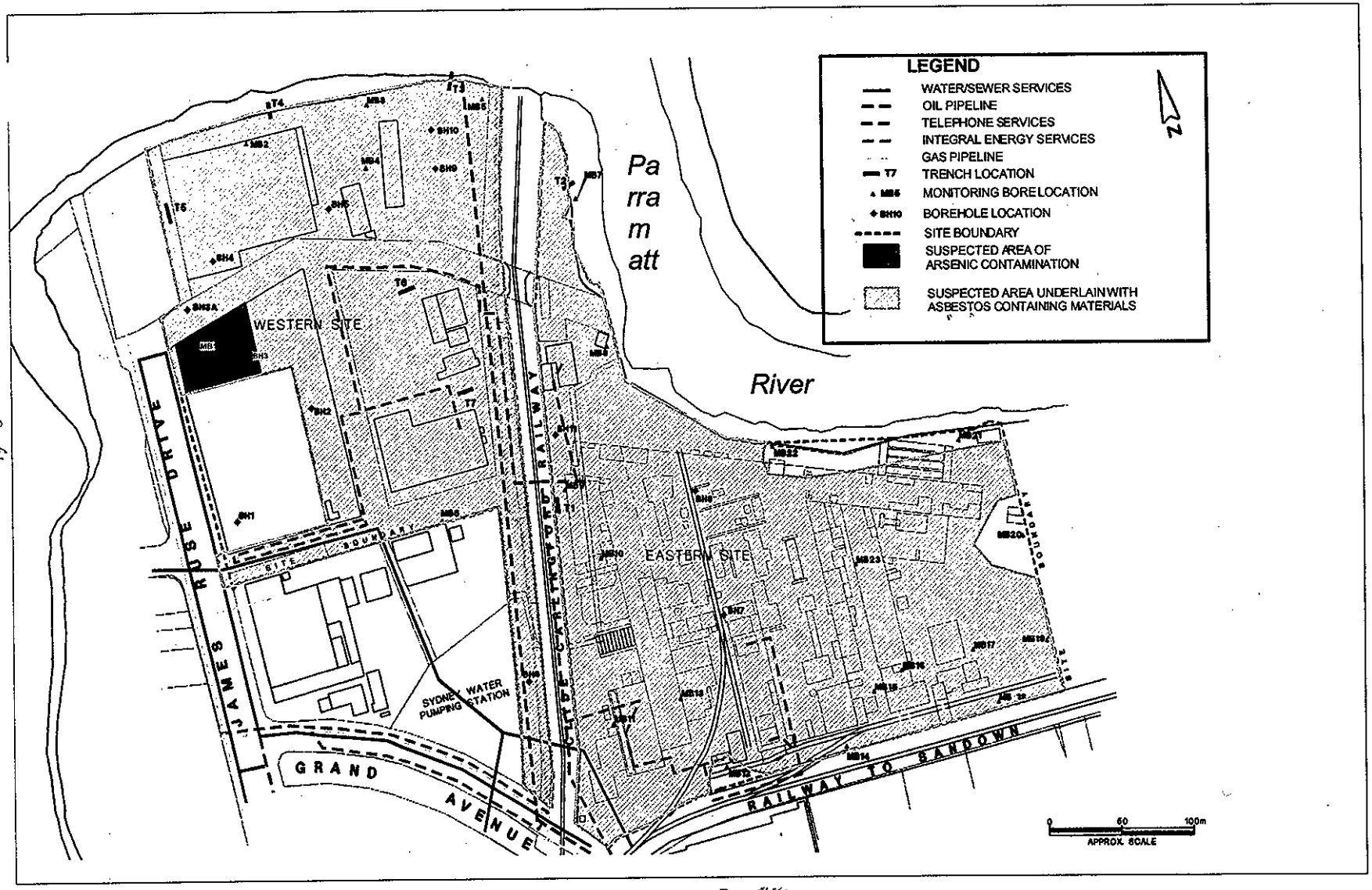
The requirements for protection from asbestos are considered to be more than adequate to protect from any other contaminants identified on the site.

All excavated material will be removed from site by an appropriately licensed asbestos removal contractor and disposed of in accordance with current NSW EPA guidelines and relevant industry codes of practise.

Any maintenance will be carried out within the excavated trench.

This Safe Work Plan has been developed with reference to relevant Australian Standards, legislation, WorkSafe Australia, WorkCover NSW and Sydney Water safe work practices and requirements.

Figure 1: Areas of Suspected Contamination, Former James Hardie Site.



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2 General health and safety requirements

Work performed relative to this Safe Work Plan will be conducted in compliance with WorkCover regulatory requirements including the Occupational Health and Safety Act 2000 (NSW), the Occupational Health and Safety Regulation 2001 and the Hazardous Substances Regulation 1996.

During any site activities dust generation must be eliminated. An appropriate, reliable water supply and hoses must be available for wetting down areas as required for any excavation works.

3 Health and safety induction

Personnel performing fieldwork activities will read a copy of the Safe Work Plan prior to initiating fieldwork and sign a compliance agreement (at rear of this document). Copies of the plan will be available and accessible to site personnel for reference and review at all times.

4 Field activities

Intrusive activities include: -

- excavation of soil; and
- any handling of soil.

Non-intrusive activities include: -

- site visits within the designated work zone; and
- inspections or audits of intrusive activities.

Prohibitions

The following activities are prohibited within the designated work zone: -

- smoking;
- eating, drinking or any other activity involving hand to mouth contact prior to personal decontamination;
- persons with facial hair wearing respirators, as it interferes with proper respirator fit; and
- unauthorised removal of material from site.

Contamination/exposure prevention

Ways in which on-site personnel may become contaminated include the following: -

- exposure to dusts from excavated material which may contain contaminants;
- being in contact with contaminated excavated material, or from materials within the excavated trench; and
- being in contact with contaminated equipment.

5 Work zones

A designated work zone will be sectioned off around the proposed work area. An exclusion zone will be established around the excavation site, and a decontamination zone will be established immediately outside the exclusion zone.

5.1 Exclusion zone

The exclusion zone for intrusive activities (excavation site) is the area where contaminants could or do occur and will normally encompass an area of 5 metres from the edge of the excavation. The boundary of the exclusion zone will be marked with either barricades or hazard netting, and appropriate signage indicating the presence of asbestos should be used. Personnel and equipment decontamination is required when exiting an exclusion zone at an intrusive activity. All individuals entering this area must be approved by the Site Supervising Officer.

5.1 Decontamination zone

In general, the decontamination zone is established immediately outside the exclusion zone to minimise the migration of contaminants from the exclusion zone to clean areas and to reduce the exposure potential of individuals leaving the exclusion zone.

6 Personal protection levels and equipment

The minimum personal protective levels for the various on site activities are defined in the following sections of the Safe Work Plan. The personal protection equipment (PPE) needed to comply with the various protection levels are detailed below.

6.1 Clothing inspection

PPE should be inspected before and during use. The following checks should be made before use: -

Determine that the clothing material is correct for the specific task at hand.

Visually inspect for:-

- Imperfect seams;
- Tears; and
- Malfunctioning closures.

During the work task, periodically inspect for the following:-

- Closure failure;
- Tears;
- Punctures; and
- Seam discontinuity.

6.2 Non-intrusive activity protection

The following are the minimum requirements for non-intrusive activities at the site:-

- Long trousers, long sleeved shirt;
- Steel toed safety boots meeting AS/NZS 2210:2000;
- Hard hat meeting AS/NZS 1800:1998 (as determined by the site supervising officer); and
- Safety glasses meeting AS/NZS 1336:1997 (as determined by the site supervising officer).

This level of protection will be utilised as a minimum for non-intrusive activities performed on site. Personnel entering an exclusion zone for intrusive activities will be required to upgrade to a level of Protection as described below.

6.3 Intrusive activity protection

During intrusive activities, such as soil excavation, all personnel involved in the exclusion and decontamination zone will wear a level of protection as follows:-

- Disposable overalls (TYVEK);
- Water proof boots fitted with steel toe and shank meeting AS/NZS 2210:2000 when working around heavy machinery. Covers should be worn on boots and disposed of with asbestos waste to eliminate off site transport of contaminated soil;
- Latex surgical gloves, Nitrile work gloves meeting AS/NZS 2161.1:2000 requirements. Standard work gloves may be worn over the Nitrile gloves for convenience. All gloves must be disposed of following the works and must not be re-used;
- Hard hat meeting AS/NZS 1800:1998 requirements when working around machinery or as directed by the Project Manager or his representative;
- Hearing protection meeting AS/NZS 1270:2002 requirements when working around machinery or plant equipment if noise levels exceed 85dB(A);
- Half face-piece disposable or cartridge type particulate respirator – Class P1 or P2; and
- Safety glasses meeting AS/NZS 1336:1997 (as determined by the site supervising officer).

Respirators to be used will be approved for protection against asbestos. Respirator filters will be changed upon detection of breakthrough, or when breathing difficulty is encountered due to particulate loading, or as per manufacturer instructions.

Disposable coveralls and gloves should be changed at least daily. Personnel will discard protective clothing which becomes torn, punctured, or appears to deteriorate under chemical action. All discarded clothing will be placed into specially marked plastic bags and disposed of as asbestos waste. If protective equipment appears to deteriorate under chemical action, the Site Supervising Officer will be notified immediately.

The Site Supervising Officer (in consultation with the Sydney Water Project Manager) has the authority to modify required levels of protection in the field when conditions warrant. Any modifications to lesser levels of protection not explicitly stated in this Safe Work Plan must be approved by the Project Health and Safety Officer. Changes to this Safe Work Plan can be requested by the Site Supervising Officer in the form of an addendum presented to the Project Health and Safety Officer, which includes justification for the changes.

6.4 Respirators

Personnel should be trained in the use of personal respirators (correct fitting and use), fitted and issued personal respirators for use during intrusive activities and for work at the equipment decontamination area. Each individual is responsible for the cleaning, inspection, maintenance and storage of any respirator they use. Before being taken to the field, all respirators will be inspected, filters installed, positive and negative pressure check conducted and then the entire respirator assembly will be sealed in a plastic bag and the respirator will remain in the sealed bag until needed. If the respirator is not used and the sealed bag is not damaged, the respirator may be left at the work site inside an area protected from the

elements. The enclosed cab of a vehicle is considered to be one example of a protected area.

After the respirator is used, the following procedures will be followed. For re-useable respirators, filters will be removed and disposed of as contaminated PPE. The respirator face piece interior and exterior will be wiped down with pre-moistened towellettes, such as baby wipes and subsequently sealed in a plastic bag for transport for cleaning. Disposable respirators must be placed into plastic bags and disposed of as asbestos waste.

7 Supervision of site activities

The requirements for supervision by an Environmental Scientist will be determined by the Technical Advisor to Sydney Water on a individual job basis.

8 Decontamination

During excavation, all personnel within the exclusion zone will be wearing respiratory protection and will be subject to personal decontamination before leaving the zones. No one will be allowed into the exclusion zone without minimum protection of a TYVEK suit, hard hat, safety boots, hearing protection, gloves and half face respirator.

Decontamination of equipment and personnel will be undertaken to limit the migration of contaminants off site. Personnel decontamination shall be undertaken within the decontamination zone when leaving an exclusion zone. Decontamination will consist of washing the exterior of protective clothing to remove any soil, followed by removal of clothing and shoe covers and disposing of these in an approved manner. Personnel will then wash face and hands thoroughly on-site. Full showering will be undertaken at the relevant depot before completion of the work shift.

Non-reusable clothing will be collected in plastic garbage bags for disposal by licensed asbestos removal contractors. No waste will be removed from the site without the approval of the Project Manager and Sydney Water. Any waste to be removed from the site would be undertaken in accordance with relevant NSW EPA guidelines and would require the services of a licensed asbestos removal contractor.

9 Environmental health risks

The site incorporates a number of sensitive environments in the immediate proximity to the underground infrastructure and to the known areas of contamination. Care must be taken when working in these areas to prevent the accidental movement of contaminants into the nearby waterways, ponds or wetlands. Potential scenarios include:

- a burst water main eroding adjacent contaminated soil into the waterways; and
- spread of contaminated soil during mechanical excavation works.

9.1 Erosion controls

For areas with an identified risk for the presence of potentially contaminated soil, the following guidelines have been established to help reduce or eliminate the transfer of these soils to the environment in the event of a major water main break:

- isolate the break and cut off the flow; and
- if this is delayed then position hay bales, sand bags, silt fence or other devices to retard the transport of soil particles.

9.2 Protection of environmental health during earthworks

All care must be taken to ensure that potentially contaminated material does not escape to the environment.

Due to the short term exposure of the potential contaminants during the excavation works, the environmental risks to flora and fauna will be only minor. The main concern will be:

- to ensure that any potential run-off from any stockpiled soils is retained on site and does not enter nearby waterways.

If these precautions are taken, risks posed to environmental health through excavations of the contaminated materials should be negligible.

9.3 Recommended work method for excavating contaminated soil

Any excavated soil must be stockpiled on-site. The materials should be placed on a sheet of HDPE plastic located adjacent to the formed excavation area. The plastic should be positioned on the up-slope side of the excavation to allow drainage of any associated water back into the excavation.

Place all of the contaminated material onto the HDPE sheet. The stockpile should not be located in areas of potential surface water flow or where the material could be washed into stormwater drains and the local waterway.

To minimise the potential for the stockpiled material to become susceptible to being blown about as dust, during dry weather conditions, it is prudent that the stockpiled material should be kept watered down and/or covered.

If the stockpiled material is to remain on-site over night then the area must be secured by surrounding with star-pickets and tape or other physical barriers. In this case or during heavy rain, the materials should be covered with plastic sheeting to prevent erosion of the stockpile or leaching of potential contaminants. The up-slope side of the excavation should also be protected with a low soil bund to prevent any unnecessary inflow of surface water during heavy rainfall.

If most of the excavated material is "wet" then the edges of the HDPE sheet must be raised and bunded to prevent any water draining from the stockpile onto the surrounding area or entering the local waterway.

At the completion of the excavation, the stockpile of potentially contaminated soil should be removed from site by a licensed contractor and disposed of in accordance with current NSW EPA guidelines.

Care must be taken to wash down equipment after use to avoid any spread of contamination. This should be carried out over the contaminated stockpile using high-pressure water. All wash-down water must be contained.

10 Safe work compliance agreement

I,_____, have read this Safe Work Plan and hereby agree to abide by its provisions and to aid the Site Safety Officer in its implementation. I understand that it is in my best interest to see that site operations are conducted in the safest manner possible; therefore, I will be alert to site health and safety conditions at all times.

_____

Signature of Employee Date

_____

Signature of Project Manager Date

11 References

Standards Australia (1997) AS/NZS1336:1997 Recommended Practices for Occupational Eye Protection.

Standards Australia (1994) AS/NZS 1715:1994 Selection, Use and Maintenance of Respiratory Protective Devices.

Standards Australia (1998) AS/NZS 1800:1998 Occupational Protective Helmets - Selection, Care and Use.

Standards Australia (2000) AS/NZS 2161.1:2000 Occupational Protective Gloves - Selection, Use and Maintenance.

Standards Australia (2000) AS/NZS 2210:2000 Occupational Protective Footwear.

Standards Australia (2002) AS/NZS 1270:2002 Acoustics – Hearing Protection.

Occupational Health and Safety Act 2000 (NSW).

Workcover Occupational Health and Safety Regulation 2001 (NSW).

Worksafe Australia (1988) Asbestos: Code of Practice and Guidance Notes.

Appendix B

Site Management Checklists

Site Management Checklist Report for Buried Hazardous Fill – Eastern Portion Former James Hardie Site, Camellia.

A. Excavation for Maintenance/Repair of existing Services		Report prepared by: Position:	Signed off by: Position:	Date

Date	Description of Works	Safe Work Plan used	Who Approved SWP? & Qualifications?	Was Surface restored satisfactorily to SMP specifications (yes/no)?	Any OH&S Problems encountered? - attach details.	Recommendations for improvement (attached details)	Recommendations adopted - Date

B. Excavation for any Other Purpose		Report prepared by: Position:	Signed off by: Position:	Date

Date	Description of Works	EPA Written Approval of Works - Date	Was Surface restored satisfactorily to EPA specifications (yes/no)?	Any OH&S Problems encountered? - attach details.	Recommendations for improvement (attached details)	Recommendations adopted - Date	

C. Record of Incidents or Complaints regarding the buried contamination		Report prepared by: Position:	Signed off by: Position:	Date

Date	Nature of Incident / Complaint	Reported by	Reported to	Action(s) to be taken	By whom	Action Completed - date

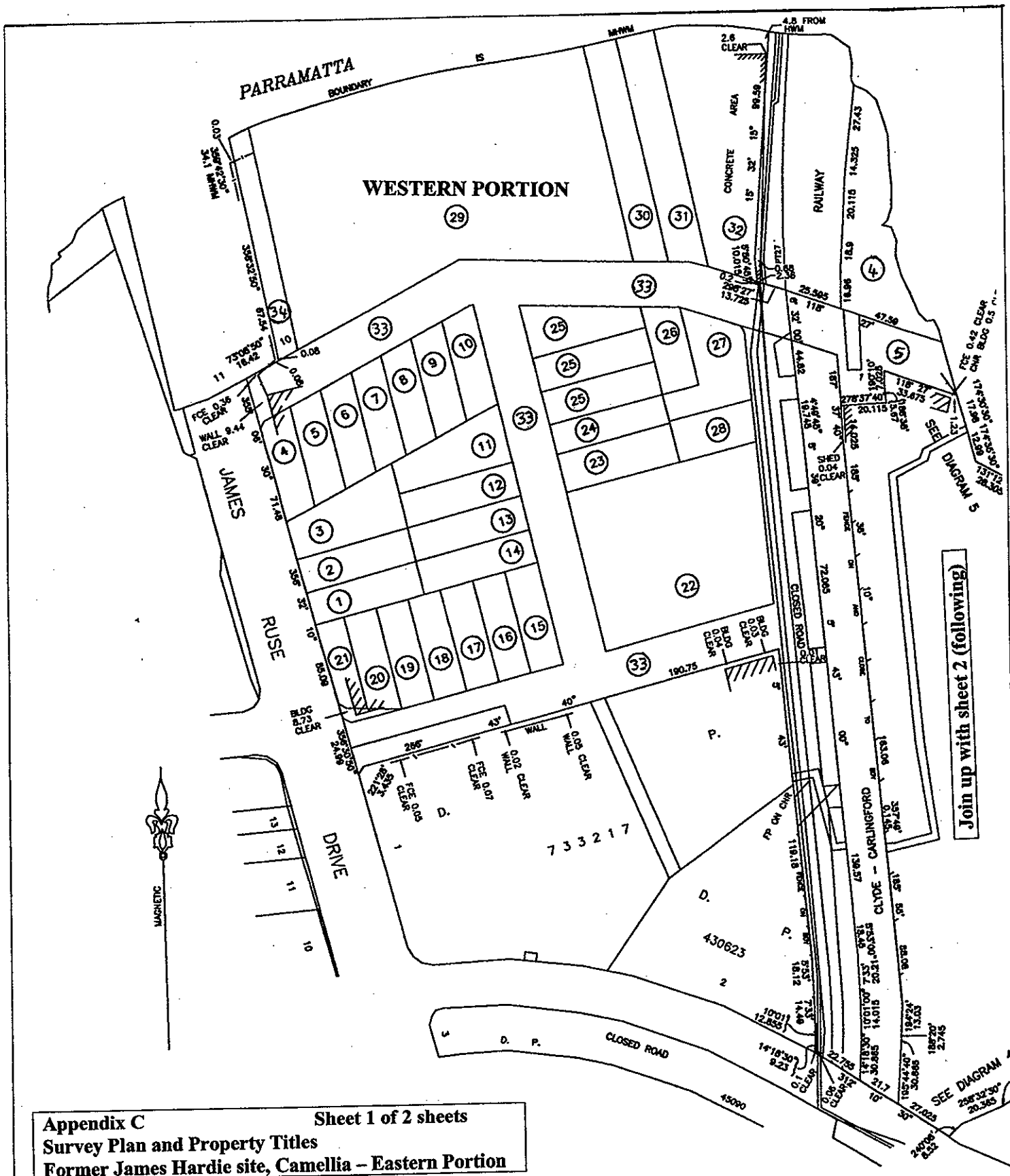
Site Inspection Template – Surface Condition, Eastern Portion. Refer to SMP for frequency of inspections.

Date:	Inspection by:				
On-site Hazard Check	**Management Control**	**Observations: Eg surface condition, hardstand, grass / gravel coverage, signage , etc**	**Description of Action required**	**Due date for action & responsible person**	**Action completed, date & by who**
Hard Surfaces including easement areas (concrete and bitumen, including roads and slabs overlying fill).	1. Implement annual visual inspection to ensure surfaces are in sound condition. 2. Take action to repair surface if evidence of deterioration.				
Soft Surfaces including easement areas (Grassed verges along roadways – Area 'C', Fig.3).	1. Mow grass regularly. 2. Implement six-monthly visual inspection to ensure minimum of 50mm of grass cover is maintained and surface is not eroded. 3. Replace grass cover if inspection indicates any erosion/break in surface cover.				
All areas of buried fill	1. A visual inspection at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that there are an adequate number of signs advising of the buried hazard which are clearly visible in areas of the contaminated waste and are not damaged (ie. signs are in tact, wording is clearly legible, and colour maintained). The site owner must ensure that the wording of the signs is as follows: "Caution. Excavation Prohibited Anywhere on Site Without Approval of [name of site owner]. Hazardous Waste Buried Below Surface Capping. Contact [name of site owner] 24 Hours - Phone [current phone number on which to contact site owner]". (As at March 2004 the Sign Wording is: "Caution. Excavation Prohibited Anywhere on Site Without Approval of Sydney Water. Hazardous Waste Buried Below Surface Capping. Contact Sydney Water 24 Hours - Phone 132090"). Damaged signs must be repaired or replaced as required.				
Whole Parramatta River embankment along boundary.	1. Undertake annual inspection for visible evidence of erosion (and after flood events).				

Parramatta River boundary	1. A visual inspection at a minimum of six-monthly intervals (by 30 June and 31 December in each calendar year) to ensure that there are an adequate number of signs advising of the buried hazard which are clearly visible in areas of the contaminated waste and are not damaged (ie. signs are in tact, wording is clearly legible, and colour maintained). The site owner must ensure that the wording of the signs is as follows: "Caution. Excavation Prohibited Anywhere on Site Without Approval of [name of site owner]. Hazardous Waste Buried Below Surface Capping. Contact [name of site owner] 24 Hours - Phone [current phone number on which to contact site owner]". (As at March 2004 the Sign Wording is: "Caution. Excavation Prohibited Anywhere on Site Without Approval of Sydney Water. Hazardous Waste Buried Below Surface Capping. Contact Sydney Water 24 Hours - Phone 132090"). Damaged signs must be repaired or replaced as required.				

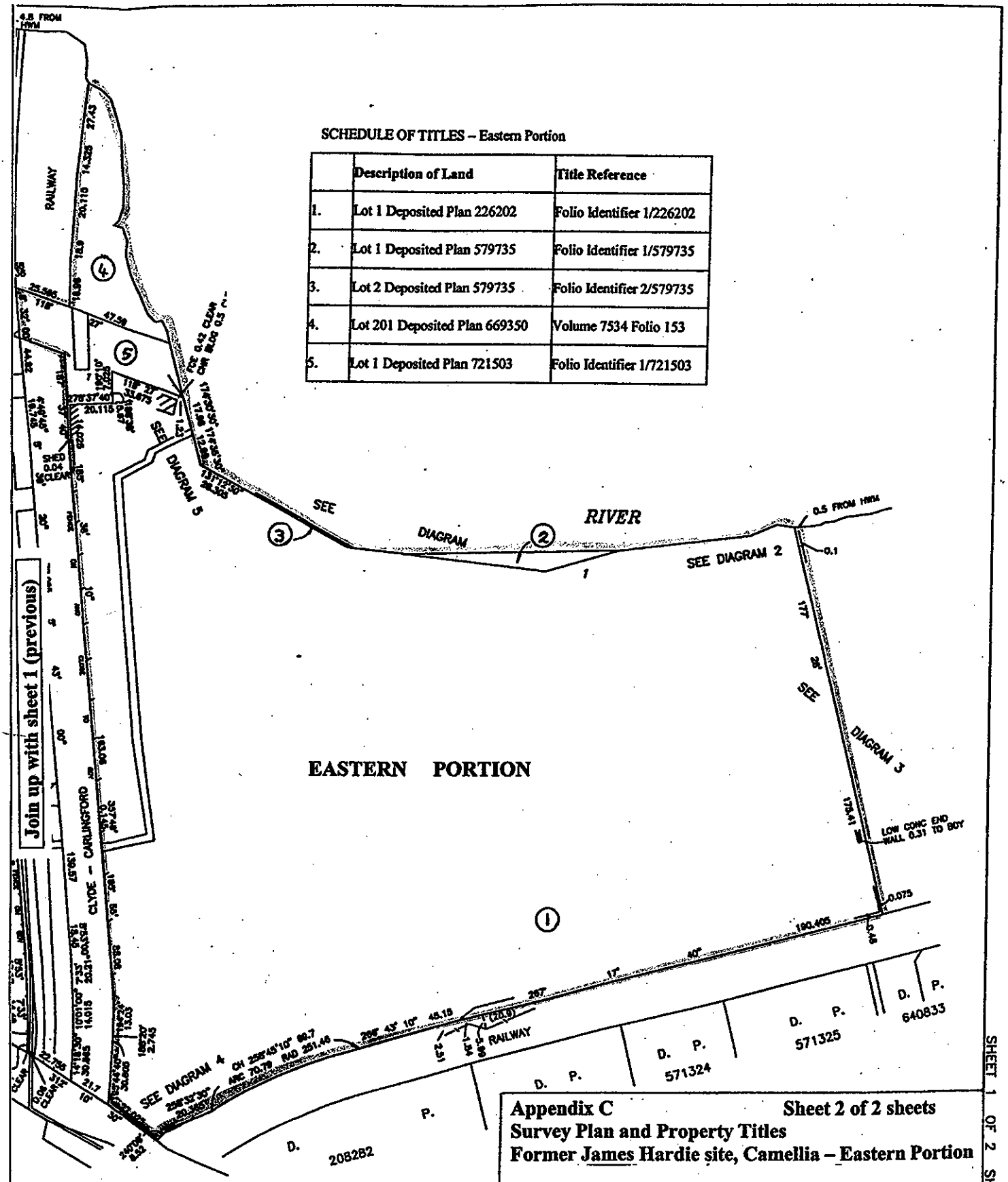
Appendix C

Survey Plan and Property Titles



Appendix C **Sheet 1 of 2 sheets**
Survey Plan and Property Titles
Former James Hardie site, Camellia – Eastern Portion

		SCALES	SURVEYED
		PLAN 1: 1000	D. BURKE
		SECTION HOR. 1: VERT. 1:	DRAWN R. ADAMS
AMENDMENT DETAILS	DATE	AUSTRALIAN HEIGHT DATUM	EXAMINED



	Description of Land	Title Reference
1.	Lot 1 Deposited Plan 226202	Folio Identifier 1/226202
2.	Lot 1 Deposited Plan 579735	Folio Identifier 1/579735
3.	Lot 2 Deposited Plan 579735	Folio Identifier 2/579735
4.	Lot 201 Deposited Plan 669350	Volume 7534 Folio 153
5.	Lot 1 Deposited Plan 721503	Folio Identifier 1/721503

Appendix C **Sheet 2 of 2 sheets**
Survey Plan and Property Titles
Former James Hardie site, Camellia – Eastern Portion

SURVEYED D. BURKE
DRAWN R. ADAMS
DATUM EXAMINED
MANAGER
SURVEY
FILE No.
FIELD BOOK 7701RE
U.S.D. REF.
MAP 211 L4
PARRAMATTA CITY
PLAN SHOWING TITLES AND PERIMETER OCCUPATIONS JAMES HARDIE – CAMELLIA
PROJECT No. 940521A
CATALOGUE No.

SHEET 1 OF 2 SHEETS

Appendix D:
Soil and Groundwater Criteria

Soil investigation levels for urban development sites
Department of Environment and Conservation NSW (April 2006)

Substance	Health-based investigation levels[1] (mg/kg)				Provisional phytotoxicity-based investigation levels[2] (mg/kg)
	Residential with gardens and accessible soil (home-grown produce contributing < 10% fruit and vegetable intake; no poultry), including children's day-care centres, preschools, primary schools, townhouses, villas (NEHF A)[3]	Residential with minimal access to soil including high-rise apartments and flats (NEHF D)	Parks, recreational open space, playing fields including secondary schools (NEHF E)	Commercial or industrial (NEHF F)	
	Column 1	Column 2	Column 3	Column 4	Column 5
Metals and metaloids					
Arsenic (total)	100	400	200	500	20
Beryllium	20	80	40	100	–
Cadmium	20	80	40	100	3
Chromium (III)[4]	12%	48%	24%	60%	400
Chromium (VI)	100	400	200	500	1
Cobalt	100	400	200	500	–
Copper	1,000	4,000	2,000	5,000	100
Lead	300	1,200	600	1,500	600
Manganese	1,500	6,000	3,000	7,500	500
Methyl mercury	10	40	20	50	–
Mercury (inorganic)	15	60	30	75	1[5]
Nickel	600	2,400	600	3,000	60
Zinc	7,000	28,000	14,000	35,000	200
Organics					
Aldrin + dieldrin	10	40	20	50	–
Chlordane	50	200	100	250	–
DDT + DDD + DDE	200	800	400	1,000	–
Heptachlor	10	40	20	50	–
PAHs (total)	20	80	40	100	–
Benzo(a)pyrene	1	4	2	5	–
Phenol[6]	8,500	34,000	17,000	42,500	–
PCBs (total)	10	40	20	50	–
Petroleum hydrocarbon components[7]					
> C16–C35 (aromatics)	90	360	180	450	–
> C16–C35	5,600	22,400	11,200	28,000	–
> C35 (aliphatics)	56,000	224,000	112,000	280,000	–
Other					
Boron	3,000	12,000	6,000	15,000	–[8]
Cyanides (complex)	500	2,000	1,000	2,500	–

Soil investigation levels for urban development sites Department of Environment and Conservation NSW (April 2006)					
Substance	**Health-based investigation levels[1] (mg/kg)**				**Provisional phytotoxicity-based investigation levels[2] (mg/kg)**
	Residential with gardens and accessible soil (home-grown produce contributing < 10% fruit and vegetable intake; no poultry), including children's day-care centres, preschools, primary schools, townhouses, villas (NEHF A)[3]	Residential with minimal access to soil including high-rise apartments and flats (NEHF D)	Parks, recreational open space, playing fields including secondary schools (NEHF E)	Commercial or industrial (NEHF F)	
	Column 1	Column 2	Column 3	Column 4	Column 5
Cyanides (free)	250	1,000	500	1,250	–

1 The limitations of health-based soil investigation levels are discussed in Schedule B(1) Guidelines on the Investigation Levels for Soil and Groundwater and Schedule B(7a) Guidelines on Health-based Investigation Levels, *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 1999)

2 The provisional phytotoxicity-based investigation levels proposed in this document are single number criteria. Their use has significant limitations because phytotoxicity depends on soil and species parameters in ways that are not fully understood. They are intended for use as a screening guide and may be assumed to apply to sandy loam soils or soils of a closely similar texture for pH 6–8.

3 National Environmental Health Forum (NEHF) is now known as enHealth.

4 Soil discolouration may occur at these concentrations.

5 Total mercury

6 Odours may occur at these concentrations.

7 The carbon number is an 'equivalent carbon number' based on a method that standardises according to boiling point. It is a method used by some analytical laboratories to report carbon numbers for chemicals evaluated on a boiling point GC column.

8 Boron is phytotoxic at low concentrations. A provisional phytotoxicity-based investigation level is not yet available.

Notes:

This table is adapted from Table 5-A in Schedule B(1): Guidelines on Investigation Levels for Soil and Groundwater to the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC 1999).

Soil investigation levels (SILs) may not be appropriate for the protection of ground water and surface water. They also do not apply to land being, or proposed to be, used for agricultural purposes. (Consult NSW Agriculture and NSW Health for the appropriate criteria for agricultural land.)

SILs do not take into account all environmental concerns (for example, the potential effects on wildlife). Where relevant, these would require further consideration.

Impacts of contaminants on building structures should also be considered.

For assessment of hydrocarbon contamination for residential land use, refer to the Guidelines for Assessing Service Station Sites (EPA 1994).

Threshold Concentration for Sensitive Land Use – Soils Guidelines for Assessing Service Station Site (NSW EPA 1994)	
Contaminant	**Threshold Concentration (mg/kg)**
TPH (C_6-C_9)	65
TPH (C_{10}-C_{36})	1,000
Benzene	1
Toluene	1.4
Ethylbenzene	3.1
Xylenes (total)	14

Trigger Values (TV) for Screening Marine Water Quality Data (µg/L) for Slightly to Moderately Disturbed Ecosystems (ANZECC 2000)		
Contaminant	**Threshold Concentration (µg/L))**	**Guideline Source**
Metals and Metalloids		
Arsenic – As (III/V)	2.3/4.5	Low reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
Cadmium – Cd	0.7	ANZECC (2000) 99% protection level due to potential for bio-accumulation or acute toxicity to particular species.
Mercury – Hg	0.1	
Nickel – Ni	7	ANZECC (2000) 99% protection level due to potential for toxicity to particular species.
Manganese	80	Low reliability trigger values (derived from the mollusc figure) from Volume 2 of ANZECC (2000)
Chromium – Cr (III/VI)	27.4/4.4	ANZECC (2000) 95% protection levels.
Copper – Cu	1.3	
Cobalt	1	
Lead – Pb	4.4	
Zinc – Zn	15	
Aromatic Hydrocarbons		
Benzene	500	Low reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
Toluene	180	
Ethylbenzene	5	
o-xylene	350	
m-xylene	75	
p-xylene	200	
Polycyclic Aromatic Hydrocarbons		
Naphthalene	50	ANZECC (2000) 99% protection level due to potential for bio-accumulation or acute toxicity to particular species.
Anthracene	0.01	Low reliability trigger values from Volume 2 of ANZECC (2000) ANZECC (2000) 99% protection level due to potential for bio-accumulation or acute toxicity to particular species.
Phenanthrene	0.6	
Fluroanthene	1	
Benzo (a) pyrene	0.1	
Chlorinated Alkanes		
Tetrachloroethene - PCE	70	Low reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
1,1,2 Trichlorothene- TCE	330	
1,1,2 Trichlorothene- 1,1,2-TCE	330	
Vinyl chloride (chloroethene)	100	
1,1,1 Trichloroethane – 1,1,1-TCA (111-TCE)	270	
1,1 Dichloroethene	700	
1,1 Dichloroethane	250	
1,2 Dichloroethane	1900	
1,1,2 - Trichloroethane	1900	Moderate reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
Chloroform	370	Low reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
Non-Metallic Inorganics		
Ammonia Total – NH_3 (at pH of 8)	910	ANZECC (2000) 95% protection levels.

Trigger Values (TV) for Screening Marine Water Quality Data (µg/L) for Slightly to Moderately Disturbed Ecosystems (ANZECC 2000)		
Contaminant	**Threshold Concentration (µg/L))**	**Guideline Source**
Cyanide (Free or unionised HCN)	4	

While the low reliability figures should not be used as default guidelines they will be useful for indicating the quality of groundwater migrating off-site.

Trigger Values (TV) for Screening Fresh Water Quality Data (µg/L) for Slightly to Moderately Disturbed Ecosystems (ANZECC 2000)		
Contaminant	**Threshold Concentration (µg/L))**	**Guideline Source**
Metals and Metalloids		
Arsenic – As (III/V)	24/13	ANZECC (2000) 95% protection levels.
Boron - B	370	ANZECC (2000) 95% protection levels (figure may not protect key test species from chronic toxicity)
Cadmium – Cd	0.2	ANZECC (2000) 95% protection levels.
Nickel – Ni	11	
Manganese	1900	ANZECC (2000) 95% protection levels (figure may not protect key test species from chronic toxicity)
Mercury – Hg	0.06	ANZECC (2000) 99% protection level due to potential for bio-accumulation or acute toxicity to particular species.
Chromium – Cr (III/VI)	3.3/1.0	Low reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000) for Cr (III)
Cobalt	2.8	
Copper – Cu	1.4	ANZECC (2000) 95% protection levels.
Lead – Pb	3.4	
Zinc – Zn	8.0	ANZECC (2000) 95% protection levels (figure may not protect key test species from chronic toxicity)
Aromatic Hydrocarbons		
Benzene	950	Moderate reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
Toluene	180	Low reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
Ethylbenzene	80	
m-xylene	75	
o-xylene	350	Moderate reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
p-xylene	200	
Polycyclic Aromatic Hydrocarbons		
Naphthalene	16	ANZECC (2000) 95% protection level due to potential for bio-accumulation or acute toxicity to particular species.
Anthracene	0.01	Low reliability trigger values from Volume 2 of ANZECC (2000)
Phenanthrene	0.6	
Fluroanthene	1	ANZECC (2000) 99% protection level due to potential for bio-accumulation or acute toxicity to particular species.
Benzo (a) pyrene	0.1	
Organochlorine Pesticides		
Aldrin	0.001	Low reliability trigger values from Volume 2 of ANZECC (2000)
DDE	0.03	
Dieldrin	0.01	
Endosulfan α	0.0002	
Endosulfan β	0.007	
Chlordane	0.03	ANZECC (2000) 95% protection levels
DDT	0.006	
Lindane	0.2	
Endosulfan	0.03	ANZECC (2000) 99% protection level due to potential for bio-accumulation or acute toxicity to particular species.
Endrin	0.01	
Heptachlor	0.01	
Organophosphorus Pesticides		
Azinphos methyl	0.01	ANZECC (2000) 99% protection level due to potential for bio-accumulation or acute

Trigger Values (TV) for Screening Fresh Water Quality Data (µg/L) for Slightly to Moderately Disturbed Ecosystems (ANZECC 2000)		
Contaminant	**Threshold Concentration (µg/L))**	**Guideline Source**
		toxicity to particular species.
Methoxychlor	0.005	Low reliability trigger values from Volume 2 of ANZECC (2000)
Dementon-S-methyl	4	
Chloropyrifos	0.01	ANZECC (2000) 95% protection levels
Diazinon	0.01	ANZECC (2000) 95% protection levels
Dimethoate	0.15	
Fenitrothion	0.2	
Malathion	0.05	
Parathion	0.004	
Non-Metallic Inorganics		
Total Ammonia as N (pH of 8)	900	ANZECC (2000) 95% protection levels
Cyanide (Free or unionised)	7	
Nitrate	700	Moderate reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
NO_x	40	ANZECC (2000) Default trigger values for physical and chemical stressors for slightly disturbed ecosystems in lowland rivers of South-east Australia. The trigger values for TP and TN are 25 µg/L and 350 µg/L, respectively, for east flowing coastal rivers in NSW.
Total Nitrogen	500	
Total Phosphorous	50	
Ammonium ($NH4^+$)	20	
Chlorine	3	ANZECC (2000) 95% protection levels.
Phenols		
Phenol	320	ANZECC (2000) 95% protection levels
2,4-dimethylphenol	2	Low reliability values (95% level of protection) from Volume 2 of ANZECC (2000)
Chlorinated Alkanes and Alkanes		
Tetrachloroethene - PCE	70	Low reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
1,1,2 Trichloroethene- 1,1,2-TCE	330	
Vinyl chloride (chloroethene)	100	
1,1,1 Trichloroethane – 1,1,1-TCA (111-TCE)	270	
1,1 Dichloroethene	700	
1,1 Dichloroethane	90	
1,2 Dichloroethane	1900	
Chloroform	370	
1,1,2 - Trichloroethane	6500	Moderate reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
Chlorinated Aromatic Hydrocarbons		
1,3- dichlorobenzene	260	Moderate reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000)
1,4 - dichlorobenzene	60	
1,2,4 - trichlorobenzene	85	
Hexachlorobenzene	0.05	Low reliability values (95% level of protection) from Volume 2 of ANZECC (2000). (QSAR derived)
Miscellaneous Industrial Chemicals		
Hexachlorobutadiene	0.04	Environmental Concern Level from Volume 2 of ANZECC (2000)

While the low reliability figures should not be used as default guidelines they will be useful for indicating the quality of groundwater migrating off-site.

Appendix E:
EPA Approved Guidelines

Guidelines made or approved by the EPA under section 105 of the *Contaminated Land Management Act 1997*

(*as of 23 March 2010*)

Section 105 of the Contaminated Land Management Act 1997 (CLM Act) allows DECCW to make or approve guidelines for purposes connected with the objects of the Act. These guidelines must be taken into consideration by DECCW whenever they are relevant and by accredited site auditors when conducting a site audit. They are also used by contaminated land consultants in undertaking investigation, remediation, validation and reporting on contaminated sites.

A list of guidelines made or approved by DECCW under the CLM Act is listed below.

Guidelines made by DECCW

- Guidelines for Assessing Service Station Sites, December 1994
- Guidelines for the vertical mixing of soil on former broad-acre agricultural land, January 1995
- Sampling Design Guidelines, September 1995
- Guidelines for Assessing Banana Plantation Sites, October 1997 - bananaplantsite.pdf, 586 kb
- Guidelines for Consultants Reporting on Contaminated Sites (97104consultantsglines.pdf; 209 KB) - September 2000
- Guidelines for Assessing Former Orchards and Market Gardens, June 2005 - orchardgdlne05195.pdf, 172 kb
- Guidelines for the NSW Site Auditor Scheme (2nd edition), April 2006 - auditorglines06121.pdf, 510kb
- Guidelines for the Assessment and Management of Groundwater Contamination, March 2007 - groundwaterguidelines07144.pdf 604 kb
- Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, June 2009 - 09438gldutycontclma.pdf, 1 Mb

Note: All references in DECCW's contaminated sites guidelines to the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC, November 1992) are replaced as of 6 September 2001 by references to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, October 2000), subject to the same terms.

Guidelines approved by DECCW

ANZECC publications

- Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, published by Australian and New Zealand Environment and Conservation Council (ANZECC) and the National Health and Medical Research Council (NHMRC), January 1992
- 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, October 2000

EnHealth publications (formerly National Environmental Health Forum monographs)

- Composite Sampling, Lock, W. H., National Environmental Health Forum Monographs, Soil Series No.3, 1996, SA Health Commission, Adelaide
- 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

National Environment Protection Council publications

- National Environment Protection (Assessment of Site Contamination) Measure 1999

The Measure consists of a policy framework for the assessment of site contamination, Schedule A (Recommended General Process for the Assessment of Site Contamination) and Schedule B (Guidelines). Schedule B guidelines include:

B(1) Guideline on Investigation Levels for Soil and Groundwater
B(2) Guideline on Data Collection, Sample Design and Reporting
B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils
B(4) Guideline on Health Risk Assessment Methodology
B(5) Guideline on Ecological Risk Assessment
B(6) Guideline on Risk Based Assessment of Groundwater Contamination
B(7a) Guideline on Health-Based Investigation Levels
B(7b) Guideline on Exposure Scenarios and Exposure Settings
B(8) Guideline on Community Consultation and Risk Communication
B(9) Guideline on Protection of Health and the Environment During the Assessment of Site Contamination
B(10) Guideline on Competencies & Acceptance of Environmental Auditors and Related Professionals

Other documents

- Guidelines for the Assessment and Clean Up of Cattle Tick Dip Sites for Residential Purposes, NSW Agriculture and CMPS&F Environmental, February 1996
- Australian Drinking Water Guidelines, NHMRC & Natural Resource Management Ministerial Council of Australia and New Zealand, 2004