



NSW Site Auditor Scheme

Site Audit Statement

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

This form was approved under the *Contaminated Land Management Act 1997* on 12 October 2017.

For information about completing this form, go to Part IV.

Part I: Site audit identification

Site audit statement no. **0503-2103**

This site audit is a:



statutory audit



~~non-statutory audit~~

within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details

(As accredited under the *Contaminated Land Management Act 1997*)

Name **Andrew Lau**

Company **JBS&G**

Address **Level 1, 50 Margaret Street**

Sydney NSW

Postcode **2000**

Phone **02 8245 0300**

Email **alau@jbbsg.com.au**

Site details

Address **165 – 169 Holden Street**

Ashbury NSW

Postcode **2193**

Property description

(Attach a separate list if several properties are included in the site audit.)

Part Lot 1 DP 115504 and part Lot 1 DP 911478

Local government area **Canterbury Bankstown**

Area of site (include units, e.g. hectares) **2,540 m² (approximately)**

Current zoning **SP2 – Infrastructure: Water Supply System**

Regulation and notification

To the best of my knowledge:

☐ ~~the site is~~ the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*, as follows: (provide the no. if applicable)

☐ Declaration no. _____

☐ Order no. _____

☐ Proposal no. _____

☐ Notice no. _____

☒ **the site is not** the subject of a declaration, order, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

To the best of my knowledge:

☐ ~~the site has been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*~~

☒ the site **has not** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*.

Site audit commissioned by

Name **Amy Dobson**

Company **Sydney Water Corporation**

Address **Level 13, 1 Smith Street**

Parramatta NSW

Postcode **2150**

Phone **0411 306 656**

Email amy.dobson@sydneywater.com.au

Contact details for contact person (if different from above)

Name **As Above**

Phone

Email

Nature of statutory requirements (not applicable for non-statutory audits)

☐ ~~Requirements under the *Contaminated Land Management Act 1997*
(e.g. management order; please specify, including date of issue)~~

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

☐ ~~Development consent requirements under the *Environmental Planning and Assessment Act 1979* (please specify consent authority and date of issue)~~

☒ Requirements under other legislation (please specify, including date of issue)
Council requirements to meet Gateway Determination for planning proposal
(Ref: PP-2020-465 (PP_2020_CBANK_001_00)) to amend the Canterbury Local
Environmental Plan 2012 as it applies to 165-169 Holden Street, Ashbury to rezone
part of the land from SP2 Infrastructure (Water Supply System) to R2 Low Density
Residential, amend the curtilage of the heritage listed Ashfield Reservoir, and introduce
a maximum height control to part of the land.

Purpose of site audit

☐ ~~A1 To determine land use suitability~~

~~Intended uses of the land:~~ _____

OR

~~A2 To determine land use suitability subject to compliance with either an active or passive environmental management plan~~

~~Intended uses of the land:~~ _____

OR

(Tick all that apply)

☐ ~~B1 To determine the nature and extent of contamination~~

☒ **B2 To determine the appropriateness of:**

☐ ~~an investigation plan~~

☒ a remediation plan

☐ ~~a management plan~~

☐ ~~B3 To determine the appropriateness of a **site testing plan** to determine if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*~~

☐ ~~B4 To determine the compliance with an approved:~~

☐ ~~voluntary management proposal or~~

☐ ~~management order under the *Contaminated Land Management Act 1997*~~

☒ **B5 To determine if the land can be made suitable for a particular use (or uses) if the site is remediated or managed in accordance with a specified plan.**

Intended uses of the land: R2 low density residential (at the date of completion of this audit)

Information sources for site audit

Consultancies which conducted the site investigations and/or remediation:

Progressive Risk Management Pty Ltd

Titles of reports reviewed:

- *Remediation Action Plan, Ashbury Reservoir, 165-169 Holden Street, Ashbury NSW.* Progressive Risk Management Pty Ltd, reference P034963.001, Version F, dated May 2021 (PRM 2021).

Other information reviewed, including previous site audit reports and statements relating to the site:

- *Combined Stage 1 and 2 Detailed Site Investigation Sydney Water Ashfield Reservoir, 165 – 169 Holden Street, Ashbury, NSW, 24 July 2015.* 2201679B-CLM-RPT-1021 Rev C. (Parsons Brinckerhoff 2015);
- *Hazardous Building Material Pre-Demolition Audit, Ashbury Water Reservoir WS0003 165-169 Holden Street, Ashbury NSW, P033623.001/C0151, November 2017.* Revision 3: Final. (Progressive Risk Management 2017);
- *Hazardous Building Materials Removal Plan, Ashbury Water Reservoir WS0003 165-169 Holden Street, Ashbury NSW, P033623.002/C0151, February 2018.* Revision 3: Final. (Progressive Risk Management 2018a).
- *Sampling, Analysis and Quality Plan, Ashbury Water Reservoir WS0003 165-169 Holden Street, Ashbury NSW, P033725.003/C0151, August 2018.* Rev 0, Final (Progressive Risk Management 2018b);
- *Hazardous Ground Gas and Groundwater Assessment, Ashbury Reservoir 165 – 169 Holden Street, Ashbury NSW, P033725.004/C0151, February 2019.* Version B Final. (Progressive Risk Management, 2019a);
- *Data Gap Analysis: Ashbury Reservoir, 165 – 169 Holden Street, Ashbury NSW, P033725.001, 17/06/2019.* Version 5 Final. (Progressive Risk Management 2019b);
- *Summary of Contamination Condition Part of Ashbury Reservoir, 165 – 169 Holden Street, Ashbury NSW, P033725.005/C0151, 17/06/2019.* Version B. (Progressive Risk Management 2019c).
- *Site Audit Report 0503-1805 165-169 Holden Street Ashbury NSW, 16 August 2019, 54448/122753 (Rev 0).* (JBS&G Australia Pty Ltd 2019).

Site audit report details

Title **Site Audit Report 0503-2103, 165 – 169 Holden Street, Ashbury NSW**

Report no. **60565/137967 (Rev 0)**

Date **27 May 2021**

Part II: Auditor's findings

Please complete either Section A1, Section A2 or Section B, not more than one section.
(Strike out the irrelevant sections.)

- Use **Section A1** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **without the implementation** of an environmental management plan.
- Use **Section A2** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **with the implementation** of an active or passive environmental management plan.
- Use **Section B** where the audit is to determine:
 - (B1) the nature and extent of contamination, and/or
 - (B2) the appropriateness of an investigation, remediation or management plan¹, and/or
 - (B3) the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or
 - (B4) whether the terms of the approved voluntary management proposal or management order have been complied with, and/or
 - (B5) whether the site can be made suitable for a specified land use (or uses) if the site is remediated or managed in accordance with the implementation of a specified plan.

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

Section A1

~~I certify that, in my opinion:~~

The ~~site is 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):~~
-

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:

Section A2

~~I certify that, in my opinion:~~

~~Subject to compliance with the **attached** environmental management plan² (EMP), the site is 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):~~
-

~~EMP details~~

~~Title~~

~~Author~~

~~Date~~

~~No. of pages~~

~~EMP summary~~

~~This EMP (attached) is required to be implemented to address residual contamination on the site.~~

~~The EMP: (Tick appropriate box and strike out the other option.)~~

- ☐ ~~requires operation and/or maintenance of **active** control systems³~~
- ☐ ~~requires maintenance of **passive** control systems only³.~~

² Refer to Part IV for an explanation of an environmental management plan.

³ Refer to Part IV for definitions of active and passive control systems.

Site Audit Statement

Purpose of the EMP:

Description of the nature of the residual contamination:

Summary of the actions required by the EMP:

How the EMP can reasonably be made to be legally enforceable:

How there will be appropriate public notification:

Overall comments:

Section B

Purpose of the plan⁴ which is the subject of this audit:

Provide a framework for remediation and detail how the site can be made suitable for the most sensitive proposed future uses under the R2 low density residential zoning (at the date of completion of this audit).

I certify that, in my opinion:

(B1)

- ☐ ~~The nature and extent of the contamination **has** been appropriately determined~~
☐ ~~The nature and extent of the contamination **has not** been appropriately determined~~

AND/OR (B2)

- ☒ The investigation, remediation or management plan **is** appropriate for the purpose stated above
☐ ~~The investigation, remediation or management plan **is not** appropriate for the purpose stated above~~

AND/OR (B3)

- ☐ ~~The site testing plan:~~
☐ ~~**is** appropriate to determine~~
☐ ~~**is not** appropriate to determine~~
~~if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*~~

AND/OR (B4)

- ☐ ~~The terms of the approved voluntary management proposal* or management order** (strike out as appropriate):~~
☐ ~~**have** been complied with~~
☐ ~~**have not** been complied with.~~

~~*voluntary management proposal no.~~

~~**management order no.~~

AND/OR (B5)

- ☒ 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~~

⁴ For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

- ☒ 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): All permissible uses within the R2 Low Density Residential zone (at the date of completion of this audit) under the *Canterbury Local Environmental Plan 2012*.

IF the site is remediated/~~managed~~* in accordance with the following plan (**attached**):

*Strike out as appropriate

Plan title	Remediation Action Plan Ashbury Reservoir, 165-169 Holden Street,		
	Ashbury NSW		
Plan author	Progressive Risk Management		
Plan date	12 May 2021	No. of pages	59

~~SUBJECT to compliance with the following condition(s):~~

Overall comments:

- The proposed remediation and validation works are considered to have met the requirements of the *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd Edition)* (EPA 2017).
- There is no evidence of migration of contaminants from the site which is likely to result in any unacceptable risks to surrounding human or ecological receptors.
- Appropriate supervision of the remediation works is to be undertaken by an appropriately qualified and experienced site contamination practitioner.
- Following the completion of remediation and validation works, a validation report is required to be prepared in accordance with relevant EPA requirements confirming the suitability of the site for all permissible uses within the R2 Low Density Residential zone (at the date of completion of this audit).
- The RAP (PRM 2021) prepared for the site addressed the identified contamination issues; with the remediation approach documented in the RAP checked by the auditor and found to be: technically feasible; environmentally justifiable given the nature and extent of the identified contamination; and consistent with relevant laws, policies and guidelines.
- A Site Audit Statement and Site Audit Report confirming the suitability of the site for the proposed land use is required upon completion of the remediation and validation works.

Part III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority (EPA) under the *Contaminated Land Management Act 1997*.

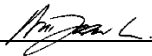
Accreditation no. **0503**

I certify that:

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

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

Signed



Date 27 May 2021

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

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

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

The auditor is to complete either Section A1 or Section A2 or Section B of Part II, **not** more than one section.

Section A1

In Section A1 the auditor may conclude that the land is *suitable* for a specified use or uses 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 investigation or remediation or management of the site was needed to render the site fit for the specified use(s). **Conditions must not be** imposed on a Section A1 site audit statement. Auditors may 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.

Section A2

In Section A2 the auditor may conclude that the land is *suitable* for a specified use(s) subject to a condition for implementation of an environmental management plan (EMP).

Environmental management plan

Within the context of contaminated sites management, an EMP (sometimes also called a 'site management plan') means a plan which addresses the integration of environmental mitigation and monitoring measures for soil, groundwater and/or hazardous ground gases throughout an existing or proposed land use. An EMP succinctly describes the nature and location of contamination remaining on site and states what the objectives of the plan are, how contaminants will be managed, who will be responsible for the plan's implementation and over what time frame actions specified in the plan will take place.

By certifying that the site is suitable subject to implementation of an EMP, an auditor declares that, at the time of completion of the site audit, there was sufficient information satisfying guidelines made or approved under the *Contaminated Land Management Act 1997*

(CLM Act) to determine that implementation of the EMP was feasible and would enable the specified use(s) of the site and no further investigation or remediation of the site was needed to render the site fit for the specified use(s).

Implementation of an EMP is required to ensure the site remains suitable for the specified use(s). The plan should be legally enforceable: for example, a requirement of a notice under the 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*.

Active or passive control systems

Auditors must specify whether the EMP requires operation and/or maintenance of active control systems or requires maintenance of passive control systems only. Active management systems usually incorporate mechanical components and/or require monitoring and, because of this, regular maintenance and inspection are necessary. Most active management systems are applied at sites where if the systems are not implemented an unacceptable risk may occur. Passive management systems usually require minimal management and maintenance and do not usually incorporate mechanical components.

Auditor's comments

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.

Section B

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 the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or whether the terms of an approved voluntary management proposal or management order made under the CLM Act have been complied with, and/or whether the site can be made suitable for a specified land use or uses if the site is remediated or managed in accordance with the implementation of a specified 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. The condition must not specify an individual auditor, only that further audits are required.

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.

Part III

In **Part III** the auditor certifies their 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

- the **NSW Environment Protection Authority**:
nswauditors@epa.nsw.gov.au or as specified by the EPA

AND

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

SSM 137859 - SSM 137858

177°43'12" 182.240 (MGA GROUND)
177°43'35" - 182.25 (SURVEY)

SSM 137858 - SSM 137857

186°35'40" 139.954 (MGA GROUND)
186°35'40" 139.95 (SURVEY)

SSM 137857 - SSM 137856

179°59'43" 120.962 (MGA GROUND)
179°59'20" 120.97 (SURVEY)

SSM 137858 - CNR (A)

190°24'30" 113.385

SSM 137857 - CNR (B)

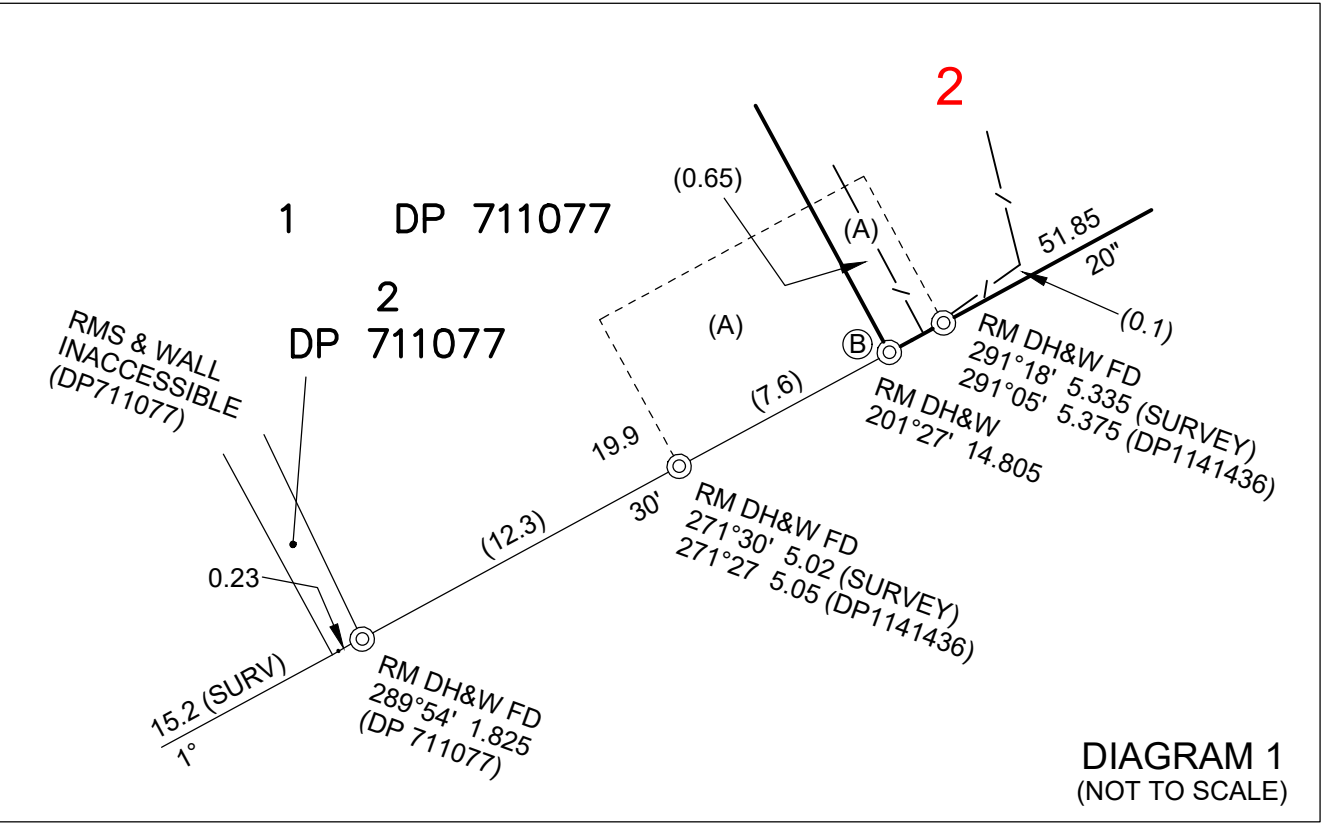
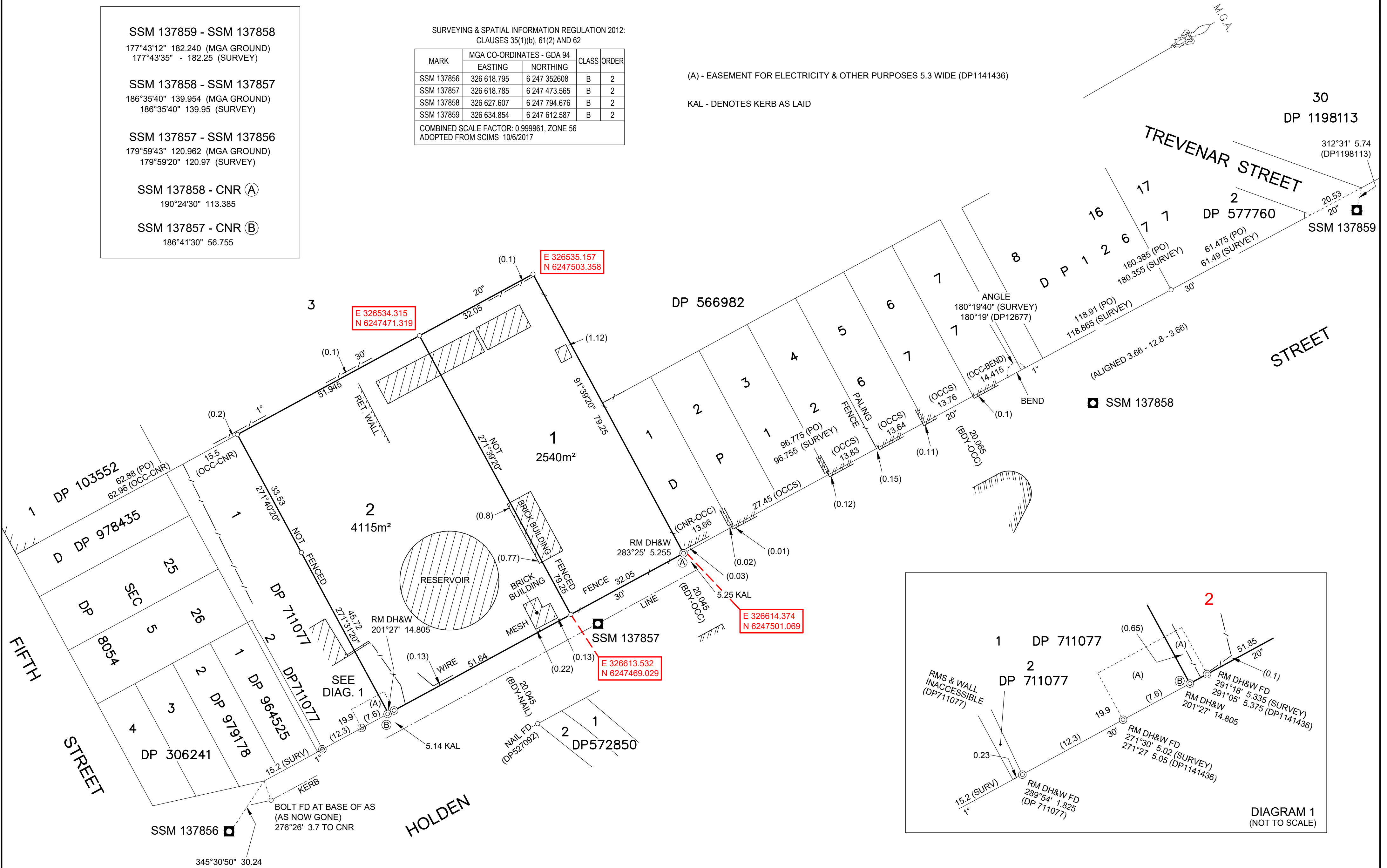
186°41'30" 56.755

SURVEYING & SPATIAL INFORMATION REGULATION 2012:
CLAUSES 35(1)(b), 61(2) AND 62

MARK	MGA CO-ORDINATES - GDA 94		CLASS	ORDER
	EASTING	NORTHING		
SSM 137856	326 618.795	6 247 352608	B	2
SSM 137857	326 618.785	6 247 473.565	B	2
SSM 137858	326 627.607	6 247 794.676	B	2
SSM 137859	326 634.854	6 247 612.587	B	2
COMBINED SCALE FACTOR: 0.999961, ZONE 56 ADOPTED FROM SCIMS 10/6/2017				

(A) - EASEMENT FOR ELECTRICITY & OTHER PURPOSES 5.3 WIDE (DP1141436)

KAL - DENOTES KERB AS LAID



SURVEYOR:
Name: MATTHEW WILLIAM CLEARY
Date: 29/5/2017
Reference: 118234504_02

PLAN OF SUBDIVISION OF LOT 1 IN DP911478 AND
LOT 1 IN DP115504

L.G.A: CANTERBURY - BANKSTOWN
Locality: CANTERBURY
Reduction Ratio: 1 : 600
Lengths are in metres.

REGISTERED

DP OR SP NUMBER



Remediation Action Plan

Asbury Reservoir, 165-169 Holden Street, Ashbury NSW

Sydney Water

P034963.001| Version F

May 2021

Document Control

Project Details:	
Project Name:	Remediation Action Plan
Site:	Ashbury Reservoir, 165-169 Holden Street, Ashbury NSW.
Client Name:	Sydney Water Corporation.
Project Reference	P034963.001/C0151

Report Version:					
Version Date:	Review Process:			Issued to:	Summary of changes from previous version:
	Prepared:	Reviewed:	Approved:		
Version A 17/02/2021	ECM	JPC	JPC	Sydney Water Corporation	Original draft of report
Version B 26/02/2021	ECM	JPC	JPC	Sydney Water Corporation	Updated draft addressing client comments
Version C 07/04/2021	ECM	JPC	JPC	Sydney Water Corporation and JBS&G (Auditor)	Updated draft for auditor review
Version D 28/04/2021	ECM	JPC	JPC	Sydney Water Corporation and JBS&G (Auditor)	Final report addressing auditor comments
Version E 04/05/2021	ECM	JPC	JPC	Sydney Water Corporation and JBS&G (Auditor)	Minor amendments to Section 3.1 and Figures.
Version F 12/05/2021	ECM	JPC	JPC	Sydney Water Corporation and JBS&G (Auditor)	Minor amendments to Section 3.1, Figures and update to Appendix B.

Report Review:					
Report Version:		Version F			
Prepared by:		Technical Review by:		Authorised for Issue by:	
					
Name:	E. McAndrew	Name:	Jonathan Coffey	Name:	Jonathan Coffey
Position:	Consultant	Position:	Technical Manager; CEnvP (SC)	Position:	Technical Manager; CEnvP (SC)
Date:	12/05/2021	Date:	12/05/2021	Date:	12/05/2021



Executive Summary

Introduction and Background

Progressive Risk Management (PRM) were engaged by Sydney Water Corporation (the client) to prepare a Remediation Action Plan (RAP) for part of Ashbury Reservoir, located at 165 – 169 Holden Street, Ashbury NSW (the site). The site location is provided in **Figure 1** and the site layout in **Figure 2**.

The site is proposed to be rezoned from the current SP2 infrastructure (Water Supply) zoning to R2 low density residential zoning (R2) under Canterbury Local Environmental Plan (LEP) (2012). The permissible uses under R2 include (but are not limited to) various residential land uses, centre-based childcare facilities, open space/ recreation land uses and commercial land uses.

Site investigations completed between 2015 and 2019 identified wide-spread fill material containing elevated concentrations of heavy metals (copper, lead and zinc), total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH) and asbestos.

With respect to soil quality/fill material, the data obtained during the previous investigations concluded that the site was not suitable for R2 zoning in its current condition.

Objectives

The objective of this RAP is to provide a framework for remediation to detail how the site can be made suitable the most sensitive proposed future site use under R2 (i.e. residential with accessible soils and childcare centres).

Scope of RAP

This RAP presents the remediation approach and framework to make the site suitable for the most sensitive land uses allowable under R2 (i.e. residential with accessible soils and childcare centres). Based on the extent of contamination identified at the site and identified data-gaps (i.e unknown fill quality underneath existing building footprints), the preferred remediation option is considered to be the excavation and offsite disposal of the identified contamination followed by site validation.

However, if the site was proposed to be redeveloped to a less sensitive use permissible under R2 (i.e open space/recreational land use, commercial land use etc), alternate remediation options may be appropriate for the site. Any such alternative remediation options/approach would be required to be detailed in a new RAP approved by Council and a NSW Environment Protection Authority (EPA) accredited site auditor.

Conclusions

It is considered that following full implementation of this RAP, including validation sampling and reporting, the site will be remediated to a standard suitable for the most sensitive land uses allowable under R2 (i.e. residential with accessible soils and childcare centres).

All remediation works are required to be supervised, validated and reported by a suitably qualified consultant, and must be audited by a NSW EPA accredited site auditor and include a site audit statement detailing the findings of the audit.

This Executive Summary should be read in conjunction with the report from which it originated in its entirety.

Table of Contents:

Executive Summary	i
1. Introduction.....	1
1.1. Objectives	1
1.2. Scope of Works	1
1.3. Background Reports	2
2. Regulatory Frameworks.....	3
2.1. Relevant Guidance.....	3
2.2. SEPP55 – Remediation of Land.....	4
2.3. Compliance Requirements	4
3. Site Information	5
3.1. Site Details.....	5
3.2. Permissible Uses Under R2 Zoning.....	5
3.3. Site History	6
3.4. NSW EPA Records	6
4. Environmental Setting	7
5. Previous Investigations	8
6. Areas of Environmental Concern.....	11
6.1. Summary of Known Contamination.....	12
6.2. Data Gaps	12
7. Conceptual Site Model.....	14
8. Remediation Design.....	15
8.1. Remediation Goals	15
8.2. Extent of Remediation Required	15
8.3. Remediation Options Assessment	16
8.4. Rationale for the Selected Remediation Option	17
9. Remediation Approach	18
9.1. Regulatory Approvals and Notifications	18
9.2. Planning and Site Establishment.....	18
9.3. Demolition of Structures and Hardstand	19
9.4. Excavation Requirements	19
9.5. Waste Classification and Offsite Disposal	20
9.6. Contingency Plan.....	21
10. Validation Program	22
10.1. Data Quality Objectives.....	22
10.2. Validation Assessment Criteria	25
10.3. Asbestos Air Monitoring.....	25
10.4. Validation Strategy	26
10.5. Imported Materials	28
10.6. Reporting	28
11. QA/QC Plan	29
11.1. Field Quality Assurance and Quality Control	29
11.2. Laboratory Quality Assurance and Quality Control	29

11.3.	QC Sampling Frequency	30
12.	Site Management	32
12.1.	Responsibilities	32
12.2.	Hours of Operation	33
12.3.	Site Security	33
12.4.	Site Induction	33
12.5.	Personal Protective Equipment	34
12.6.	Site Safety Signage	34
12.7.	Protection of services.....	34
12.8.	Environment and Work Health & Safety.....	35
12.9.	Traffic Control Plan	38
12.10.	Materials Tracking	38
13.	Emergency Procedures and Response	39
13.1.	Emergency Muster Point.....	40
14.	Conclusion.....	41
15.	Limitations	42

Figures

Appendix A: Imported Materials Protocol

Appendix B: Site Survey

1. Introduction

Progressive Risk Management (PRM) were engaged by Sydney Water Corporation (the client) to prepare a Remediation Action Plan (RAP) for part of Ashbury Reservoir, located at 165 – 169 Holden Street, Ashbury NSW (the site). The site location is provided in **Figure 1** and the site layout in **Figure 2**. A survey of the site area (provided by Sydney Water) is included in **Appendix B**.

The site is proposed to be rezoned from the current SP2 infrastructure (Water Supply) zoning to R2 low density residential zoning (R2) under Canterbury Local Environmental Plan (LEP) (2012). The permissible uses under R2 include (but are not limited to) various residential land uses, centre-based childcare facilities, open space/ recreation land uses and commercial land uses.

Site investigations completed between 2015 and 2019 identified wide-spread fill material containing elevated concentrations of heavy metals (copper, lead and zinc), total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH) and asbestos. Anthropogenic inclusions in the fill also exceeded the adopted aesthetic criteria for the most sensitive proposed future site use under R2 (i.e. residential with accessible soils and childcare centres).

With respect to soil quality/fill material, the data obtained during the previous investigations concluded that the site was not suitable for R2 zoning in its current condition.

1.1. Objectives

The objective of this RAP is to provide a framework for remediation to detail how the site can be made suitable the most sensitive proposed future site use under R2 (i.e. residential with accessible soils and childcare centres).

1.2. Scope of Works

In order to fulfil the project objectives, the scope of works for the RAP comprises the following:

- Outline the applicable legislation and planning approvals.
- Review of relevant previous investigations and other environmental reports.
- Evaluation of potential remediation options.
- Identify areas of the site that require remediation and validation; areas that require further characterisation and how validation of the site will be achieved.
- Development of an unexpected finds procedure for potential unexpected finds of contamination.
- Provision of remediation methodologies including procedures and policies which enable the remediation works to be conducted, whilst minimising risk to human health and the environment.
- Establish remediation goals and validation criteria that will enable the site to be considered suitable for the residential land use without posing an unacceptable risk to human health or the environment.
- Detail the validation sampling, reporting and quality requirements to be implemented to support the final validation of the site.
- Consideration of contingency plans to respond to site incidents associated with the remediation, which may pose risk to human health and the environment.

1.3. Background Reports

The following reports have been reviewed as part of the preparation of this RAP:

- ADE Consulting Group (2018) Geotechnical Investigation, 165-169 Holden Street, Ashbury NSW.
- JBS&G (2019) Site Audit Report 165-169 Holden Street, Ashbury NSW (reference: 54448/122753).
- Parsons Brinckerhoff (2015) Combined Stage 1 and 2 Detailed Site Investigation: Sydney Water Ashfield Reservoir, 165-169 Holden Street ref: 2201679B-CLM-RPT-1021 RevC (PB, 2015).
- Progressive Risk Management (2018) Data Gap Analysis: 165-169 Holden Street, Ashbury NSW ref: P033725.001 Rev4_Final (PRM, 2018).
- Progressive Risk Management (2019) Hazardous Ground Gas and Groundwater Assessment: 165-169 Holden Street, Ashbury NSW ref: P033725.004 (VerB_Fina) (PRM, 2019a).
- Progressive Risk Management (2019) Letter Report: Summary of Contamination Condition, Part of Ashbury Reservoir, 165-169 Holden Street, Ashbury NSW ref: P033725.005 (VerB_Final) (PRM, 2019b).

2. Regulatory Frameworks

This RAP is designed to assist in fulfilling the general obligation to ensure protection of the environment and the health and safety of workers, contractors and residents accessing the site now and in the future.

2.1. Relevant Guidance

Specific legislative requirements, guidelines, industry approved standards and Codes of Practice which were utilised in the preparation of this document are as follows:

National Framework:

- National Environment Protection Council (1999, Revised 2013) National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 – Schedule B1 Guideline on Investigation levels for Soil and Groundwater (NEPC, 2013).

State Legislation:

- Contaminated Land Management Act (CLM Act) 1997.
- Environmental Planning and Assessment Act (EP&A Act) 1979.
- Protection of the Environment Operations Act (POEO Act) 1997.
- Protection of the Environment Operations (Waste) Regulations (POEO) 2014.
- Waste Avoidance and Resource Recovery Act 2001.
- NSW Work Health and Safety Act 2011 and Regulation 2017.

State Environmental Planning Policies:

- State Environmental Planning Policy No. 55 – Remediation of Land (SEPP55).
- State Environmental Planning Policy (Infrastructure) 2007.

Guidelines:

- NSW EPA (1995) Sampling Design Guidelines.
- NSW EPA (2014) Waste Classification Guidelines.
- NSW EPA (2017) Guidelines for the NSW Site Auditor Scheme (3rd Edition).
- NSW EPA (2019) Draft Guidelines for the Assessment and Management of Hazardous Ground Gases.
- NSW EPA (2020) Consultants Reporting on Contaminated Land.
- WA Department of Health (2009) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.

Technical Guidance:

- CRC Care Technical Report No. 10, Health screening levels for petroleum hydrocarbons in soil and groundwater Summary, 2011 (CRC Care, 2011).
- CRC Care Technical Report No. 39, Risk-based management and remediation guidance for benzo(a)pyrene, 2017 (CRC Care, 2017).

Exemptions and Approvals:

- NSW EPA (2014) The Excavated Natural Material Order 2014, Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014.

Australian Standards:

- Australian Standards 4482.1 Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-Volatile and Semi-Volatile Substances 2005.

2.2. SEPP55 – Remediation of Land

In consideration of Category 1 or 2 remediation according to NSW *State Environmental Planning Policy Number 55 – Remediation of Land (SEPP55)*, the remediation works area is considered Category 2 (not requiring consent) as:

- The development is not Designated Development; State Significant Infrastructure; or State Significant Development under the EP&A Regulation.
- The remediation is not proposed on land identified as critical habitat under the Threatened Species Conservation Act 1995.
- Remediation work is not likely to have a significant effect on threatened species, populations, ecological communities or their habitats.
- The remediation is not proposed in an area or zone identified in a planning instrument as being an area of environmental significance such as scenic areas, wetlands.
- The remediation does not require consent under another SEPP or a regional environmental plan.
- The proposed remediation is consistent with Councils Contaminated Land Policy.

2.3. Compliance Requirements

- Soil disposed from the site must be classified in accordance with the NSW EPA (2014) Waste Classification Guidelines.
- Disturbance (including excavation) of any materials containing asbestos containing materials and removal of any asbestos from the site will need to be completed under an Asbestos Management Plan (AMP) prepared by a suitably qualified hygienist and Asbestos Removal Control Plan (ARCP) by an appropriately licensed Asbestos Removalist. Where greater than 10 m² of non-friable asbestos or any quantity of friable asbestos is to be removed, notification to SafeWork NSW will be required 5 days prior to removal.

3. Site Information

3.1. Site Details

A summary of site details is provided in **Table 1**.

Table 1: Site Details	
Detail:	Information:
Site Address:	165-169 Holden Street, Ashbury, NSW 2193
Lot Parcel:	Part Lot 1 DP115504 and part lot 1 DP911478.
Site Area	~2540 m ²
Local Council:	City of Canterbury Bankstown
Current Zoning:	SP2 – Water Supply System under Canterbury Local Environmental Plan (2012).
Current site use:	Unused portion of a former depot associated with the adjoining SWC Ashbury Reservoir.
Proposed use:	Proposed to be rezoned to R2 Low Density Residential land.
Surrounding land use	<p>The site is with within a predominantly residential land use area.</p> <p>North: Open space parkland and residential properties.</p> <p>South: Active SWC Reservoir (WS0003) and residential properties.</p> <p>East: Holden Street and residential properties.</p> <p>West: Open space parkland and residential properties further west.</p>

3.2. Permissible Uses Under R2 Zoning

The site is proposed to be rezoned from the current SP2 infrastructure (Water Supply) zoning to R2 low density residential zoning. Under Canterbury Local Environmental Plan (2012) the permissible uses under R2 low density residential zoning include:

Permitted without consent:

- Home occupations

Permitted with consent:

- Bed and breakfast accommodation
- Boarding houses
- Building or business identification signs
- Business premises
- Car parks
- Centre-based child-care facilities
- Community facilities
- Dual occupancies
- Dwelling houses
- Exhibition homes
- Flood mitigation works
- Group homes
- Health consulting rooms
- Home businesses
- Home industries
- Office premises

- Places of public worship
- Recreation areas
- Respite day care centres
- Restaurants or cafes
- Roads
- Semi-detached dwellings
- Shops
- Oyster, pond-based and tank-based aquaculture.

3.3. Site History

- The site has been owned by Sydney Water since 1909 and used as a reservoir (WS0003) since at least 1930.
- The site is located adjacent the former South Ashfield Brickworks which may be the source of the identified fill material onsite.
- Historic aerial photographs indicate there were a larger number of buildings within the investigation area which appear to be a combination of permanent structures (including those remaining onsite) and demountable structures.
- NSW WorkCover licencing information for 1995 – 1996 indicates that petroleum and diesel was stored in cabinets in storage warehouses along the western boundary. Records indicate that up to 200L of fuel was stored.

3.4. NSW EPA Records

A search of NSW EPA records was completed by PRM on 28 January 2021 to identify potential offsite sources of contamination. The search indicated the following:

- The site has not been notified under Section 60 of the Contaminated Land Management Act 1997 (1997).
- There were no records for the site or any properties within the suburb of Ashbury in relation to contaminated land under Section 58 of the CLM Act 1997.
- There were no records of current or former licenced activities under the Protection of the Environment Operations Act 1997 held for the site.

4. Environmental Setting

The site environmental setting is summarised in **Table 2**.

Table 2: Environmental Setting	
Soils Landscape:	A review of NSW Environment & Heritage soil and land information (eSPADE) indicates soils at the site are part of the Blacktown Soil Landscape. Soils of the Blacktown landscape are typically shallow to moderately deep red and brown podzolic soils on crests, upper slopes and well-drained areas, deep yellow podzolic soils and soloths on lower slopes and areas of poor drainage.
Acid Sulphate Soils:	The CSIRO Australian Soil Resource Information System (ASRIS) indicated that soils underlying the site are mapped as having a very low probability of occurrence of acid sulfate soils (ASS).
Geology and Soil:	<p>A review of the Sydney 1:100,000 Geological Map (Department of Mineral Resources, 1983, 1:100,000 Geological Series Sheet 9130 (Edition 1)) indicates that the site is underlain by Ashfield Shale, comprising black to dark-grey shale and laminate. NSW Soils Landscape map (1:100,000) shows the site is underlain by Blacktown Soils which are described as shallow to moderately deep red and brown podzolic soils.</p> <p>Fill material was encountered across the site during previous environmental assessments which was generally described as gravely clays with varying degrees of anthropogenic inclusions consisting of building rubble, minor asbestos, coal, fly ash and slag.</p>
Hydrogeology:	<p>A review of the licensed borehole register on the NSW Government Water Information website (http://allwaterdata.water.nsw.gov.au/water.stm) was completed by PB (2015) and indicated there were no registered groundwater bores within a 500 m radius of the site.</p> <p>Previous investigations encountered groundwater at the site at depths between 5.50 meters below ground level (mbgl) and 13.95 mbgl. The significant differential in groundwater elevation over a short distance identified between monitoring wells indicates the localised groundwater flow direction to be to the west of the site towards the former brickworks pit.</p>
Topography / Drainage:	<p>The site is situated at approximately 40-50 metres Australian Height Datum (mAHD) and slopes down to the south and west.</p> <p>Surface water is expected to flow to the south/southwest with little infiltration given hardstand across the site surface.</p>

5. Previous Investigations

A summary of previous environmental works completed at the sites is summarised in **Table 3**. See **Section 1.3** for complete report titles.

Table 3: Previous Environmental Works

Report:	Works completed:
PB (2015) Stage 1 and 2 DSI	<p>PB conducted a combined Stage 1 and 2 DSI of the then proposed divestment area. The scope included a combined desktop study and intrusive soil investigation (15 test pits to depths of between 0.8 and 3.0 meters below ground level (mBGL)) and analysis of selected soil samples. Results identified the following exceedances of adopted site assessment criteria (SAC):</p> <ul style="list-style-type: none"> Concentrations of benzo(a)pyrene TEQ (BaP TEQ) exceeded the adopted SAC for human health in four samples (TP3, TP9, TP12 & TP14). Concentrations of benzo(a)pyrene exceeded the adopted ecological SAC in seven samples (TP1, TP3, TP9, TP12-TP14). The concentration of lead in sample TP12 (0.5-0.6) exceeded the adopted human health SAC. The concentration of zinc in samples TP11(0-0.1) and TP12(0.5-0.6) exceeded the adopted ecological SAC, however, PB considered these elevations limited and that they did not pose a significant risk to onsite ecological receptors. Asbestos containing material (ACM) in the form of fibre cement sheeting fragments were observed at two locations (TP11 and TP14). The calculated concentration of ACM for TP11 exceeded the adopted health screening level for ACM in soil for residential land use. <p>PB recommended the appropriate management and removal of asbestos, lead and PAH impacts onsite in order to meet the criteria for residential land use in order for potential future divestment. Based on the preliminary findings it was estimated that approximately 1625 m³ of material was impacted by asbestos, based on the assumption that asbestos impacts were confined to the upper fill material across the entire site area (measured by PB to be 2708m² noting the different proposed divestment area at the time of the PB investigation). PB noted deeper excavation would be required around TP9 where benzo(a)pyrene impacts were reported within the underlying sandy fill materials. PB undertook a preliminary waste classification from the samples collected during the investigation and considered the fill material to be classified as special waste (asbestos) and general solid waste.</p>
PRM (2018) Data Gap Assessment	<p>PRM completed a targeted soil investigation as part of a Data Gap Assessment (DGA) with the following objectives:</p> <ul style="list-style-type: none"> Delineate previously identified areas of concern from PB (2015) at TP14, TP9 and TP3. Compare analytical data to waste classification criteria for soils which may require offsite disposal as part of the remediation works. Discuss any specific remediation considerations to inform the preparation of the RAP. <p>The scope of work included excavation of nine test pits from depths of 0.1-1.3 mBGL and analysis of representative soil samples. Additionally, TCLP analysis of select samples was undertaken in order to assist with preparation of an insitu waste classification. Based on the findings the following conclusions were made:</p> <ul style="list-style-type: none"> Review of the methodology used by PB (2015) to calculate site specific EILS concluded that additional assessment of physiochemical properties of site soils should be undertaken to improve the robustness of EILS. An adjustment to the SAC used by PB was undertaken for the assessment of benzo(a) pyrene risk to ecological receptors. Ecological screening levels provided in CRC Care <i>Technical Report No. 39, Risk-based management and remediation guidance for benzo(a)pyrene</i>, 2017 are based on more recent research and viewed as a more appropriate screening level for ecological risk. The concentrations of TRH exceeded ecological criteria at TP103 and TP107, and concentrations of PAHs exceeded for both ecological and human health criteria at TP103 and TP107. These are proposed to be removed during remediation. Copper and zinc exceedances identified at TP109 are also required to be removed, however, additional testing is recommended to be undertaken as part of the post-demolition testing.

Table 3: Previous Environmental Works

	<ul style="list-style-type: none"> No asbestos was identified during the DGA site works, or within any of the analysed soil samples. Comparison of data to waste classification criteria indicates the fill material is consistent with General Solid Waste (non-putrescible). This classification requires adoption of NSW EPA immobilisation approvals and subsequently is subject to disposal restrictions and excludes the previously identified asbestos impacted areas at TP11 and TP14. <p>With respect to soil quality/fill material, the data obtained during PB (2015) and PRM (2018) investigations, PRM concluded that the site was not suitable for low-density residential land use in its current condition.</p>
ADE (2018) Geotechnical Investigation	<p>ADE Consulting Group Pty Ltd (ADE) was commissioned by Sydney Water to undertake a geotechnical investigation for a proposed low rise residential project at site.</p> <p>The objectives of the investigation were to provide information on the subsurface soil profile and groundwater conditions, geotechnical design parameters for building foundations, soil aggressivity to steel and concrete, site preparation recommendations and discuss any other geotechnical findings relevant to the proposed development.</p> <p>There were five (5) boreholes drilled to a depth of about 3.45m below ground level (bgl), one (1) borehole was drilled to 4.95 m bgl and another one (1) borehole was drilled to 10.0 m bgl. Standard Penetration Tests (SPT) were carried out within boreholes to assess soil strength and consistency. Samples were collected during drilling to assist in classifying site soils and for laboratory testing.</p> <p>Subsurface conditions at the site predominantly consisted of FILL overlaying Residual soils and extremely to highly weathered SHALE Bedrock. The Fill soils encountered at the site were generally sandy CLAY with gravel.</p> <p>The site classification Class 'P' is considered appropriate at present condition. After removal/stripping of the existing pavement and any fill, the site could be reclassified as 'H1' (Highly reactive clay sites, which may experience high ground movement from moisture changes) based on Shrink-Swell tests performed on samples collected from the boreholes.</p> <p>Aggressivity testing was conducted on selected samples. The laboratory test results were compared against tables 6.4.2 (C) and 6.5.2 (C) from AS 2159 – 2009 for exposure classification. Chemical test results indicated mildly to non-aggressive ground conditions for concrete and non-aggressive to steel structural elements.</p>
PRM (2019a) HGG & Groundwater Assessment	<p>PRM were further engaged to conduct hazardous ground gas (HGG) and Groundwater assessment at the site. The objective of the assessment was to assess potential HGG and groundwater contamination at the site and assess the suitability of the site for proposed divestment for residential land use. The scope of works included drilling nine boreholes to various depths for installation of HGG monitoring wells, including three installed as dual-purpose wells for groundwater monitoring.</p> <p>A total of six HGG spot monitoring events over a two-month period were undertaken and supplemented with continuous HGG monitoring in selected monitoring wells over a four-week period using GasClams. Groundwater samples were collected over one monitoring event. The investigation concluded the following:</p> <ul style="list-style-type: none"> Laboratory analysis of groundwater samples identified concentrations of heavy metals above the adopted ecological SAC, however, the identified exceedances were considered likely to be indicative of background/natural water quality in the underlying shale aquifer. The Gas Screening Values (GSV) for the site were characterised as a Characteristic Gas Situation (CS) of CS1 (very low risk).
PRM (2019b) Summary of Contamination Condition	<p>PRM were engaged to prepare a summary of contamination conditions for the proposed divestment portion of land. The purpose of the letter report was to review the previous environmental reports that had been undertaken at the site, provide a summary of the current contamination conditions of the site and any conclusions and recommendations.</p> <p>The summary concluded the following in regard to contamination at the site:</p> <ul style="list-style-type: none"> With respect to site soils, the data obtained during the PB (2015) and PRM (2018) investigations indicate that the site is not suitable for low density residential land use in its current condition. With respect to HGG and groundwater quality, the site is considered suitable for the proposed divestment for residential land use with accessible garden. <p>The summary concluded that the site is not suitable for residential land use in its current condition without remediation. Excavation and offsite disposal of unsuitable materials followed by site validation is considered the most suitable remediation option.</p>

Table 3: Previous Environmental Works

	<p>Additionally, the site is considered to present a risk of unexpected finds relating to asbestos, in particular relating to building rubble impacted fill material towards the southwest and western boundary of the site. This should be managed during the remediation works by visual observations of the environmental consultant during excavation in addition to validation sampling following removal.</p> <p>PRM recommended that a RAP be prepared to assess remediation options for the site and outline the remediation requirements including estimated disposal volumes for each waste stream. Alternatively, the identified contamination in soils could be notified to potential purchasers prior to sale and managed/remediated prior to and/or during site development works.</p>
JBS&G Site Audit Statement (2019)	<p>Andrew Lau of JBS&G Australia Pty Ltd (JBS&G) was engaged by Sydney Water Corporation on 23 November 2017 to conduct a site audit for the site.</p> <p>The objectives of the site audit were to:</p> <p>Independently review the environmental investigation reports as requested by the client; and</p> <p>Prepare a SAR and issue a SAS, providing an opinion on the appropriateness of the investigation to determine the nature and extent of contamination at the site.</p> <p>The audit included review of previous works completed by PB (2015) and PRM (2018) and PRM (2019).</p> <p>The findings of the site audit concluded:</p> <ul style="list-style-type: none"> • The soil investigations identified concentrations of contaminants of potential concern (copper, zinc, TRH C16-34, benzo(a)pyrene, benzo(a)pyrene TEQ and total PAHs) in fill soils above the adopted site assessment criteria, which require remediation or management for residential with accessible soils/gardens land use. • While not identified in the recent site investigations (PRM 2019a and PRM 2019b), asbestos has previously been identified at the site as ACM fragments. There is potential for additional asbestos to be present in fill material at the site and consideration should be given to the presence of asbestos in any remediation and/or redevelopment plans for the site. • While assessment of groundwater at the site identified concentrations of heavy metals above the adopted site assessment criteria, the detected concentrations were attributed to background groundwater quality. There are no complete source pathway receptor linkages identified. • Hazardous ground gases at the site have been determined to pose very low risk and as such, no further action is required. • Consideration of aesthetic issues including staining, odours, anthropogenic contaminants and presence of asbestos has been adequately addressed in the assessment of soils at the site. • There is no evidence of migration of contaminants from the site which is likely to result in any unacceptable risks to surrounding human or ecological receptors. • The site investigation works (PRM 2019a and PRM 2019b) are considered to have met the requirements of the Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd Edition) (EPA 2017). • The nature and extent of contamination of soil, groundwater and ground gases at the site were considered to have been adequately assessed.

6. Areas of Environmental Concern

Areas of Environmental Concern (AEC) and contaminants of potential concern (CoPC) as described in PB (2015) and PRM (2018) are summarised below. The primary source of site contamination identified is associated with fill material of variable type and extent across the entire site. The fill material was observed to:

- Vary in depth between sample locations across the site, and unknown depths beneath existing building footprints.
- Contain varied anthropogenic materials including building rubble and asbestos.
- Contain concentrations of PAH, TRH, heavy metals (lead, zinc and copper) and asbestos which exceeded residential land use investigation criteria.
- Have aesthetic considerations which are unsuitable for proposed residential land use.

A summary of exceedances from PB (2015) and PRM (2018) is detailed in **Table 4**.

Analyte	Sampling location	Results
Heavy Metals	TP12_0.5 (PB, 2015)	The concentration of lead (490 mg/kg) exceeded the adopted health SAC and the concentration of zinc (2400 mg/kg) exceeded the adopted ecological site assessment criteria (SAC).
	TP11_0-0.1 (PB, 2015)	The concentration of zinc in sample (400mg/kg) exceeded the ecological SAC adopted by PB and the revised ecological SAC of 33mg/kg adopted by PRM.
	TP109_0-0.1 (PRM, 2018)	The concentration of copper (240 mg/kg) and zinc (450 mg/kg) exceeded the adopted ecological SAC.
PAH	TP03_0.0 (PB, 2015)	The concentration of BaP TEQ (4.1 mg/kg) exceeded the adopted health SAC (3 mg/kg) and The concentration of BaP (3 mg/kg) exceeded the ecological SAC (0.7 mg/kg) adopted by PB, however, was below the revised ecological SAC of 33mg/kg adopted by PRM.
	TP12_0.5 (PB, 2015)	The concentration of BaP TEQ (4.9 mg/kg) exceeded the adopted health SAC (3mg/kg). The concentration of BaP (3.6mg/kg) exceeded the ecological SAC (0.7mg/kg) adopted by PB, however, was below the revised ecological SAC of 33mg/kg adopted by PRM.
	TP01_0.05 (PB, 2015)	The concentration of BaP (1.1 mg/kg) exceeded the ecological SAC (0.7 mg/kg) adopted by PB, however, was below the revised ecological SAC of 33mg/kg adopted by PRM.
	TP13_0.05 (PB, 2015)	The concentration of BaP (1.4 mg/kg) exceeded the ecological SAC (0.7 mg/kg) adopted by PB, however, was below the revised ecological SAC of 33mg/kg adopted by PRM.
	TP103_0.3-0.4 (PRM, 2018)	The concentration of BaP TEQ (79 mg/kg) and total PAH (790 mg/kg) exceeded the adopted health SAC (3mg/kg and 200mg/kg), and the concentration of BaP (55mg/kg) exceeded the adopted ecological SAC (33mg/kg).
	TP103_0.6-0.7 (PRM, 2018)	The concentration of BaP TEQ (3.5 mg/kg) exceeded the adopted health SAC (3mg/kg).
	TP107_0.1-0.2 (PRM, 2018)	The concentration of BaP TEQ (11mg/kg) exceeded the adopted health criteria (3mg/kg).
TRH	TP107_0.1-0.2 (PRM, 2018)	The concentration of TRH C16-C34 (320 mg/kg) exceeded the adopted ecological SAC (300mg/kg (coarse-grained)).
	TP103_0.3-0.4 (PRM, 2018)	The concentration of TRH C16-C34 (1500 mg/kg) exceeded the adopted ecological SAC (1300mg/kg(fine-grained) and 300mg/kg (coarse-grained)).
Asbestos	TP11_0.0-0.1 (PB, 2015)	The concentration of ACM (0.0107%w/w) exceeded the adopted HSL for low density residential (0.01%w/w).

Table 4: Summary of Site Exceedances

Analyte	Sampling location	Results
		The presence of ACM in surface soils exceeded the criterion of 'no asbestos in surface soils.

The location of previous investigation location and soil exceedances are provided in **Figure 3**.

6.1. Summary of Known Contamination

Above listed AECs and CoPC requiring remediation are summarised in **Table 5** and are delineated in **Figure 4**. The indicative extents of contamination have been estimated to the nearest 'clean' test pit, or site boundary.

Table 5: Summary of Know Contamination

Area	Description	CoPC	Comments
Area 1 Encompasses the western remediation area	Western portion surrounding existing building.	BaP TEQ, total PAH, TRH C16-C34, lead, zinc, copper, ACM.	PB intrusive works identified exceedances of SAC at TP11 and TP12 (see Table 4). PRM intrusive works identified exceedances of SAC at TP109 and TP103. No previous sampling undertaken by PB or PRM below site buildings in the west of the site (See Table 6 for more information).
Area 2 Encompasses the eastern remediation area	North eastern portion of site.	BaP TEQ, TRH C16-C34.	PB intrusive works identified exceedances of SAC at TP03, and PRM intrusive works identified exceedances of SAC at TP107.

6.2. Data Gaps

Based on a review of the current site characterisation data, the following data gaps have been identified and are summarised in **Table 6**. The data gaps will be required to be addressed during site development/remediation works following demolition of existing site structures.

Table 6: Summary of Data Gaps

Item	Description
Potential soil contamination under existing building footprints.	Given the age of the buildings and the historical storage of fuels. COPC may be present beneath existing site buildings. Fill material has been identified at testing locations directly adjacent to building footprints (e.g TP12) indicating a high likelihood of fill material to be present beneath buildings.
The full extent of fill material is not well characterised and likely to vary across the site.	Due to the presence of concrete hardstand and buildings across the site footprint during investigation works, intrusive works (i.e test pits) have been limited to accessible non-hardstand areas (e.g garden beds/grassed areas) and those hardstand areas able to be accessed without significant disturbance of the hardstand. As such, the full extent of fill material present across the site may increase based on visual observations during remediation works, particularly below building footprints where no investigation locations have been completed to date.

Table 6: Summary of Data Gaps

Item	Description
Waste Classification of fill material	Preliminary insitu waste classification indicates that the fill material is consistent with General Solid Waste (GSW) (non-putrescible), excluding the previously identified asbestos impacted areas at TP11 which will require offsite disposal as GSW with Special Waste (asbestos). However, additional sampling and analysis is required to confirm this preliminary classification as it is possible that localised areas of contamination may exist in subsurface soils beneath existing site building footprints or areas of hardstand not previously assessed

7. Conceptual Site Model

The following Conceptual Site Model (CSM) describes the known and potential complete contamination source-pathway-receptor (SPR) linkages.

Table 7: Conceptual Site Model

Source	Wide-spread fill material containing elevated concentrations of heavy metals (copper, lead and zinc), TRH, PAHs and asbestos.
Contaminants of potential concern (CoPC)	<ul style="list-style-type: none"> • Heavy metals • TRH • PAH • Asbestos
Exposure Pathway	<ul style="list-style-type: none"> • Direct contact with contaminated media • Ingestion/inhalation of soil derived dust and/or fibres.
Potential Receptors	<ul style="list-style-type: none"> • Future contractors during re-development works. • Future residents or site users/occupants. • Onsite flora and fauna
SPR Linkages	Pathways have the potential to become complete without further management or remediation and during future development works or future intrusive works by contractors/maintenance staff.
Data Gaps	<ul style="list-style-type: none"> • See Table 6.

8. Remediation Design

8.1. Remediation Goals

The remediation goals include:

- Removal, to the extent practicable, unacceptable risks to human health and the environment from the identified CoPC rendering the site suitable for the most sensitive use under R2 zoning (i.e. residential with accessible soils and childcare centres). low density residential land use.
- Preventing, to the extent practicable, any potential contamination of the surrounding environment.
- Addressing unexpected finds that may be encountered during site works.
- Validation of the site in accordance with NSW EPA approved guidelines for future residential land use.

8.2. Extent of Remediation Required

8.2.1. General

Based on the results of the previous intrusive investigations completed at the site, remediation and validation will be required in the following areas for the site to be considered suitable for future residential land use. Remediation extents have been estimated to the nearest 'clean' test pit, or site boundary. Additional validation will be required across areas not previously sampled (i.e beneath building footprints) or portions of the site not being remediated (i.e within residual fill remaining between the two remediation areas) in order to confirm suitability of the soils to remain on site.

Two remediation areas have been identified and are summarised in **Table 8** and are depicted on **Figure 4**.

Table 8: Remediation Areas	
Remediation Area	Summary
RA1	<p>Material description: Fill: gravelly clay, grey/brown/orange, with foreign materials; brick, concrete, minor ash, charcoal and slag.</p> <p>Known contamination: Concentrations of BaP, BaP TEQ, total PAH, TRH C16-C34, lead, zinc and copper SAC, TP12, TP109 and TP103. Asbestos was identified in shallow soils (0-0.1mBGL) at TP11.</p> <p>Approximate area: 832 m² (note this includes soils within the area below the existing building in the west of the site which are assumed to be contaminated).</p> <p>Anticipated depth of remediation: The extent of contaminated fill has been identified across RA1 at various depths. Generally, the fill profile within RA1 is shallow in the north (between 0.3 and 0.6mBGL) becoming deeper near TP103 (~0.8mBGL)</p> <p>Indicative volume of material: Based on an estimate average depth of 0.6mBGL across the entire remediation area, an approximate excavation volume of 500m³ has been estimated for RA1, however, it is noted that these volumes may increase during remediation based on validation results and visual observations.</p>
RA2	<p>Material description: Fill: silty or gravelly clay, brown or red-brown, minor concrete and brick, or silty sand (topsoil) dark brown.</p> <p>Known contamination: Concentrations of BaP TEQ and TRH C16-C34 exceeded SAC at TP03 and TP107.</p> <p>Approximate area: 615m²</p> <p>Anticipated depth of remediation: 0.3mBGL.</p> <p>Indicative volume of material: Based on an estimate average depth of 0.3mBGL across the entire remediation area, an approximate excavation volume of</p>

Table 8: Remediation Areas

Remediation Area	Summary
	185 m ³ has been estimated for RA2, however, it is noted that these volumes may increase during remediation based on validation results and visual observations.

8.2.2. Asbestos Impacted Materials

Within RA1, ACM was identified at one location in the north (TP11). The ACM was identified as fibre cement sheeting fragments in shallow soils (0-0.1mBGL). The fill in the vicinity of TP11 location noted inclusions building rubble including concrete fragments, minor ash and slag and ACM. Suspected ACM was not identified within the fill layer in other investigation locations, however, the full extent of ACM impacted fill material present across the site may increase based on visual observations during remediation works, particularly below some hardstand areas and building footprints where no investigation locations have been completed to date. The location of known ACM impacted fill at PB (2015) investigation location TP11 is depicted on **Figure 3**.

8.2.3. Additional Waste Classification Requirements

Fill soils located beneath the building footprints require sampling and analysis in order to provide a waste classification to support their offsite disposal. The additional sampling may be undertaken insitu (via test pitting) or exsitu following excavation and stockpiling. Soils excavated from beneath building footprints for exsitu testing are to be temporarily stockpiled on hardstands or plastic and sampled at the density as provided in Industrial Waste Resource Guidelines 702 (Soil Sampling) i.e minim of 3 samples up to 25m³ then 1:25m³ thereafter.

Waste Classification samples are to be analysed for a range of contaminants including metals, PAH, TRH/BTEX and Asbestos.

In consideration of the ash/coal product noted in the site fill, the waste classification results will be required to be compared to both NSW EPA (2014) and the immobilisation approvals used by the EPA under the Protection of the Environment Operations (Waste) Regulation 2014. Specifically, approval 1999/05 relating to Ash, Ash-contaminated natural excavated materials or coal-contaminated natural excavated material is considered applicable.

8.3. Remediation Options Assessment

The following is a list of common remediation strategies used on contaminated sites:

- Defer remediation of the soil, restrict access to the site and leave site undisturbed.
- Onsite treatment of the soil so the contaminants are either destroyed or the associated hazards are reduced to an acceptable level.
- Excavation and offsite treatment of the soil so the contaminants are either destroyed or the associated hazards are reduced to an acceptable level, after which the soil is returned to the site.
- Excavation and disposal of all contaminated soil from the site to an approved landfill.
- Consolidation and isolation of the contaminated soil by onsite containment within a suitably designed barrier and on-going management.

A summary of the remediation options assessment undertaken as part of the development of this RAP is included in **Table 9**.

Table 9: Remediation Options Assessment

Strategy	Discussion
Defer remediation	Rejected – does not achieve the objective of making the site suitable for the most conservative use under R2 zoning.
On-site treatment	Rejected – not a viable option for all contamination types encountered (i.e. metals, asbestos) and the cost of establishing onsite remediation is not viable.
Off-site treatment	Rejected – not a viable option as only small areas of localised material are contaminated; it is not considered financially appropriate to transport the soils for offsite treatment and not a viable option for all contamination types encountered.
On site capping	Rejected – not considered suitable or practicable for the most conservative use under R2 zoning.
Partial excavation/disposal and on-site containment	Rejected – not considered suitable or practicable for the most conservative use under R2 zoning.
Excavation/offsite disposal	Selected: Given the contamination encountered and considering the remediation objectives, excavation and offsite disposal are considered cost-effective, practical and time efficient method.

8.4. Rationale for the Selected Remediation Option

Excavation and offsite disposal of the identified fill materials in RA1 and RA2 at the site is considered to be the most appropriate remediation option in order to meet the remediation objective of making the site suitable for the most sensitive proposed future site use under R2 (i.e. residential with accessible soils and childcare centres).

However, if the site was proposed to be redeveloped to a less sensitive use permissible under R2, alternate remediation options may be appropriate for the site. Any such alternative remediation options/approach would be required to be detailed in a new RAP approved by Council and a NSW EPA accredited site auditor.

9. Remediation Approach

Various steps are required to meet the stated remediation objectives and to ensure the site is suitable for the most sensitive proposed future site use under R2 (i.e. residential with accessible soils and childcare centres).

9.1. Regulatory Approvals and Notifications

For works involving the removal of asbestos impacted fill, notification to start works will be required to SafeWork NSW. The notification is to be undertaken by the Principal Contractor (PC).

Where required, the site owner is responsible for notifying Council and local residents of the of the commencement (and completion) of the proposed remediation works, including scope and estimated program.

9.2. Planning and Site Establishment

9.2.1. Project Safety and Environmental Management

Prior to the commencement of site works, the PC shall prepare a Project Safety and Environmental Management Plan (PSEMP). This plan will include specific details and work method statements describing all environmental and work health and safety (WH&S) controls to be implemented and followed during the remediation works.

The PSEMP is to specify requirements for all site personnel and procedures to minimise disturbance and impacts to surrounding areas. The following critical elements are required to be included in the PSEMP:

- Measures and procedures to minimise the potential for site workers, neighbours and/or member of the public, visitors, or neighbours to be exposed to contamination during the remedial works.
- Material tracking and imported material protocols.
- Measures and procedures to minimise impacts to any sensitive ecological communities.
- All site staff, contractors and sub-contractors are to complete site-specific safety inductions and made aware of the contamination type expected through the remediation.

See **Section 12** for more information.

9.2.2. Asbestos Removal Control Plan

For works involving the removal of asbestos impacted fill in RA1, the PC is to prepare an Asbestos Removal Control Plan (ARCP) for the remedial works prior to commencement. An ARCP is prepared to ensure workers and other persons are not at risk from exposure to asbestos fibres during the asbestos removal. The ARCP must include details of how the asbestos removal will be carried out including method, tools, equipment and PPE and details of the asbestos to be removed.

9.2.3. Site Establishment

Site establishment tasks shall include, but may not be limited to:

- Mobilise plant and equipment, and installation of health and safety, and environmental controls outlined in the PSEMP.

- Establishment of pedestrian and vehicle traffic routes and controls. Consideration should be given as to whether a footpath access/closure permit may be required.
- Preparation and establishment of stormwater diversions and sedimentation controls.
- Removal of vegetation (grass/ weeds/ shrubs).
- Where required, establishment of preliminary ARCP requirements including (but not limited to):
 - Appropriate asbestos and construction signage should be implemented on the exterior of the remediation area at visible locations to site users and the public to attempt to prevent inadvertent access.
 - Asbestos decontamination facilities for personnel and plant (if required in the ARCP) should be implemented within the remedial work area, which should include a mobile personal decontamination unit and the establishment of a geofabric lined pad for the washing of plant and trucks.
 - Installation of air monitoring equipment by the project hygienist.
 - Installation of dust suppression equipment as necessary

The PC shall endeavour to protect any property and infrastructure at the site and mitigate impacts to the surrounding environment to the extent practicable, throughout the works.

9.3. Demolition of Structures and Hardstand

Existing building and hardstand will be required to be demolished and disposed offsite to allow for the excavation of underlying fill. Demolition of structures is to be undertaken in accordance with relevant industry standards, including the management of potential hazardous building materials (HBM). The offsite disposal of site structures are required to be documented by the PC and disposal tracking information provided the Environmental Consultant for including in the Validation Report (see **Section 10.6**).

Additional validation sampling is required subsequent to demolition and disposal of site structures to address data gaps as identified in **Section 6.2**. Validation sampling requirements beneath building footprints are described in **Section 10.4**.

9.4. Excavation Requirements

The estimated extent of each RA and indicative disposal are detailed in **Table 10**. Volume estimates have been provided for each RA, with the extent of each RA estimated to the nearest 'clean' test pit location or site boundary. However, it is noted that these volumes may increase during remediation based on validation results and visual observations.

Table 10: Volume Estimate Summary		
Remediation Area	Estimated Volume	CoPC
RA1	Area of approximately 832m ² to anticipated average depth of 0.6mBGL. Total anticipated volume 500m ³ .	BaP, BaP TEQ, TRH C16-C34, lead, zinc, copper and asbestos.
RA2	Area of approximately 615m ² to an anticipated average depth of 0.3mBGL. Total anticipated volume 185m ³ .	BaP TEQ, TRH C16-C34.

9.5. Waste Classification and Offsite Disposal

Preliminary insitu Waste Classification undertaken by PB (2015) and PRM (2018) indicates that the fill encountered at the site generally meets the classification of General Solid Waste (non-putrescible), with the following exceptions:

- The area of ACM impact identified by PB (2015) at TP11. A classification of Special Waste (Asbestos) will apply to any asbestos impacted soils. The extent of ACM impacted fill needs to be confirmed via observations during the remedial works and will need to be excavated and disposed of separately.
- Analytical results for TP103_0.3 returned concentrations of B(a)P and total PAH exceeding both restricted and hazardous waste criteria. In consideration of the ash/coal product noted in the fill during test pitting, the results for TP103_0.3 were also compared to the immobilisation approvals used by the EPA under the Protection of the Environment Operations (Waste) Regulation 2014. Specifically, approval 1999/05 relating to Ash, Ash-contaminated natural excavated materials or coal-contaminated natural excavated material is considered applicable. The immobilisation approval allows for material to be classified according to the leachable concentration (TCLP) value of B(a)P alone. It is noted that disposal restrictions apply for this material which would need to be considered as outlined in 1999/05.
- Fill material located under B1 which have not been assessed.

The fill soils are to be assessed in accordance with the following:

- NSW EPA (2014) Waste Classification Guidelines.
- NSW EPA *General Approval of the Immobilisation of Contaminants in Waste* (Approval Number 1999/05) which allows ash contaminated natural materials to be assessed on their TCLP concentrations alone (not total concentrations) with respect to benzo(a)pyrene and total PAHs may be applicable.

All transport works shall be carried out in a manner that minimises disturbance and impacts to the surrounding areas. The material may need to be registered with the NSW EPA Waste Locate tracking system to comply with the legislation regarding the transporting/ movement of asbestos waste or waste containing asbestos.

Transport of classified waste to a facility that is appropriately licenced to accept the waste must be undertaken in accordance with the NSW Protection of the Environment Operations (Waste) Regulation.

9.6. Contingency Plan

9.6.1. General

Potential events that may arise during or following the remediation and actions that will be undertaken if such unexpected conditions occur are summarised in **Table 11**.

Table 11: Contingency Items	
Event	Action
Development plans change/decided	Review the applicability of this RAP to the revised development plans.
Contamination is found to extend below proposed remediation depth or extent	Review of the remediation strategy will be undertaken. Possible responses could include further excavation, risk assessment, further delineation sampling / monitoring.
Soil classified as hazardous waste is identified	Hazardous soil would need to be treated prior to being disposed to landfill. Such pre-treatment could either occur onsite or could occur at a suitably licensed offsite treatment facility. In the event hazardous waste was encountered and onsite pre-treatment was proposed then an addendum to this RAP would be prepared.
Contamination is found to have migrated offsite	In the event that contamination was encountered extending beyond the site boundary initially the extent and significance would be assessed along with the need for further remediation / management through monitoring and potentially fate and transport assessment / risk assessment.
Validation samples fail criteria.	Excavate additional soil and revalidate that area or assess other potential remediation or validation options.
Underground cables or pipes containing unknown product	Stop work temporarily, identify product / substance (through sampling), determine extent and origin of subject pipe, develop remediation and or material handling protocol dependant on product or substance.

9.6.2. Unexpected finds Protocol

If during remediation works, material is encountered which appears to be potentially contaminated and appears to be different from the contamination described in this RAP, or point sources of contamination such as underground storage tanks which were not expected to be present are encountered, the following procedures should apply:

- Any suspicious material/soil which has been excavated should be stockpiled on bunded, strong, impermeable plastic sheeting, protected from erosion and all seepage retained.
- Excavation works at that part of the site where the suspicious material (soil) was encountered should cease until inspection is carried out and documented by the environmental consultant.
- Based on visual inspection, the environmental consultant should provide interim advice on construction health and safety, soil storage and soil disposal to allow construction to proceed if possible.
- Based on sampling and analysis of the material, the environmental consultant should provide final advice, based on comparison of the laboratory test results to suitable criteria relating to human health, potential environmental impacts and waste disposal.

"Suspicious" material may include underground storage tanks, odorous material, fibrous material, brightly coloured material, tarry or ashy material, drums, or metal / plastic chemical containers etc.

Any unexpected events which may affect the outcome of the remediation should be notified to the appointed Environmental Consultant. At that time potential actions to address the unexpected event will be assessed and presented.

10. Validation Program

10.1. Data Quality Objectives

The data quality objectives (DQO) process is a systematic planning tool based on the scientific method for establishing criteria for data quality and for developing data collection designs. The DQO process is a seven-step planning approach endorsed by the NSW EPA as described in Schedule B2 of NEPC 2013.

DQOs are statements that define the confidence required in conclusions drawn for data produced for a project, and which must be set to realistically define and measure the quality of data needed.

The DQO process is intended to develop sampling designs for data collection activities that support decision making and allow the relevant parties to improve the effectiveness, efficiency and defensibility of a decision in a resource and cost-effective manner.

DQOs have been developed for this project and are discussed in the following sections.

Step 1: State/Define the problem

To provide an approach to manage the preferred remediation strategy of excavation and offsite disposal to ensure that the site is suitable for the proposed land use (all land uses under R2 low density residential zoning).

Validation of the remediation works is required to demonstrate that identified risks have been adequately managed or removed and that the site is suitable for the proposed residential land use.

In addition, due to the likelihood of localised unexpected finds being identified during remediation works (i.e. where existing site structures exist and have not been investigated), a detailed approach to address unexpected finds is also required.

Step 2: Identify the decision

The key decisions to be made are as follows:

- Has the fill material been suitably removed (to the extent practicable) and validated?
- Are there any remaining unacceptable risks to onsite or offsite receptors?
- Are there any aesthetic impacts remaining in the remediation area?
- Where materials are removed, have the materials been assessed for waste classification to all allow for offsite disposal to a suitably licensed landfill facility?
- Is any further management required?

Step 3: Identify inputs to the decision

The information inputs required for the project include:

- Previous environmental reports and existing environmental data.
- Conceptual site model.
- Physical observations during remediation works.
- Results of chemical analysis of validation samples collected.
- Material removal and recycling/disposal documentation.
- Adopted assessment criteria from relevant NSW EPA approved guidelines.
- Assessment of the suitability of the data for the purposes of environmental assessment through application of data quality indicators (DQIs), namely precision, accuracy, representativeness, completeness and comparability (PARCC) parameters.

Step 4: Define the boundaries of the study

The extent of the study boundary is as follows:

- The lateral boundaries of the study are as defined by Sydney Water and outlined in **Figure 2**.
- The vertical extent of the study is varied and is defined by the depth to natural clay soils.
- The temporal extent of the study is the date of inspections and validation sampling.

Step 5: Develop a decision rule

Laboratory analytical data will be assessed against NSW EPA endorsed criteria. The decision rules adopted to answer the decisions outlined are summarised in **Table 12**.

Table 12: Summary of Decision Rules		
No.	Decision	Rule
1	Do chemical concentrations in underlying soils pose a potential risk to human health or to the environment?	<p>All soil data will be compared against NSW EPA endorsed criteria applicable to residential land use (with access to garden/soil). If required, statistical analysis will also be undertaken to facilitate site decision.</p> <p>The following rules will be applied for assessment of human health and environmental risk:</p> <ul style="list-style-type: none"> • If the results are less than the adopted site criteria, then the decision is no. • If the results are greater than the adopted guideline and the statistical analysis demonstrates that the upper 95% confidence limit on the average concentration falls below the adopted site criteria; with no single analyte concentration exceeding 250% of the adopted site criteria; and the standard deviation of the results being less than 50% of the site criteria then the decision is no. • If the statistical soil results do not meet the adopted criteria, then the decision is yes, and further assessment will be required to determine the extent of potential risk and suitable remediation actions.
2	Has material been suitably classified for the purposes of offsite disposal to licensed landfill facility?	<p>If the materials have been classified in accordance with NSW EPA (2014) Waste Classification and NSW EPA <i>General Approval of the Immobilisation of Contaminants in Waste</i> (Approval Number 1999/05), then the decision is yes.</p>

Step 6: Specify limits on decision errors

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

Specific limits for this project have been adopted in accordance with the appropriate guidance from the NSW EPA, NEPC (2013), appropriate indicators of data quality (used to assess QC) and Standard Operating Procedures (SOPs) for field sampling and handling.

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined Data Quality Indicators (DQIs) for completeness, comparability, representativeness, precision and accuracy. The acceptable limit on decision error is 95% compliance with DQIs. The pre-determined DQIs established for the project are discussed below in relation to precision, accuracy, representativeness, comparability and completeness (PARCC parameters), as follows:

- **Precision:** Measures the reproducibility of measurements under a given set of conditions. Field precision will be monitored through the use of PRMs SOPs and ensuring that these are complied with throughout the sampling event(s). Suitable criteria and/or performance indicators for assessment of laboratory precision include

performance of intra-laboratory and inter-laboratory duplicate sample sets through calculation of Relative Percentage Differences (RPD).

- **Accuracy:** Measures the bias in a measurement system. Accuracy in the field activities will be monitored through the use of SOPs and ensuring that these are complied with throughout the sampling event(s). The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness:** Expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to validate the site to the required accuracy. To ensure the data produced by the laboratory is representative of conditions encountered in the field, the following steps will be taken:
 - Blank samples will be run at the laboratory in parallel with field samples to confirm there are no unacceptable instances of laboratory artefacts.
 - Review of RPD values for field and laboratory duplicates to provide an indication that the samples are generally homogeneous, with no unacceptable instances of significant sample matrix heterogeneities.
 - The appropriateness of collection methodologies, handling, storage and preservation techniques will be assessed to ensure/confirm there was minimal opportunity for sample interference or degradation (i.e. volatile loss during transport due to incorrect preservation/transport methods/sampling technique for example).
- **Comparability:** Expresses the confidence with which one data set can be compared with another. In the event that the reported data sets are comprised of data sets from separate sampling events, issues of comparability between data sets are reduced through adherence to the same SOPs on each data gathering activity. In addition, the data will be collected by experienced samplers and NATA accredited laboratory methodologies will be employed in all laboratories.
- **Completeness:** Is defined as the percentage of measurements made which are judged to be valid measurements. In assessing the completeness of the field data the following is considered:
 - All critical locations and depths sampled.
 - Representative samples collected.
 - An appropriately experienced sampling team is engaged in the investigation program.

In validating the degree of completeness of the analytical data sets acquired during the program the following is considered:

- Whether SOPs for sampling protocols have been adhered to
- Copies of all project chain of custody (COC) documentation are reviewed and presented.

It can therefore be considered whether the proportion of "useable data" generated in the data collection activities is sufficient for the purposes of the land use assessment.

The measures/criteria employed to enable review of these parameters are detailed in **QA/QC** presented in **Section 11**.

Step 7: Optimise the design for obtaining the data

The remediation program presented is aimed at obtaining the necessary data to allow the identified decisions in Step 2 to be made.

10.2. Validation Assessment Criteria

Site investigation criteria provided in NEPM 2013 are not intended to be used as clean-up or remediation criteria. However, the following criteria derived from NEPM (2013) and CRC Care (2011) guidelines are applicable based on the proposed divestment to residential land use. The validation assessment criteria (VAC) are summarised in **Table 13**.

Table 13: Validation Criteria	
VAC	Applicability
Health Investigation Level (HIL) A: residential land use with accessible soil.	HIL A has been selected to assess suitability for the sites zoning of R2 – low density residential.
Health Screening Level (HSL) A: low – high density residential.	In accordance with NEPC (2013) methodology, HSL for petroleum hydrocarbon compounds have been adopted for coarse grain soils as a conservative measure due to the mixed soil profiles identified onsite
Ecological Investigation Levels and Ecological Screening Levels (EIL/ESL).	EILs and ESLs for urban residential and public open space, and site specific ILs as per PRM (2018) have been selected.
Management Limits (ML)	In addition to the HIL/HSLs NEPM also includes 'Management Limits' that are designed to avoid or minimise the potential effects of petroleum hydrocarbons such as formation of observable light non-aqueous phase liquids (LNAPL), fire and explosive hazards and effects on buried infrastructure e.g. penetration of, or damage to, in-ground services by hydrocarbons. The application of the management limits requires consideration of the depth of building basements and services and depth to groundwater.
Aesthetic Impact	<p>As per NEPM 2013 the aesthetic condition of a site is required to be taken into account. An assessment of site aesthetics requires consideration of the natural state of soil on any given site, and a comparison between it and the soil encountered during investigation works.</p> <p>NEPM 2013 advises that:</p> <p><i>There are no specific numeric aesthetic guidelines, however site assessment requires balanced consideration of the quantity, type and distribution of foreign materials or odours in relation to the specific land use and it's sensitivity. For example, higher expectations for soil quality would apply to residential properties with gardens compared with industrial settings'.</i></p> <p>Given these NEPM (2013) requirements, the aesthetic criteria of relevance to the site are considered to be:</p> <ul style="list-style-type: none"> • No malodorous nature (odour). • Significant discolouration (staining). • Significant volumes of various types of anthropogenic contaminants (e.g. demolition rubble) on the site surface.

10.3. Asbestos Air Monitoring

Due to the presence of asbestos contamination at TP11 of RA1, and the proximity of the site to neighbouring residents, asbestos fibre air monitoring (AAM) is advised for all excavation work in the vicinity of TP11 in RA1. The results of the monitoring should be provided by the environmental consultant to the principal contractor each workday to confirm that control measures are adequate prior to works commencing the next day. The results of the air monitoring will be included in the Validation Report.

10.3.1. Exposure Trigger Levels

Trigger levels for airborne asbestos fibres have been adopted from the Code of Practice *How to Safely Remove Asbestos in the Workplace have been developed for asbestos*.

AAM results should be obtained within 24 hours of sample collection. While this precludes "real time" monitoring, inspections will be made by the LAA during excavation and loading

works and, if there are any visible dusts, amendments to the adopted dust management procedure will be made to mitigate the potential release of airborne asbestos fibres.

Table 14: Airborne Fibre Trigger Values

Action Level	Controls and Actions
< 0.01 fibres/ml	No new control measures are necessary and continue with control measures
>=0.01 fibres/ml but <= 0.02 fibres/ml	1. Review control measures
	2. Investigate the cause
	3. Implement controls to eliminate or minimise exposure and prevent further release
> 0.02 fibres/ml	1. Stop removal work
	2. Notify regulator (SafeWork NSW) by phone followed by email or written statement that work has ceased and the results of the air monitoring
	3. Investigate the cause and conduct a thorough visual inspection of the enclosure (if used) and associated equipment in consultation with all workers involved with the removal work
	4. Implement controls to eliminate or minimise exposure and prevent further release and extend the isolated/barricaded area around the removal area/enclosure as far as reasonably practicable (until fibre levels are at or below 0.01 fibres/ml, wet wipe and vacuum the surrounding area, seal any identified leaks (e.g. with expandable foam or tape) and smoke test the enclosure until it is satisfactorily sealed.
	5. Suspend removal works until further air monitoring is conducted and do not recommence until fibre levels are at or below 0.01 fibres/ml

10.4. Validation Strategy

A validation program will be undertaken during and following completion of the remediation works to demonstrate that the remediation works have met the nominated remediation goals. The adopted validation strategy consists of validation sampling and analysis and qualitative assessment (through visual observations) of the remediation works.

10.4.1. Validation of Remediation Areas

For RA1 and RA2 (excluding building footprints), the following will be completed by the Environmental Consultant:

- Soil samples collected from the base and walls of excavations. Samples will be collected in a systematic sampling pattern of one sample per 20 m lineal for wall >0.5m in height and one sample per 400 m² for the base (i.e 20 x 20m grid).
- All soil samples will be collected using a fresh pair of disposable nitrile gloves and placed into laboratory supplied, teflon-lined sample jars and labelled with a unique sample ID. Collected samples will be immediately transferred to laboratory supplied sample jars.
- Samples will be analysed by a NATA accredited laboratory for TRH, heavy metals and PAH.
- Each 20 x 20m grid will also require a visual assessment by the site LAA to confirm no suspected ACM is present.
- All soil samples will be assessed against criteria outlined in **Table 13**.
- If initial analytical results are above the adopted VAC further vertical and/or lateral excavation will be required, and a second round of validation samples will be collected. This will continue until all wall and base validation samples meet the VAC.
- Where asbestos is expected to be encountered (i.e. in the vicinity of TP11, RA1), daily Asbestos Air Monitoring will be undertaken to ensure controls are adequate.

- An asbestos clearance certificate (ACC) will be prepared by the hygienist following removal of any asbestos impacted fill. Once the ACC has been prepared for the area directly surrounding TP11, the requirement for ongoing AAM can be determined by the supervising hygienist/LAA and Environmental Consultant. Additional ACM finds can then be managed via the unexpected finds protocol.
- Material tracking and material importation information will be reviewed to ensure compliance with this RAP, including landfill disposal dockets for soils and miscellaneous waste items.
- Reporting (see **Section 10.6**).

10.4.2. Building footprints

For building 1 (B1) and building 2 (B2) the following validation is required to be completed by the environmental consultant following building demolition, offsite disposal and excavation (where required):

- Additional targeted sampling will be undertaken from the base of the excavation of the building footprint. Samples will be collected in a systematic sampling pattern of one sample per $\sim 64\text{m}^2$ (i.e. $8 \times 8\text{m}$ grid) across each building footprint.
- All soil samples will be collected using a fresh pair of disposable nitrile gloves and placed into laboratory supplied, teflon-lined sample jars and labelled with a unique sample ID. Collected samples will be immediately transferred to laboratory supplied sample jars.
- Samples will be analysed by a NATA accredited laboratory for TRH, heavy metals and PAH.
- The building footprint will require a visual assessment by the site LAA to confirm no suspected ACM is present.
- All soil samples will be assessed against criteria outlined in **Table 13**.
- If initial analytical results are above the adopted VAC further vertical and/or lateral excavation will be required, and a second round of validation samples will be collected. This will continue until all wall and base validation samples meet the VAC.
- Where asbestos is expected to be encountered, daily Asbestos Air Monitoring will be undertaken to ensure controls are adequate.
- An asbestos clearance certificate (ACC) will be prepared by the hygienist following removal of any asbestos impacted fill.
- Material tracking and material importation information will be reviewed to ensure compliance with this RAP, including landfill disposal dockets for soils and miscellaneous waste items.
- Reporting (see **Section 10.6**).

10.4.3. Areas not undergoing remediation

Following the removal of hardstand, the central portion of the site (between RA1 and RA2) will require additional validation sampling to ensure the residual fill material not being removed is suitable to remain onsite. The following validation sampling will be adapted for the central portion of the site:

- Samples will be collected in a systematic sampling pattern of one sample per 400 m^2 (i.e. $20 \times 20\text{m}$ grid).
- All soil samples will be collected using a fresh pair of disposable nitrile gloves and placed into laboratory supplied, teflon-lined sample jars and labelled with a unique sample ID. Collected samples will be immediately transferred to laboratory supplied sample jars.
- Samples will be analysed by a NATA accredited laboratory for TRH, heavy metals and PAH.

- Each 20 x 20m grid will also require a visual assessment by the site LAA to confirm no suspected ACM is present.
- All soil samples will be assessed against criteria outlined in **Table 13**.
- A visual inspection of the remnant fill will be completed by the project hygienist/LAA and an asbestos clearance certificate (ACC) will be prepared.
- Reporting (see **Section 10.6**).

10.5. Imported Materials

Where imported materials are required to be used, certified Excavated Natural Material (ENM) or certified Virgin Excavated Natural Material (VENM) must be used. All imported material is to be pre-approved by the supervising consultant prior to import.

10.6. Reporting

10.6.1. Validation Report

A validation report will be prepared by the environmental consultant at the completion of the remediation works in accordance with NSW EPA guidance and will contain as a minimum:

- Details of the remediation works conducted, including detailed photographic log.
- Information demonstrating that the objectives of the RAP have been achieved.
- Information demonstrating compliance with appropriate regulations and guidelines.
- Information detailing material tracking undertaken during the work, including imported material tracking undertaken during the works, including imported material and material disposed of offsite (if required).
- Any variations to the strategy noted during the implementation of the remediation.

10.6.2. Environmental Management Plan

All contaminated soils are proposed to be excavated and removed from site. Therefore, an Environmental management Plan (EMP) is not expected to be required. However, if contaminated material remains around services at the site where it is not practicable to remove, an EMP may be required. If it becomes apparent that an EMP will be required for this situation, then such a plan should be prepared by the Environmental Consultant.

11. QA/QC Plan

11.1. Field Quality Assurance and Quality Control

All field and laboratory procedures are to be assessed for DQIs in accordance with the NSW EPA (2017) *Contaminated Site: Guidelines for the NSW Site Auditor Scheme*. The QA/QC protocols to be adopted during remediation and validation are summarised in **Table 15**.

Table 15: Field QA/QC Procedures

Field Procedure	QA Procedure Description
Sampling Team:	Environmental Consultant must be professionally qualified environmental scientists and engineers trained in conducting site contamination projects.
Equipment Calibration:	All equipment will be calibrated as specified in relevant operator manuals. If a PID is used for the remediation works, then it should be calibrated using isobutylene gas at the start of each shift.
Chain of Custody Forms:	All samples will be logged and transferred under appropriately completed Chain of Custody forms.
Preservation:	All samples will be received at the laboratory in appropriately preserved containers, with preservation including packing samples with ice packs in eskies.
Rinsate Blanks:	Rinsate blanks will be collected at a rate of one per piece of equipment per day (if sampling equipment other than a fresh nitrile glove is used) to determine if any cross contamination may have occurred during sampling, as specified given in Section 8 of Australian Standard AS4482.1-2005. Rinsate blanks are to be analysed for Metals, TRH/BTEX PAH.
Blind Field Duplicates (for testing by Main Lab):	Blind field duplicate samples will be prepared in accordance with procedures given in Section 8 of Australian Standard AS4482.1-2005. The frequency of blind field duplicate testing will correspond to at least 5% for soil samples (1 in 20 samples). Blind duplicates are to be analysed for the same analytical suite as the primary sample.
Split Samples (for Inter-Laboratory Testing):	Split samples will be prepared will be prepared in accordance with procedures given in Section 8 of Australian Standard AS4482.1-2005. The frequency of blind field duplicate testing will correspond to at least 5% for soil samples (1 in 20 samples). Split samples are to be analysed for the same analytical suite as the primary sample.
Trip Spike and Trip Blank:	A trip spike and trip blank will be included with each sampling event. Trip spikes and trip blanks will be analysed for TRH C6-C9 and BTEX.

11.2. Laboratory Quality Assurance and Quality Control

The primary and secondary laboratories must be NATA registered for the specified tests. A data validation process is to be used to assess the effectiveness of the overall analytical process and to assess the use of data.

Table 16 outlines the data validation criteria, qualifications to the data and the overall QA/QC procedures used for the laboratory testing program.

Table 16: Laboratory QA/QC

Procedure	QA Procedure Description
Holding Times	Holding times are the maximum permissible elapsed time in days from the collection of the sample to its extraction and/or analysis. All extraction and analyses will be completed within standard guidelines.
Reagent Blanks	The reagent blank sample is a laboratory prepared sample containing the reagents used to prepare the sample for final analysis. The purpose of this procedure is to identify contamination in the reagent materials and assess potential bias in the sample analysis due to contaminated reagents. The QC criterion is no detectable contamination in the reagents.
Laboratory Duplicates	Laboratory duplicates are field samples that are split in the laboratory and subsequently analysed a number of times in the same batch.

Table 16: Laboratory QA/QC

Procedure	QA Procedure Description
	These sub-samples are selected by the laboratory to assess the accuracy and precision of the analytical method. Intra-laboratory duplicates are performed on a frequency of 1 per 10 samples.
Laboratory Control Standard	A laboratory control standard is a standard reference material used in preparing primary standards. The concentration should be equivalent to a mid-range standard to confirm the primary calibration. Laboratory control samples are performed on a frequency of 1 per 20 samples or at least one per analytical run.
Matrix Spikes / Matrix Spike Duplicates (MS/MSD)	MS/MSDs are field samples to which a predetermined stock solution of known concentration has been added. The samples are then analysed for recovery of the known addition. Recoveries should be within the set range as stated by the laboratory.
Surrogate Spikes	Surrogate spikes provide a means of checking, for every analysis, that no gross errors have occurred at any stage of the procedure leading to significant analyte loss. Recoveries should be within the stated laboratory control limits.
QA/QC Conclusion	The QA/QC indicators should either all comply with the required standards or showed no variations that would have no significant effect on the quality of the data.

11.3. QC Sampling Frequency

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

Project DQIs utilised for sampling are shown in **Table 17**.

Table 17: Sample DQIs

DQO	Frequency	DQI
Precision:		
Intra-laboratory field duplicates	1 per 20 primary samples	<50% RPD
Inter-laboratory field duplicates	1 per 20 primary samples	<50% RPD
Accuracy:		
Laboratory control samples	1 per batch	70-130%
Matrix spikes	1 per batch	70-130%
Surrogate spikes	1 per batch	70-130%
Representativeness:		
Sample transport and handling appropriate	All samples	Yes
Samples extracted and analysed within correct holding times	All samples	Organics: 14 days Inorganics: 6 months
Trip spike	1 per day when sampling for volatiles	60-140% recovery
Trip blank	1 per day	<LOR
Rinsate	1 per day when reusable equipment is used	<LOR
Comparability:		

Table 17: Sample DQIs

DQO	Frequency	DQI
Precision:		
Standard operating procedures for sampling	All samples	Yes
Standard analytical methods used	All samples	Yes
Consistent field conditions, sampling staff and laboratory analysis	All samples	Yes
Limits of reporting appropriate and consistent	All samples	Yes
Completeness:		
Appropriate documentation for testing and COC	All samples	Yes
Appropriate logging of soil and other field observations	All samples	Yes
Satisfactory QC frequency and results	All QC samples	Yes
Data considered 95% valid	-	-

12. Site Management

12.1. Responsibilities

The implementation of the controls outlined in this RAP are the responsibility of the PC engaged to undertake the works.

Onsite works should only be conducted by contractors/individuals who have read and acknowledged understanding of this RAP.

Table 18 provides a summary of the responsibilities for the implementation and management of this RAP. These responsibilities do not replace any other regulatory responsibilities of the parties in relation to works within the work area.

Table 18: Role Definition	
Role	Definition
Site Owner	<ul style="list-style-type: none"> Appoint Principal Contractor and Environmental Consultant. Confirm works are Category 2 under SEPP 55.
Principal Contractor	<ul style="list-style-type: none"> Comply with the RAP for all remediation works including relevant legislation and guidance (including the WHS Act 2011 and Regulation 2017 or relevant legislation current at the time of the works). To ensure that all licences, clearances, permits and approvals are in place in the appropriate manner. Inform the consultant if conditions change significantly from those documented in the RAP. On-site implementation of the RAP. Day to day management of the requirements of the RAP and ensuring that the checking, monitoring and inspection of appropriate mitigation measures for contract and sub-contract personnel is undertaken. Notification to client and the consultant and the appropriate external bodies (such as emergency services, regulatory authorities) in the event of an environmental incident. Development of traffic management plan for trucks entering and leaving the site. Temporary suspension of remediation work if the environment or health and safety of personnel or the community is at risk. Suspension of individuals from the remediation area where disregard for the RAP has been identified. Material tracking including detailed reconciliation ('cradle to grave') of imported materials and material disposed of offsite.
Site Supervisor (as appointed by the Principal Contractor)	<ul style="list-style-type: none"> Evaluate conditions and complete the Site Hazard Assessment at the commencement of works. Ensure all workers have undertaken any appropriate remediation inductions. Induct all personnel onto project specific WHS before any remediation works commence. Inform all contractors of identified hazards/risks that have the potential to affect their health or safety. Maintain security for the duration of the project. Ensure lines of communications are established and maintained. Comply with the RAP for all remediation works including relevant legislation and guidance (including the WHS Act 2011 and Regulation 2017 or relevant legislation current at the time of the works). Conduct a Daily Toolbox Talk with all workers at the commencement of each day's work. Monitor the works to ensure compliance with this RAP. Stop works if work practices deviate from the approved RAP or conditions are considered unsafe.

Table 18: Role Definition

Role	Definition
Environmental Consultant	<ul style="list-style-type: none"> • Provide the RAP to any worker or contractor (who is under the control of the Principal Contractor). • Ensure all parties clearly understand the RAP requirements and ensure that compliance with the RAP is a condition of any works undertaken by any contractor/site worker contracted by the Principal Contractor. • Provide remediation supervision to ensure that works are being completed in accordance with all statutory requirements, best practice guidelines and the requirements of the RAP. • Undertake sampling, validation reporting, air monitoring and waste classification (where required). • Update the RAP if they become aware that the site conditions have changed and inform any other parties (contractors/site workers, etc.) of the changes.

12.2. Hours of Operation

The Principal Contractor shall be responsible for ensuring all works are conducted during the hours prescribed in the conditions of approval for the development.

The prescribed hours are assumed to be only between the hours of:

- 7.00am and 5.00pm Monday to Friday.
- 8.00am and 5.00pm on Saturdays.
- No work to be carried out on Sundays and public holidays.

12.3. Site Security

No person shall enter the site or remediation area without the permission of the Principal Contractor/Site Supervisor. Contractors and visitors must be inducted onto the site prior to the start of any planned works. During excavation / remediation works, signage at the work entrance and where appropriate safety fencing, will be maintained to restrict access to the works area. Only authorised persons will be able to enter the works area.

12.4. Site Induction

The Principal Contractor must ensure all personnel working on the site attend an induction prior to entering the site for the first time. The site induction should include a brief outline of the remediation project, details on general site hazards (e.g. vehicle movements, heavy machinery, contamination etc.) and details on the specific hazards associated with the remediation works including but not limited to:

- Nature of the materials being handled.
- Personal protective equipment to be utilised on site.
- Necessary decontamination procedures to be undertaken whilst on site.

12.5. Personal Protective Equipment

Table 19 outlines the general PPE requirements onsite, which should be readily available for ALL personnel including contractors and visitors:

Table 19: Job Specific PPE Requirements			
Type	Description	Required Yes/No	Required Activities
Head Protection	Hard Hat	Y	All site activities
Eye Protection	Safety glasses with side shields	Y	All site activities
	Goggles	-	-
	Face shield	-	-
Hand Protection	Disposable latex gloves	-	-
	Disposable nitrile gloves	Y	Soil sampling activities
	Cut resistant gloves	Y	Manual handling activities
	Rubber gloves	-	-
	Gauntlets	-	-
Respiratory Protection	Respirator (nominate type and cartridge) Respiratory Protective Equipment (RPE) compliant to AS/NZS 1716:2009.	-	Half face respirators with particulate filter required when undertaking asbestos disturbance/removal works.
Body Protection	Disposable coverall Type 5, Category 3 (prEN ISO 13982-1) or equivalent.	Y	Required when undertaking asbestos disturbance/removal works.
	Sunhat, sunscreen, repellent	Y	If working in sun
General Environmental Protection	Cold weather gear	Y	Where required
	Wet weather gear	Y	Where required

12.6. Site Safety Signage

The below signs are representative of some Work Health Safety signs which should be utilised on site boundaries:



12.7. Protection of services

The Principal Contractor shall identify and mark out all services at the site and shall obtain utility plans from relevant authorities and Dial Before You Dig (DBYD) service and any relevant information as to the presence of services at the site.

It is the Principal Contractors responsibility to gain accurate information as to the depth, size and alignment of services. These may include overhead power cables, underground power, telecommunications, drains, sewers and water mains.

The Principal Contractor shall:

- Take special care to ensure that services are protected in accordance with the conditions specified by the controlling authority.
- Arrange for a representative from the controlling authority to be present, unless the authority directs otherwise, when the remediation contractor is:
 - Proving the locations of services.
 - Excavating within 1 m of the service.
 - Arrange with the appropriate authority for the closure and subsequent restoration of any service that must be shut down while the works are in progress.
 - Adopt a method for uncovering and protecting the service from damage if the service must be uncovered and left exposed, to the satisfaction of the controlling Authority.
 - Immediately inform the owner or controlling authority of any damage or interference to any service, structure or property.
 - Carry out any temporary bypass and restoration of the services to the satisfaction of the respective authorities and owners.

12.8. Environment and Work Health & Safety

An Environment and Works Health & Safety Management Plan must be prepared by the Principal Contractor prior to commencement of remediation works. The objectives of the Plan will be to:

- Protect the health of workers and the general public during the remediation works and comply with applicable health and safety legislation; and
- Ensure the works do not negatively impact on potential environmental receptors and comply with applicable environmental legislation.

All site staff, contractors and sub-contractors are to complete site-specific safety inductions and be made aware of the contamination type expected through the remediation.

Table 20 lists key environmental and WHS considerations (related to remediation works) that are required to be included in the plan and some control measures to manage hazards. It is noted that the information is a guide only. The Principal Contractor is required to undertake their own environmental and safety hazard identification risk assessment as part of preparing the plan.

Table 20: Key Environmental and Health & Safety Hazards	
Hazard	Control Measure
Air quality / vapours /odours generated from remediation/excavation	<p>Potential odours or vapours associated with the site should be controlled as follows:</p> <ul style="list-style-type: none"> • Use of appropriate covering techniques such as the use of plastic sheeting to cover excavation faces or stockpiles. • Use of fine mist sprays and odours-suppressant agents on the impacted areas/materials. <p>If odours are detected the site is to be inspected the Environmental Consultant and any recommended control measures are to be implemented throughout the remediation process.</p>
Air quality – dust	<p>Dust management measures may include:</p> <ul style="list-style-type: none"> • Erection of dust screens around the perimeter of the site / remediation / excavation areas. • Securely covering all loads entering and exiting the site. • Use of water sprays carts on exposed soil. • Cessation of operations that may generate dust during periods of high winds. • Covering of stockpiles of contaminated soil when not in use and minimising periods of stockpiling. • Keeping excavation surfaces moist; and dust monitoring.

Table 20: Key Environmental and Health & Safety Hazards

Hazard	Control Measure
Air quality – asbestos	<ul style="list-style-type: none"> If friable asbestos is uncovered the following controls will be required: Exclusion zone is to be set up around the area with warning signs. Supervision of works by licensed asbestos contractor. Wearing of appropriate additional PPE such as a suitable respirator, disposable overalls, steel capped boots and gloves removed in a decontamination area prior to leaving the asbestos impacted zone. Minimisation of dust generation in accordance with measures implemented for dust control. Air monitoring for airborne asbestos fibres for the duration of excavation works.
Air quality- emissions from vehicles and plant	Plant and vehicles involved in the remediation will be properly maintained to ensure their emissions comply with applicable guidelines. Vehicles and plant will be turned off when not in use.
Surface water and sediment	<p>Adequate stormwater runoff, run-on and sediment control measures for the remediation works are required to avoid sediment discharge to the stormwater system. It is considered that the following control measures may be required:</p> <ul style="list-style-type: none"> Placement of silt fencing and straw bales down-gradient of the work areas to intersect sediments and reduce the risks of erosion. Installing measures to divert clean stormwater away from exposed contaminated soil. Stop works during heavy rain events. Surface of stockpiles should be covered with polythene sheets or tarpaulins weighted with heavy objects when not in use. Soil stockpiles should be appropriately bunded to prevent spreading of contamination. <p>Control measures should be implemented in accordance with the guidelines stated in Managing Urban Stormwater – Soils and Construction (NSW Department of Housing, 1998). All remediation areas shall be bunded to contain surface water runoff from the remediation areas and to prevent the leaching of contaminants into the subsurface. All surface water discharges from the bunded areas to Councils stormwater system shall not exceed the threshold concentrations specified in NSW EPA guidelines.</p>
Stockpiles	Stockpiles must be tracked from the point of excavation to their final disposal at a suitably licenced landfill.
Transport of soils	<p>Contaminated soil must be classified prior to disposal in accordance with NSW EPA (2014) Waste Classification Guidelines. Disposal of contaminated soil must meet the following requirements:</p> <ul style="list-style-type: none"> Contaminated soil is to be trucked in accordance with NSW EPA requirements. Trucks used to transport contaminated fill shall meet the NSW EPA licensing requirements for the waste transported. Trucks used to transport contaminated fill must have a suitable covering for the load. The wheels and exterior of the vehicles must be cleaned down prior to leaving site. Truck movements shall be along designated transport corridors approved by Council. A copy of every landfill weigh-bridge docket for each load delivered will be forwarded to the environmental consultant to reconcile volume. A register of truck licence plates entering and leaving the site must be maintained. Drivers code of conduct to be developed and signed by all truck drivers.
Designation, delineation and control of access to various work zones	<p>Appropriate work zones should be set up and maintained for the remediation works for the purposes of containing and controlling the potential transfer of contaminated soil and managing health and safety of workers and the general public during the remedial works. Some examples of zones that are likely to be required include:</p> <ul style="list-style-type: none"> Remediation zones – these would be set up for various remedial

Table 20: Key Environmental and Health & Safety Hazards

Hazard	Control Measure
	<p>works across the Site. Only people who are necessary for undertaking the work should enter these zones.</p> <ul style="list-style-type: none"> Decontamination Zone – should be attached to each remediation zone. At the completion of the work, personnel and equipment used in remediation are to be decontaminated within the Decontamination Zone. Validated Zones – area where remediation and validation has been completed. Controls required to be implemented to ensure that the areas do not become recontaminated (e.g. by tracking contaminated soil through such zones etc). General Construction Zones – Areas where normal construction protocols apply and no specific remediation protocols are required.
Hazardous materials (including fuel and chemical management)	Any hazardous materials should be stored in accordance with appropriate environmental and health and safety regulations. Refuel plant and equipment using mobile tanker in a designated area with appropriate environmental controls / bunding. Make available "spill kits" onsite. Clean up spillage as soon as practicable using spill kits.
Noise and vibration	<p>All equipment and machinery shall be operated in an efficient manner to minimise the emission of noise.</p> <p>In the event that complaints are received or if directed by Council, noise monitoring should be carried out by a recognised acoustic consultant. Noise control measures as recommended by the acoustic consultant should be implemented throughout the remediation process.</p> <p>Vibration emissions during remediation works must not result in damage to near-by premises or results in an unreasonable loss of amenity to nearby residents. The relevant provisions of the POEO Act must be satisfied at all times.</p> <p>Specific vibration controls will be set in vicinity of any heritage structures. In the event that complaints are received or if directed by Council, vibration monitoring will be carried out by a recognised vibration consultant. Vibration control measures as recommended by the vibration consultant will be implemented throughout the remediation process. Hours of operation will be in accordance with conditions of approval.</p>
Monitoring requirements	<p>Monitoring requirements at the site are likely to include:</p> <ul style="list-style-type: none"> Regular visual monitoring to check environmental and safety controls are in place and effective. Visual monitoring for dust generation and dust monitoring. Observations of odours during the works. Monitoring using a PID for volatile compounds in the breathing zone for workers as well as on site boundaries. The action limits should be set based on the response factor of the PID to contaminants of concern on the site. Monitoring for airborne asbestos fibres.
Work health and safety	<p>A Site-Specific Work Health & Safety Plan (SSWHS) shall be prepared prior to the commencement of the work in accordance with the relevant legislation. Potential hazards specific to the remediation works (i.e. not hazards that would be commonly encountered on construction projects) include, but are not necessarily limited to:</p> <ul style="list-style-type: none"> Dermal contact or ingestion of contaminated soil or groundwater. Inhalation of contaminated vapours. Inhalation of fibres. <p>No eating, drinking, chewing gum or tobacco, smoking or any practice that involves hand to mouth transfer increases the probability of ingestion of foreign matter into the body.</p> <p>Personnel should ensure that hands are thoroughly washed before eating, drinking or smoking with an appropriate sanitizer (such as Chlorohexidine).</p> <p>Any clothing that becomes dirty from onsite work should be disposed of or washed separately from other clothes.</p>

12.9. Traffic Control Plan

Given the location of the site in a residential street, traffic control is unlikely to be required for trucks entering or leaving the site. If deemed required, the Principal Contractor will be responsible for ensuring that a suitable traffic management plan is developed.

12.10. Materials Tracking

It is important that the movement of contaminated soil, clean soil and soils classified for offsite disposal are tracked across the site and tracked to the final offsite disposal destination (where required). Therefore, a Materials Tracking Plan should be designed and implemented for the remediation works and any other works involving disturbance of soil.

The movement of materials across the site should be documented on a daily basis (until such time as all contaminated soils have been removed from the site and underlying soils have been confirmed to be free of any contamination). This should be undertaken using plans of the site marked up daily. These daily materials tracking plans will show all relevant feature of the site including excavations, validated areas; stockpiles movement; as well as indicating any movement of material within or off the site. Appropriate tracking forms should be developed and completed for materials movements.

If site constraints allow, it is recommended that appropriate work zones should be set up and maintained for the remediation works; these are likely to include:

- Remediation zones – these would be set up for various remediation works across the site. Only people who are necessary for undertaking the work should enter these zones.
- Validated Zones – area where remediation and validation has been completed. Controls required to be implemented to ensure that the areas do not become re-contaminated (e.g. by tracking contaminated soil through such zones etc).
- General Construction Zones – Areas where normal construction protocols apply, and no specific remediation protocols are required.

All stockpiles must be tracked and managed from the point of excavation to their final disposal at a suitably licenced landfill (if required). Specific considerations for stockpiles will include:

- No stockpiles shall be placed on footpaths or nature strips.
- To reduce dust and stormwater issues, the period and volume of stockpiling should be minimised.
- All stockpiles shall be placed within an erosion containment boundary away from drainage lines, gutters or stormwater pits or inlets.
- Plastic sheets or similar to be placed beneath stockpiles, or stockpiles will be established on paved or hardstand areas.
- Covering of stockpiles with membranes (polythene sheets or tarpaulins weighted with heavy objects).
- Appropriate bunding of stockpiles to prevent spreading of contamination.
- Placement of silt fencing and straw bales downslope of the stockpile area to intersect sediments.

13. Emergency Procedures and Response

In the event of an emergency, the safety of people shall always be the FIRST priority. Provided no other risks to human life are present, attend to any injured personnel in so far as is required to prevent further injury.

ALL personnel within the works area shall be alerted to emergencies by verbal command and directed to a designated muster or assembly point.

If a spill has occurred, provided the safety of those on or off-site has been determined and emergency services have been notified, take all practical steps to prevent the spill from reaching all environmental receptors both on and off site.

Incidents, injuries and near misses must be reported into the Principal Contractor and client immediately. Environmental incidents need to be reported immediately to the client representative and the responsible authorities.

Table 21: Summary of Potential Emergencies

Emergency	Action
Fire or Explosion	Call the fire brigade on 000. Evacuate the area and assemble at assembly point. Warn third parties that may be impacted by the event. Ensure fire brigade is met at the site.
Medical Emergencies	<p>Prior to arrival on-site:</p> <ul style="list-style-type: none"> Ensure First Aid kits are up to date and contain First Aid supplies relevant to the nature of the work done on site. Ensure appropriate first aid equipment is carried at all times. Ensure at least one field person has a Senior First Aid Certificate. <p>In the event of an Injury:</p> <ul style="list-style-type: none"> Apply First Aid, provided you do not place yourself or others at risk. For serious injuries including hit by vehicle, vehicle accident, bitten by a snake or spider etc. Call 000 for an Ambulance.
Loss of Contaminant	Stop work. Use temporary bunding material to limit the extent of the spill and block storm water drains.
Utility Strike	Stop work. Assess if the area needs to be evacuated. Inform the relevant utility company.
Meteorological Event	<ul style="list-style-type: none"> Check Bureau of Meteorology website before travel to site: www.bom.gov.au. Listen to local radio stations for any weather alerts. Regularly check the local weather forecast. Drive with due care in adverse weather conditions. Pull over and stop if road conditions are unsafe. Cancel field work if necessary.
Vehicle Collision	<p>Prior to arrival on-site:</p> <ul style="list-style-type: none"> Ensure driver is appropriately licensed and that Pre-Start Checklist has been completed. <p>In the event of a Vehicle Accident:</p> <ul style="list-style-type: none"> Assess self for injuries. If uninjured, and it is safe to do so, drive vehicle to side of road and turn on hazard lights. If uninjured, and safe to do so, assess injuries of other occupants. If necessary, apply first aid to self or others' injuries. Call the emergency services on 000 if anyone is injured.
Biological (snake, spider, bee etc.)	<ul style="list-style-type: none"> Ensure at least one field person has a Senior First Aid Certificate. Ensure first aid kit has set press bandages. Appropriate PPE. Ensure all staff know how to administer EpiPen if relevant.

Table 21: Summary of Potential Emergencies

Emergency	Action
Heat or Cold Stress	<ul style="list-style-type: none"> • Check the local weather forecast. • Increase hot/cold fluid intake. • Appropriate PPE. • Ensure First Aid Kit has emergency space blanket/ice-packs. • Stop and rest as necessary in extreme conditions.

13.1. Emergency Muster Point

In the event of an incident or emergency, all personnel shall stop all works, shut down all equipment (where practical and safe to do so) and relocate to the muster point/s.

Table 22: Emergency Muster Point

Emergency	Action
Location of muster or assembly point (refer to site plan).	To be confirmed by Principal Contractor
Fire, Ambulance or Police	000 (Australia)
Closest Hospital	Canterbury Hospital, 575 Canterbury Road, Campsie NSW 2194

14. Conclusion

This RAP documents remediation and validation strategies to address contamination on the site including waste classification of materials to be disposed offsite as part of the site remediation and contingency measures for various scenarios that could arise during the remediation.

It is considered that following full implementation of this RAP the site will be suitable for the proposed R2 low density residential land use.

All remediation works are required to be supervised, validated and reported by a suitably qualified consultant, and must be audited by a NSW EPA accredited site auditor and include a site audit statement detailing the findings of the audit.

15. Limitations

This report is confidential and has been prepared by Progressive Risk Management Pty Ltd (PRM) for Sydney Water Corporation (the client). This report may only be used and relied upon by the client and must not be copied to, used by or relied upon by any person other than the client.

This report is limited to the observations made by PRM during the 2018 contamination assessment and information and documentation provided by the client. PRM has assumed that the information provided is complete, accurate and reliable. PRM has not sought to independently verify those sources or the information provided by those sources and have not provided a warranty as to the completeness, accuracy, reliability or appropriateness of the information provided unless otherwise stated.

All results, conclusions and recommendations presented should be reviewed by a competent person before being used for any other purpose. PRM accepts no liability for use of, interpretation of or reliance upon this report by any person or body other than the client. Third parties must make their own independent inquiries.

This report should not be altered amended or abbreviated, issued in part or issued incomplete without prior checking and approval by PRM. PRM accepts no liability that may arise from the alteration, amendment, abbreviation or part-issue or incomplete issue of this report. To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and this report are expressly excluded (save as agreed otherwise with the client).

PRM shall bear no liability in relation to any change to site conditions after the date of this report. This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope and limitations defined herein (*Scope of Works*). Should information become available regarding conditions at the site including previously unknown sources of contamination, PRM reserves the right to review the report in the context of the additional information.

Figures

Figure 1: Regional Site Location

Figure 2: Site Layout

Figure 3: Previous Sample Locations and Exceedances

Figure 4: Remediation Areas

326700

326600

326500

326400

6247600

6247500

6247400

6247300

326400

326500

326600


326700



Project Reference	P034963.001
Report Name	Remediation Action Plan
Client	Sydney Water

**165-169 Holden Street,
Ashbury NSW**

**Figure 1
Site Locality**



PROGRESSIVE RISK MANAGEMENT

Scale: 1:2000

Coor. Sys: GDA 1994 MGA Zone56

Legend

- Approximate Site Boundary (disposal area)
- Approximate Sydney Water Property



N








Project Reference	P034963.001		
Report Name	Remediation Action Plan		
Client	Sydney Water		
165-169 Holden Street, Ashbury NSW			
Figure 2 Site Layout			
			
PROGRESSIVE RISK MANAGEMENT			
Scale: 1:850			
Coord. Sys: GDA 1994 MGA Zone56			
<div>Legend</div> <div><div> Site Boundary (disposal area)</div><div> Approximate Sydney Water Property</div><div> Inaccessible Areas (buildings)</div></div> <div></div>			



Image Source: Metromap (2020)

Project Reference	P034963.001
Report Name	Remediation Action Plan
Client	Sydney Water

**165-169 Holden Street,
Ashbury NSW**

**Figure 3
Sampling Locations and Site
Exceedances**

PROGRESSIVE RISK MANAGEMENT

Scale: 1:500

Coord. Sys: GDA 1994 MGA Zone56

Legend

- Site Boundary (disposal area)
- Approximate Sydney Water Property
- Inaccessible Areas (buildings)
- PRM Testpit Locations (2018)
- PB Testpit Location (2015)
- EIL/ESL Exceedance
- HIL/HSL Exceedance
- Asbestos Detected

Project Reference

P034963.001

Report Name

Remediation
Action Plan

Client

Sydney Water

165-169 Holden Street,
Ashbury

Figure 4

Remediation Areas

P

R

M

PROGRESSIVE RISK MANAGEMENT

Scale: 1:400

Coord. Sys: GDA 1994 MGA Zone56

Legend

Site Boundary
(disposal area)

Approximate Sydney
Water Property

RA1

RA2

Inaccessible Areas
(buildings)

PRM Testpit Locations (2018)

PB Testpit Location (2015)

N

The figure is an aerial photograph of a residential area with overlaid remediation information. Two main areas are highlighted: B1 (a large orange-shaded area on the left) and B2 (a smaller orange-shaded area on the right). Various testpit locations are marked with blue and black icons and labeled TP01 through TP15. The map is overlaid with a grid showing coordinates from 326540 to 326600 and 6247460 to 6247500. A scale bar (0-10m) and a north arrow are present in the bottom right corner.

Testpit Location	Year	Coordinates (approx.)
TP01	2015	326540, 6247460
TP02	2018	326580, 6247480
TP03	2015	326590, 6247480
TP04	2015	326550, 6247470
TP05	2018	326560, 6247480
TP06	2015	326590, 6247490
TP07	2015	326590, 6247500
TP08	2018	326550, 6247490
TP09	2015	326540, 6247470
TP10	2018	326560, 6247500
TP11	2015	326550, 6247470
TP12	2015	326550, 6247470
TP13	2018	326560, 6247490
TP14	2015	326540, 6247470
TP15	2015	326540, 6247470

Image Source: Metromap (2020)

Appendix A: Imported Materials Protocol

Imported Materials Protocol

Any material imported to the site will need to be validated/checked prior to importation to prevent potentially contaminated material from being placed at the site. This includes, but not limited to, capping material, drainage aggregates and landscaping products (topsoil/growing medium). The following sections outline the requirements for the type of material imported to the site.

Imported Material Types

Virgin Excavated Natural Material (VENM)

Any VENM to be imported to the site, including natural quarried products, will need to meet the definition as outlined in the POEO 1997. Prior to VENM being imported to the site, the VENM source will need to be approved by the environmental consultant.

In order for the source to be approved the following will need to be provided/undertaken prior to the importation:

- Appropriate VENM documentation/report (should include source site history and soil chemical analysis) for each source site to be reviewed by the environmental consultant.
- For natural quarried products the appropriate documentation for each source/supplier/material type will need to be reviewed.
- Site inspection of the source site by environmental consultant following report approval.
- If required additional QA samples may need to be obtained and analysed (minimum of 3 samples per source). Samples to be analysed for the following combinations: heavy metals, PAHs, TRH, BTEX, OCPs/OPPs, PCBs and asbestos. Additional parameters may be required and dependant on source site history.
- Visual inspection upon importation to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation.

Excavated Natural Material (ENM)

Any ENM to be imported to the site must be assessed in accordance with the Excavated Natural Material Order 2014 (or more recent version if applicable at time of import). Prior to ENM being imported to the site, the ENM source will need to be approved by environmental consultant.

In order for the source to be approved the following will need to be provided/undertaken prior to the importation:

- Appropriate ENM documentation/report for each source site to be reviewed by environmental consultant.
- Site inspection of the source site by the environmental consultant following report approval.
- If required additional QA samples may need to be obtained and analysed (minimum of 3 samples per source). Samples analysis as per the Excavated Natural Material Order 2014.
- Analysis of source material for the presence/absence of asbestos (minimum of 1 samples per 100m³) and confirmation a visual inspection for the presence of asbestos was undertaken.
- Visual inspection upon importation to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation.

Recycled Material Products

Any recycled materials to be imported to the site will need to meet the relevant NSW EPA exemption and be fit for purpose at the site. Prior to the recycled materials being imported to the site, the source/supplier will need to be approved by the environmental consultant.

In order for the source to be approved the following will need to be provided/undertaken 3 to 4 days prior to the importation:

- Appropriate documentation/report for each source/supplier/material type to be reviewed by PRM. Documentation to include confirmation that material has been classified with reference to a relevant exemption.
- Inspection of the source/material by the environmental consultant following report approval.
- If required samples obtained and analysed (minimum of 3 samples per source/material type) for the following combinations: heavy metals, PAHs, TRH, BTEX, OCPs/OPPs, PCBs and asbestos.
- Visual inspection upon importation to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation.

Landscaping Materials

Prior to the landscaping materials being imported to the site, the source/supplier/material type will need to be approved by the environmental consultant.

In order for the material type to be approved the following will need to be provided prior to the importation:

- Appropriate documentation/report for each source/supplier/material type to confirm material has been produced under an appropriate standard is fit for purpose on the site. Documentation to be reviewed by the environmental consultant.
- Inspection of the source/material by the environmental consultant following documentation approval.
- Samples to be obtained and analysed (minimum of 3 samples per source/material type) for the following combinations: heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc); PAHs; TRH; BTEX; OCP; OPPs; PCBs; and asbestos.
- Visual inspection upon importation to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation.

Assessment of Imported Materials (No Documentation)

Should suitable VENM or ENM documentation not be available for a preferred source, the following sections outline the minimum requirements for assessing the source site:

VENM Assessment

A VENM assessment sampling and reporting should incorporate the following:

- Details of the source site address and source site history.
- Description of material (soil type, colour, odours etc).
- A minimum of 1 sample per 1,000m³ to a maximum of 10 samples per source site. QA/QC samples to be collected as required.
- Soil samples to be analysed for the following combinations: heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc); PAHs; TRH; BTEX; OCP; OPPs; PCBs; and asbestos. Additional parameters may be required and dependant on source site history. Electrical Conductivity (EC) and potential Hydrogen (pH) analysis may also be undertaken for a potential ENM classification should the source fail a VENM assessment.

- With the exception of asbestos, heavy metals and EC all analytical results must be less than the laboratory limit of reporting.
- Heavy metals to be consistent with background ranges.
- Asbestos to be absent.
- Laboratory report(s) from a NATA accredited laboratory including chain of custody documentation.

The report will need to also assess whether the material contains potential acid sulfate soils (PASS) or acid sulfate soils (ASS).

ENM Assessment

ENM assessments are to be undertaken in accordance with the Excavated Natural Material Order 2014 (or more recent version if applicable at time of import). The report must also include laboratory report(s) from a NATA accredited laboratory including chain of custody documentation. Additionally, for this site the ENM assessment should include analysis for the presence/absence of asbestos.

Imported Materials Assessment Criteria

Imported materials, such as recycled and landscaping materials will be compared to the following criteria:

- Heavy metals to be consistent with background ranges as per NEPM 2013.
- Organic compounds to be less than the laboratory limit of reporting.
- Asbestos to be absent (including ENM samples).
- Landscaping materials are to also consider NEPM 2013 ecological criteria.

Importation criteria for VENM and ENM has not been provided. However, asbestos must be absent from ENM samples. The QA samples, if obtained, will be compared to the supplied documentation of the source material report.

Further assessment of risk can be considered in relation to site specific circumstances / application and available documentation for each material type.

Approval Prior to Importation

In the event materials do not meet the applicable criteria detailed in sections above, materials will not be approved. All imported materials must be approved by the environmental consultant prior to importation. It may be beneficial to develop a tracking code system for each approved source site (e.g IMP001, IMP002 etc) and use this code when recording imported loads from the relevant source site.

Imported Materials Tracking/Logging

Dockets and quantities for all imported materials will need to be provided by the principal contractor to the environmental consultant. A 'gatehouse' system will need to be developed by the principal contractor to document all loads of imported materials coming onto the site. This should include truck registration, source site name, truck type etc. Material tracking must include a detailed reconciliation ('cradle to grave') of imported materials and material disposed of offsite

Unexpected Finds

In the event that imported materials arrive on site which do not meet the applicable criteria detailed in sections above, the following procedures must be completed:

- Stop work immediately and isolate the material via physical separation from other imported material and barrier tape.
- The Client Project Manager is to be notified as soon as practicable and within 24 hrs.
- The environmental consultant is to inspect the material the nature of the non-conformance.
- The Principal Contractor is to contact the source site and arrange for the material to be returned to the source site.
- The Principal Contractor is to provide written confirmation to the environmental consultant that the material has been received by the source site, including trucking dockets.

Appendix B: Site Survey

SSM 137859 - SSM 137858
177°43'12" 182.240 (MGA GROUND)
177°43'35" - 182.25 (SURVEY)

SSM 137858 - SSM 137857
186°35'40" 139.954 (MGA GROUND)
186°35'40" 139.95 (SURVEY)

SSM 137857 - SSM 137856
179°59'43" 120.962 (MGA GROUND)
179°59'20" 120.97 (SURVEY)

SSM 137858 - CNR (A)
190°24'30" 113.385

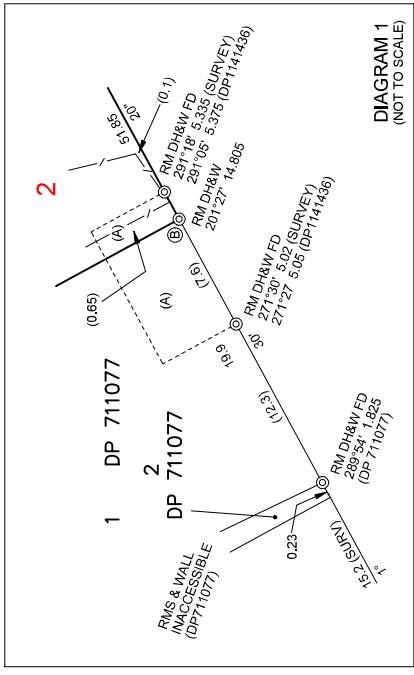
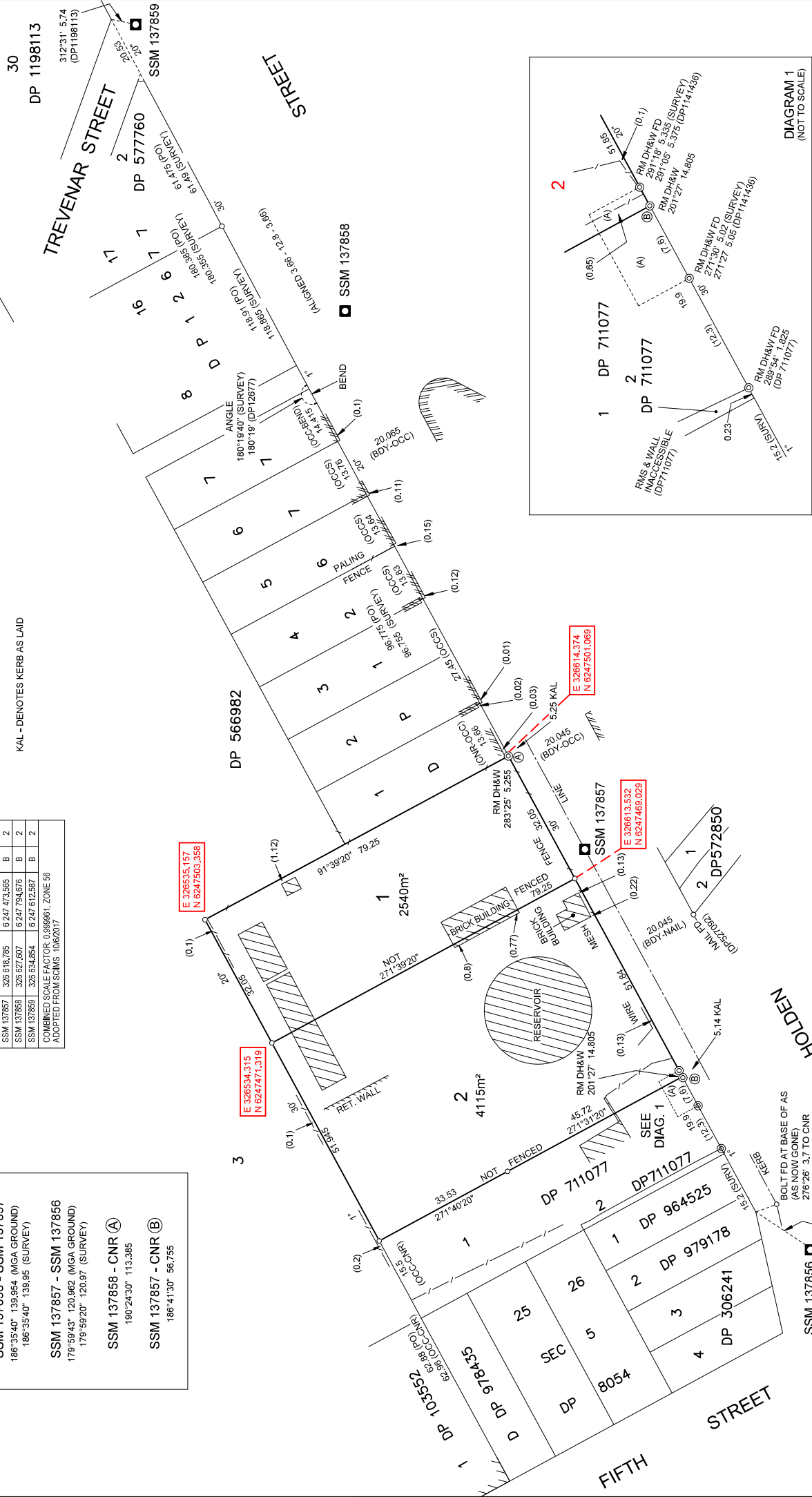
SSM 137857 - CNR (B)
186°41'30" 56.755

SURVEYING & SPATIAL INFORMATION REGULATION 2012
CLAUSES 35(1)(b), 61(2) AND 62

MARK	MGA COORDINATES - GDA 94		CLASS ORDER
	EASTING	NORTHING	
SSM 137859	326 618 795	6 247 352 608	B 2
SSM 137857	326 618 795	6 247 473 565	B 2
SSM 137858	326 627 807	6 247 794 576	B 2
SSM 137856	326 634 854	6 247 612 587	B 2

COMBINED SCALE FACTOR: 0.999961, ZONE 56
ADOPTED FROM SCIMS 10/6/2017

(A) - EASEMENT FOR ELECTRICITY & OTHER PURPOSES 5.3 WIDE (DP1141436)
KAL - DENOTES KERB AS LAID



SURVEYOR: Name: MATTHEW WILLIAM CLEARY Date: 29/5/2017 References: 118234504_02	PLAN OF SUBDIVISION OF LOT 1 IN DP911478 AND LOT 1 IN DP115504	L.C.A.: CANTERBURY - BANKSTOWN Locality: CANTERBURY Reduction Ratio: 1:600 Lengths are in metres.	REGISTERED	DP OR SP NUMBER
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