



SITE AUDIT REPORT FOR SAS 304

15-33 BRIGHTON AVENUE, CROYDON PARK, NSW

Prepared for Andree Shehadeh of Dyldam | 6 March 2020

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Version	Date	Author	Signature	Approver	Signature
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Disclaimer

This Site Audit relates only to those matters relevant to the Contaminated Land Management Act 1997, which describes that "The general object of this Act is to establish a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation under Division 2 of Part 3." The SAS and SAR do not seek to provide an opinion regarding other aspects of the environment not related to site contamination, to the suitability of the site in regard to the occupational health and safety legislation, or to the suitability of the engineering design.

By definition, Auditing involves the review and critique of Consultants' and Contractors' work, including site histories, site surveys, subsurface investigations, chemical and physical analyses, risk assessments and modelling. Accordingly, the Auditor relies on the experience, expertise and integrity of the relevant organisations. The information sources referenced have been used to determine site history and local subsurface conditions. While the Auditor has used reasonable care to avoid reliance on data and information that is inaccurate or unsuitable, the Auditor is not able to verify the accuracy or completeness of all information and data made available.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements and site history, not on sampling and analysis of all media at all locations for all potential contaminants.

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

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

CONTENTS

EXECUTIVE SUMMARY	2
Background	2
Environmental Investigations	2
Audit Conclusions	2
1. INTRODUCTION	3
1.1. Background to this Site Audit Report	3
1.2. Overview of the Site Audit Process	4
2. AUDIT DETAILS	5
2.1. Site Auditor	5
2.2. Site Audit Statement	5
2.3. Input to this Report by Auditor's Support Team	5
2.4. Type of Audit	5
2.5. Proposed Development	5
2.6. Potential for Conflict of Interest	5
2.7. Objectives of Audit	6
2.8. Documents Reviewed	6
2.9. Audit Meetings and Site Inspection	6
2.10. Audit Correspondence	7
3. SITE IDENTIFICATION & SURROUNDS	8
3.1. Site Identification and Land use	8
3.2. Audit Discussion	8
4. ENVIRONMENTAL SETTING	9
4.1. Topography and Hydrology	9
4.2. Soils and Geology	9
4.2.1 Regional Geology	9
4.2.2 Site Soil Profile and Geology	9
4.2.3 Acid Sulphate Soils	9
4.3. Hydrogeology	10
4.4. Audit Discussion	10
4.4.1 Soils and Geology	10
4.4.2 Hydrogeology	10
5. SITE HISTORY	11

5.1. Auditor's Summary of Site History	11
5.2. Audit Discussion	11
6. SITE CONDITION	12
6.1. Previous Site Layout	12
6.2. Current Site Layout	12
6.3. Visible and Olfactory Signs of Contamination	12
6.4. Audit Discussion	12
7. CONTAMINANTS AND MEDIA	13
7.1. Potential Contaminants of Concern	13
7.2. Media Assessed	13
7.3. Audit Discussion	13
8. CONCEPTUAL SITE MODEL	15
9. STAGES OF SITE INVESTIGATIONS AND MILESTONES	16
9.1. Chronology	16
9.2. Summary of Reports	16
9.2.1. Environmental Investigations Australia (EIA), Preliminary Site Investigation (May 2016)	16
9.2.2. Environmental Investigations Australia (EIA), Detailed Site Investigation 25-33 Brighton Avenue, Croydon Park (April 2018)	17
9.2.3. Environmental Investigations Australia (EIA), Detailed Site Investigation 15-21 Brighton Avenue, Croydon Park (September 2018)	18
9.3. Auditor Comment	19
10. SITE ASSESSMENT CRITERIA	20
10.1. Assessment Criteria for Soil	20
10.2. Criteria for Groundwater	21
10.3. Criteria for Soil Vapour	23
10.4. Data Evaluation	23
10.5. Audit Discussion	23
10.5.1. Appropriateness of Criteria	23
10.5.2. Criteria and LORs	23
11. ASSESSMENT OF INVESTIGATION RESULTS	24
11.1. Soil	24
11.2. Groundwater	25
11.3. Soil Vapour	26

11.4. Quality Assurance/Quality Control	27
11.4.1 Field QC Samples	27
11.4.2 Laboratory QC	27
11.4.3 General Requirements	28
11.5 Audit Discussion on Contamination Status	29
11.5.1 Soil	29
11.5.2 Vapour	29
11.5.3 Groundwater and Surface Water	29
12. REMEDIAL ACTION PLAN	30
12.1. Summary of proposed remediation	30
12.1.1. Extent of known contamination	30
12.1.2. Data Gaps	30
12.1.3. Extent of Remediation	30
12.1.4. Remedial Strategy	30
12.1.5. Preferred Remediation Option	31
12.2. Guideline Compliance	36
12.3. Audit Discussion	36
13. REMEDIATION AND VALIDATION	37
14. ASSESSMENT OF RISK	38
15. LONG TERM MANAGEMENT	39
16. POTENTIAL FOR OFF-SITE MIGRATION	40
17. REGULATORY REQUIREMENTS	41
17.1. Protection of the Environment Operations Act, 1997	41
17.2. Guidelines made by the NSW EPA	41
17.3. Guidelines approved by the EPA	41
17.4. Guidelines from International Sources	42
17.5. NSW EPA (2017) Appendix A: Decision-making process for assessing urban redevelopment sites	42
17.6.1. OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites	42
17.6.2 Aesthetic Issues	42
17.6.3 Investigation Levels	43
17.6.4 Groundwater Assessment	43
17.6.5 Hazardous Ground Gases	43
17.6.6 Background Soil Concentrations	43
17.6.7 Assessment of Chemical Mixtures	43

17.6.8 Assessment of Ecological Risks	43
17.6.9 Migration of Contaminants	43
17.6.10 Site Management Strategy	43
17.7 Audit Discussion	43
18. ADEQUACY OF CONSULTANT'S WORK	44
18.1. Audit Conclusions	44

TABLE

Table 1: Audit Meetings and Site Inspection	6
Table 2: Site Identification	8
Table 3: Key Stages of the Investigation and remediation	16
Table 4: Assessment Criteria for Soil (mg/kg)	20
Table 5: Assessment Criteria for Groundwater (µg/L)	22
Table 6: Analysis of Soil Data	24
Table 7: Analysis of Groundwater Data	26
Table 8: Site Investigation Field QA/QC	27
Table 9: Laboratory QA/QC	28
Table 10: Summary of General Reporting Requirements	28
Table 11: Summary of Field Methods and QA/QC	29

APPENDICES

APPENDIX A	FIGURES
APPENDIX B	INTERIM ADIVCE
APPENDIX C	SITE PHOTOGRAPHS

AUDIT REPORT REQUIREMENTS

The following items are listed in section 3.3 of NSW EPA (2017) *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 3rd Edition* as being required to be addressed in a Site Audit Report.

NSW EPA Reporting Requirement	Section in this Report
a) site location details, including maps giving details of potential receptors	3
b) site history including past, current and proposed zoning and approved use, describing all potentially contaminating activities on the site and adjoining land	5
c) a clear outline of the actual or potential contamination of the land	6
d) potential contaminants of concern from both on-site and off-site sources, listing each specific contaminant – where the auditor considers that a contaminant that would usually be expected to be of concern is not in this case, the auditor must state this and give reasons for this conclusion	7.1
e) soil stratigraphy and hydrogeology	4.2 & 4.3
f) a conceptual site model	8
g) a clear statement of the investigation and remediation that has taken place	9.1
h) evaluation of quality assurance and quality control plans, including appropriate implementation of sampling plan(s), sample handling, collection and transport processes	11.4 & 13.4
i) a summary of all analytical results and an evaluation of those results	11
j) a summary and justification of environmental quality criteria used by the auditor in assessing the reports of consultants	10
k) assessment of risks to human health, structures and the environment arising from the actual or potential contamination of land	10.4
l) the need for any ongoing management of residual contamination and how that management should be achieved	15
m) requirements relevant to the audit imposed by the planning consent authority, EPA or any other public authority and documented evidence that these requirements have been met	17
n) any evidence of, or potential for, migration of contaminants from the site including odour, air quality, stormwater, sedimentation, soil vapour, ground gases and groundwater issues – where the auditor considers that off-site migration is not a potential issue, the auditor must say this and give reasons for this conclusion	16
o) an assessment of aesthetic issues, odours and background soil concentrations where these are required by these guidelines or other guidelines made or approved by the EPA	17.6.2
p) conclusions and recommendations, and details of how they have been reached	18.1
q) any other information relevant to the site audit, including copies of correspondence between the auditor and consultant(s) relevant to the outcome of the assessment, remediation and validation works	Appendix B
r) the auditor's opinion of the adequacy of the work of each consultant in relation to all of the above areas	18
s) documentation of all cases where the consultants have departed from applicable guidelines with appropriate comment on whether these departures are acceptable	17.6.1

EXECUTIVE SUMMARY

Background

Dyldam Pty Ltd engaged Rod Harwood, a New South Wales (NSW) Environmental Protection Authority (EPA) Accredited Contaminated Land Site Auditor (Accreditation Number 03-04), to provide Audit Services for the site located at 15-21 and 25-33 Brighton Street, Croydon Park, NSW. The site is known as Lot C DP440959, Lot 2A Section 2 DP3010, Lot A&B DP33356, Lot 1 DP123636 and Lot 10, DP102819.

The area is annotated on Figures as Appendices to this report and also on the SAS which will be completed after the completion of this report.

The site is to be redeveloped as a high density residential development.

This Site Audit Report (SAR) has been developed to document the information reviewed as part of a site audit of contamination assessment, and to form the basis and rationale for the conclusions contained in the associated Site Audit Statement (SAS) No.304.

Canterbury-Bankstown Council has requested that a NSW EPA Accredited Auditor be engaged to a Site Audit Statement (SAS) following validation of the site. The audit is therefore a Statutory Audit under the Contaminated Land Management Act, 1997.

Environmental Investigations

EIAustralia completed a Preliminary Site Investigation (PSI) in 2016 and two Detailed Site Investigations (DSI) in 2018. The site history provided in the PSI identified historical land use as residential from the 1940s to the 1980s when the use changed to commercial/industrial. Potentially contaminating land uses at the site have included mechanical workshops, tyre fitting, and underground storage of fuel.

Soil and groundwater investigations have identified a small area of asbestos impact to shallow fill, concentrations of metals exceeding the ecological investigation levels (EILs) in shallow fill and petroleum hydrocarbons in soil in close proximity to the underground storage tank in the southwest.

A Remedial Action Plan (RAP) has been prepared by EIA to make the site suitable for the proposed high-density residential land use. The RAP states that the preferred remedial strategy is off-site disposal of impacted soils to licensed waste facilities. The remedial works will also involve an additional investigation for data gap closure; UPSS excavation and disposal.

Audit Conclusions

Based on the discussion presented above, the Auditor is satisfied that the site has been demonstrated through assessment and intrusive sampling that the site may be suitable for the proposed high density residential land use with the provision that the Remedial Action Plan is followed.

A Section B site audit statement has been prepared.

1. INTRODUCTION

1.1. Background to this Site Audit Report

Dyldam Pty Ltd engaged Rod Harwood, a New South Wales (NSW) Environmental Protection Authority (EPA) Accredited Contaminated Land Site Auditor (Accreditation Number 03-04), to provide Audit Services for the site located at 15-21 and 25-33 Brighton Avenue, Croydon Park, NSW. The site is known as Lot C DP440959, Lot 2A Section 2 DP3010, Lot A&B DP33356, Lot 1 DP123636 and Lot 10, DP102819.

A Site Audit Notification (SAN) was submitted to NSW EPA on the 12th of July 2019 (SAN 304).

The area is annotated on Figures as Appendices to this report.

The site is to be redeveloped for the construction of a high density mixed commercial and residential land use.

This Site Audit Report (SAR) has been developed to document the information reviewed as part of a site audit of contamination assessment and remediation, and to form the basis and rationale for the conclusions contained in the associated Site Audit Statement (SAS) No.304.

Canterbury-Bankstown Council made the request for Audit as follows:

A preliminary assessment has now been completed of the two Detailed Site Investigation (DSI) reports you have submitted.

This assessment notes that the DSI for 15-21 Brighton Avenue Croydon Park recommends that prior to future redevelopment of the site, supplementary investigations are completed to close current investigation data gaps. The DSI for 25-33 Brighton Avenue recommends development and implementation of a Remedial Action Plan and preparation of a final site validation report by a suitably qualified environmental consultant to certify the site suitability for the proposed land use.

The findings of the DSIs clearly state that further investigation, and/or reporting is required.

The preliminary assessment recommends that a NSW EPA accredited site auditor be engaged to review and endorse the DSIs and the proposed actions required, and to issue a 'Section B' Site Audit Statement and Report to indicate suitability of the site for the proposed use. Council will require this to occur before the Planning Proposal can be further progressed.

The engagement of a site auditor and Site Audit Statement and Report is necessary to advise on what further investigation and reporting is required to establish the site's suitability for the proposed land use, and also to review the information contained in the submitted DSIs.

This is to ensure Council meets SEPP 55 requirements that it must be satisfied that the land is suitable, or will be suitable, after remediation, for all the purposes permitted in the proposed R4 zone. Council is not fully satisfied that the land can be made suitable for the proposed zone, and requires the measures outlined above to occur before it can proceed further.

The audit is therefore a Statutory Audit under the Contaminated Land Management Act, 1997.

The Contaminated Land Accredited Site Auditor (accredited by the NSW Environment Protection Authority (EPA)) and the scope of the Audit are contained in Section 2. The SAS and SAR relate to the property identified in Section 3.

1.2. Overview of the Site Audit Process

The Site Audit has been conducted in accordance with the requirements of the Contaminated Land Management (CLM) Act 1997. The CLM Act (Part 1, Section 4) describes a site audit as an independent review:

- a. that relates to management (whether under this Act or otherwise) of the actual or possible contamination of land, and
- b. that is conducted for the purpose of determining any one or more of the following matters:
 - i. the nature and extent of any contamination of the land,
 - ii. the nature and extent of any management of actual or possible contamination of the land,
 - iii. whether the land is suitable for any specified use or range of uses
 - iv. what management remains necessary before the land is suitable for any specified use or range of uses,
 - v. the suitability and appropriateness of a plan of management, long-term management plan or a voluntary management proposal.

NSW EPA (2017) Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd edition), describes the site assessment and audit process as:

1. Consultant is commissioned to assess contamination

In most cases, a site owner or developer engages a contaminated site consultant to assess a site for contamination and, where required, to develop a remediation plan, implement the plan and validate the remediation.

The contaminated site consultant designs and undertakes the site assessment and, where required, all remediation and validation activities to achieve the objectives specified by the owner or developer. The site Auditor independently reviews the works undertaken to ensure that they comply with current regulations, standards and guidelines, and that the site has been assessed, remediated and validated to a standard appropriate to the proposed land use.

2. Site auditor reviews the consultant's work

The site owner or developer commissions the site auditor to review the consultant's work. The auditor prepares a site audit report and a site audit statement at the conclusion of the review, which are given to the owner or developer.

Where the planning consent authority or the EPA uses its legal powers to require the carrying out of a site audit, the site owner or developer must commission a site auditor accredited under the CLM Act to perform this task. This is known as a 'statutory' audit. The CLM Act requires that an auditor must notify the EPA when they have been commissioned by anyone other than the EPA to perform a statutory site audit. The auditor is also required to furnish the local authority and the EPA with a copy of the completed site audit statement and must give a copy of the site audit report to the local authority, the consent authority if different to the local authority and/or the EPA on request.

Section 53B(6) of the CLM Act describes that site audits conducted by EPA accredited site Auditors must take the following matters into account:

- the provisions of the CLM Act and the CLM Regulations;
- the guidelines made or approved by the EPA; and
- the provisions of any environmental planning instruments applying to the site.

Guidelines made and approved by NSW Environment Protection Authority (EPA) are listed in Section 17 of this document.

2. AUDIT DETAILS

2.1. Site Auditor

The NSW EPA Contaminated Land Accredited Site Auditor who conducted this site audit was Mr Rod Harwood (NSW EPA Accreditation Number 03-04).

Formal Site Audit Notification submitted to NSW EPA on the 12th of July 2019 (EPA Reference DOC 19/602221).

2.2. Site Audit Statement

This SAR relates to Site Audit Statement (SAS) Number 304.

2.3. Input to this Report by Auditor's Support Team

The Auditor did not rely on members of his support team during this Audit but did utilise Renee Ashton from HEC in the preparation of this report.

2.4. Type of Audit

A statutory site audit is one that is required by:

- a regulatory instrument issued under the Contaminated Land Management Act 1997 (CLM Act), including EPA agreements issued by EPA to voluntary proposals
- the Environmental Planning and Assessment Act 1979, including an environmental planning instrument or development consent condition.
- any other Act.

Canterbury-Bankstown Council has requested that a NSW EPA Accredited Auditor be engaged to provide oversight of the contamination on the site. The audit is therefore a Statutory Audit under the Contaminated Land Management Act, 1997.

This Site Audit Report has been written in accordance with NSW EPA (2017) Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd edition).

2.5. Proposed Development

The current proposal is to redevelop the site for high density mixed commercial and residential use. Based on the plans provided by the client, the proposed development involves demolition of all existing structures, followed by the construction of multiple, 4 to 5 storey, mixed commercial and residential apartment buildings. Commercial apartments will occupy the ground floor of each building fronting Brighton Avenue. The development will include a one to two level, basement car parking facility, requiring excavation of site soils to approximately 6m bgl.

2.6. Potential for Conflict of Interest

Under the provisions for the Site Auditor Scheme laid out in the Contaminated Land Management Act 1997, section 54 deals with the potential for conflict of interest in conducting contaminated Site Audits. Section 54 of the Contaminated Land Management Act 1997 states:

1. A site auditor must not carry out a site audit of land:
 - i. if he or she is or is related to a person by whom any part of the land is owned or occupied, or
 - ii. if he or she has a pecuniary interest in any part of the land or any activity carried out on any part of the land, or
 - iii. if it involves the site auditor reviewing any aspect of work carried out by, or a report written by, the site auditor or a person to whom the site auditor is related.

2. A site auditor has a pecuniary interest for the purposes of this section if there is a reasonable likelihood or expectation of appreciable financial gain or loss to the site auditor, or to a person to whom he or she is related, from the relevant part or activity, but does not have such an interest if the interest is so remote or insignificant that it could not reasonably be regarded as likely to influence any decision that the site auditor might make in relation to a site audit of the land.
- A site auditor is related to a person for the purposes of this section if the site auditor:
 - is an employer, partner or employee of the person, or
 - is a spouse, de facto partner, sibling, parent or child of the person, or
 - has a contractual arrangement with the person that might reasonably be seen to give rise to a conflict between the site auditor's duties as a site auditor and the site auditor's interests under the arrangement, or
 - is employed by the same employer as the person.

The Auditor confirms that none of the above conditions apply with regard to this Audit as the Auditor:

- Within the meaning given in S 54(3) of the Contaminated Land Management Act 1997 is not related to the site owners or occupiers;
- Does not have a pecuniary interest in the land or any activity carried out on the land; and
- Has not ever been employed by any of the companies involved in the contaminated site assessment and remediation.

2.7. Objectives of Audit

The objective of the audit is to provide a Site Audit Statement and Site Audit Report for the site certifying that there are no risks posed to human health or the environment for the proposed high density residential development, with the provision that the Remedial Action Plan is followed and implemented.

2.8. Documents Reviewed

The Auditor has been provided with the following documents detailing the environmental investigations conducted at the site:

- Environmental Investigations Australia (EIA) (26 May 2016) Preliminary Site Investigation Report, 15-33 Brighton Avenue, Croydon Park NSW.
- Environmental Investigations Australia (EIA) (20 April 2018) Detailed Site Investigation, 25-33 Brighton Avenue, Croydon Park NSW.
- Environmental Investigations Australia (EIA) (10 September 2018) Detailed Site Investigation, 15-21 Brighton Avenue, Croydon Park NSW.
- Environmental Investigations Australia (EIA) (30 September 2019) Remediation Action Plan, 15-33 Brighton Avenue, Croydon Park NSW.

2.9. Audit Meetings and Site Inspection

Audit meetings and site inspections are summarised Table 1 below.

Table 1 Audit Meetings and Site Inspection

Date	Reason	Observations
28 th August, 2019	Site inspection	Site was tenanted.

2.10. Audit Correspondence

The Site Auditor provided feedback during the course of the audit on reports provided for review, documented as verbal communication. Letters of Interim Advice and checklists of reports against the requirements of OEH (2011) are provided in Appendix B.

3. SITE IDENTIFICATION & SURROUNDS

This section provides details of the site and its land use, it describes the surrounding land uses and summarises the potentially sensitive human health and environmental receptors. This information has been sourced primarily from the consultants' reports, the Auditor's observations of the site and, where required, from referenced published literature.

3.1. Site Identification and Land use

The site location is shown in Figure 1, Appendix A. The layout of the site is shown on Figure 2 Appendix A.

The site identification and land use details are included in Table 2 below.

Table 2 Site Identification

Item	Detail
Street Address	15-33 Brighton Avenue, Croydon Park NSW
Lot and DP	Lot C in DP 440959, Lot 2A Section 2 in DP 3010, Lot A & B in DP 333556, Lot 1 in DP 123636, Lot 11 in DP 862370 and Lot 10 in DP 1026819.
Area	Approximately 1.47 ha.
Co-ordinates	Easting: 325177.537 Northing: 6247756.784
Local Government	Canterbury-Bankstown City Council.
Site Location	Figure 1.
Surrounding Land Use	North: Residential dwellings. East: Residential dwellings. South: Residential dwellings. West: Brighton Ave followed by residential dwellings.
Nearby Sensitive Receptors	Cooks River approximately 500m south of the site. Residential dwellings north (<180m), east (<30m), south (<150m) and west (<60m). Croydon Park Uniting Church (<65m north) Croydon Park Public School (125m north) St Matts Church Ashbury (280m north-east) Seedlings Kids Childcare (<135m south) Croydon Park (parkland) (460m south) Robert's Dale Campus SMBC (Christian College) (<200m east) St Francis Xavier Catholic School & Church (400m east) W H Wagener Sporting Oval (750m east)
Current Land Use	Commercial/Industrial.
Current Zoning	IN2 – Light Industrial (Canterbury City Council LEP, 2012)
Proposed Land Use	Mixed commercial and residential apartment buildings.

3.2. Audit Discussion

The Auditor is satisfied that the site identification details provided are an accurate representation of the area and are generally consistent with the Auditor's observations and knowledge of the area.

4. ENVIRONMENTAL SETTING

4.1. Topography and Hydrology

EIA (2016) provide following description of the topography and hydrology of the site:

The site slopes towards the south to south-west based on observations made during the site walkover inspection. Site drainage is likely to be consistent with the general slope of the site. Stormwater is likely to be collected by pit and pipe drainage, and drain either to the municipal stormwater system or to Cooks River, located approximately 500m south of the site.

The topography of the site observed during the Auditor's site visit was consistent with the description above.

4.2. Soils and Geology

4.2.1 Regional Geology

EIA (2016) describe the regional geology as:

With reference to the 1:100,000 scale Geological Series Sheet 9130 (Sydney), the site is located within close proximity to the contact of the Ashfield Shale and Bringelly Shale. Ashfield Shale is described as black to dark-grey shale and laminite, while the Bringelly Shale is described as shale, carbonaceous claystone, laminite, fine to medim-grained lithic sandstone, rare coal and tuff.

The soil Conservation Service of NSW Soil Landscapes of the Sydney 1:100,000 Sheet (Chapman and Murphy, 2002) indicates that the site overlies the Blacktown soil landscape, which is described as gently undulating rises on the Wianamatta Group shales, with shallow to moderately deep (<100 cm) red and brown podzolic soils on crests, upper slopes and well drained areas; deep (150 – 300cm) yellow podzolic soils and soloths on lower slopes and in areas of poor drainage.

The Auditor has confirmed this mapping.

4.2.2 Site Soil Profile and Geology

The site geology observed by EIA (2018) is reproduced by the Auditor below.

0 to approx. 0.3 mbgl: Concrete

0 to approx. 0.05 mbgl: Topsoil: Silty sand; fine to medium grained, brown, with trace rootlets, moist and no odour.

0.05 to approx. 0.5 mbgl (max depth 1.3 mbgl): Fill: Clayey sand; fine to coarse grained, dark brown, with angular to sub-angular gravels, no odour.

0.3 to approx. 6.1 mbgl: Residual Clay: Silty clay; low to medium plasticity, orange mottled grey, no odour.

0.5 to approx. 8.2 mbgl: Bedrock: Sandstone/shale.

The Auditor is satisfied that the geological descriptions accurately describe the fill and natural profile at the site.

4.2.3 Acid Sulphate Soils

EIA (2016) describe the acid sulfate soil potential of the site as follows:

The Canterbury City Council LEP 2012 Acid Sulfate Soils Map (Sheet_006) shows the site to be within areas mapped as Class 5 Acid Sulfate Soils (ASS). Class 5 ASS are located within 500m on adjacent

Class 1, 2, 3 or 4 land. Works in Class 5 areas that are likely to lower the water table by 1 mAHD and by which the water table is likely to be lowered below 1 mAHD on adjacent Class 1, 2, 3 or 4 land.

With reference to the Prospect Parramatta Acid Sulfate Soil Risk Map (1:25,000 scale; Murphy, 1997), the site is located within an area of no known occurrences.

The Auditor has checked the mapping with the and agrees with the mapping.

4.3. Hydrogeology

No hydrogeology background is provided in EIA (2016, 2018). However, an online search of registered groundwater bores was conducted by EIA (2016) through the NSW Department of Primary Industries – Office of Water Groundwater resources map (Ref. <http://allwaterdata.water.nsw.gov.au/water.stm>). There were no registered bores within a 500m radius of the site.

4.4. Audit Discussion

4.4.1 Soils and Geology

The Auditor is satisfied that the consultants have adequately documented the soils and geology of the site, including ASS, from a regional and site perspective.

4.4.2 Hydrogeology

The Auditor is satisfied that the regional hydrogeology is sufficiently documented for the purposes of the assessment.

5. SITE HISTORY

5.1. Auditor's Summary of Site History

The site history provided in EIA (2016) was sourced by a review of historical title deeds dating back to 1898 and review of historical aerial photographs dating back to 1930. A summary of the site history as provided by EIA (2016) is provided below:

All the lots appear to have been used for residential purposes from at least the 1930s. The land use changed from residential to commercial across all the lots between approximately the late 1940s and 1980s, with residential dwellings removed and multiple commercial warehouses built.

Council records indicate various commercial/industrial land uses have been undertaken at the site. Potentially contaminating activities include; manufacturing and fitting of automotive exhaust systems; repair, servicing and warehousing of electrical equipment; timber yard; wholesale and storage of batteries; storage of boats and heavy machinery; printing factory; bulk storage of building materials including sandstone and tiles; motor mechanics and manufacturing of fibreglass components. An environmental assessment was undertaken in 2008 at 17 Brighton Ave, which identified evidence of oil spillage, with no precautionary methods in place to prevent discharge into the stormwater system.

5.2. Audit Discussion

The Auditor is satisfied that the site history identified by the consultant is adequate given the site location and usage.

6. SITE CONDITION

6.1. Previous Site Layout

The previous site layout is shown in historical aerial photographs provided by EIA (2016).

Images indicate that the site appears to have been residential from at least the 1930's to early 1970s-1990s. Land use changes from residential to commercial/industrial, with all residential dwellings demolished, and several large warehouses built across the site. The site is currently used for commercial/industrial purposes (storage and distribution of radiators, air conditioning units and textile goods (including linen and clothing), with parts of the site cleared and covered in concrete.

6.2. Current Site Layout

The site is currently occupied by six large commercial/industrial warehouses and one former residential dwelling, with unsealed and sealed areas surrounded by the site building.

6.3. Visible and Olfactory Signs of Contamination

During the preliminary site walkover, EIA (2016) noted no suspicious odours in any accessible areas. No evidence of staining (i.e. from vehicles) was observed and no evidence of stress to plants was identified in accessible areas.

In the Detailed Site Investigation, EIA (2018) notes the presence of a diesel underground storage tank and bowser was identified within the south western corner of the site. A weak hydrocarbon odour and dark grey staining was noted from approximately 0.3 to 0.4 mBGL within fill material in BH106. Charcoal/ash was evident in the fill soil profile at BH105.

6.4. Audit Discussion

The site condition described by the consultants is generally consistent with the review of historical documentation.

7. CONTAMINANTS AND MEDIA

7.1. Potential Contaminants of Concern

The site history review identified the following potential contaminants in soil and groundwater at the site (EIA, 2016, 2018):

Soil:

- Total petroleum hydrocarbons (TRH);
- Benzene, toluene, ethylbenzene, total xylenes (BTEX);
- Volatile organic compounds (VOC);
- Polycyclic aromatic hydrocarbons (PAH);
- Polychlorinated biphenyls (PCB);
- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
- Other metals (Be, Co, Cr, Mn and Se);
- Organochlorine and organophosphate pesticides (OCP/OPP);
- Semi-volatile organic compounds (SVOC);
- LNAPL and DNAPL;
- PFAS;
- Phenolic compounds (including pentachlorophenol); and
- Asbestos.

Groundwater:

- TRH;
- BTEX;
- Volatile organic compounds (VOC), including chlorinated VOC;
- Polycyclic aromatic hydrocarbons (PAH);
- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc); and
- Phenols

The Auditor is satisfied that this suite of potential contaminants in soil addresses the identified potential sources.

7.2. Media Assessed

Media assessed included soil and groundwater, with PID readings taken during soil sampling.

The Auditor is satisfied that soil vapour monitoring is not required to understand the contaminant profile of the site as volatile contaminants were not identified at the site.

7.3. Audit Discussion

The potential contaminants identified are consistent with the known site history. The Auditor is satisfied that the contaminant suite identified is appropriate.

The Auditor is satisfied that all potentially affected media have been assessed. Soil vapour assessment would only be required by the Auditor if volatile contaminants exceeding current NEPC (2013) HSL values were identified. No such impacts were apparent.

8. CONCEPTUAL SITE MODEL

EIA (2018) provided the following conceptual site model for 15-21 Brighton Avenue, Croydon Park:

Detailed Site Investigation
15-21 Brighton Avenue, Croydon Park NSW
Report No. E23959.E02_Rev0

Page | 25

Table 5-5 Conceptual Site Model

Impacted Media	Contaminants of Potential Concern	Transport mechanism	Exposure pathway	Potential receptor
Soil	HM, TRH, PAH, BTEX, OCP, OPP, PCB, and asbestos	Disturbance of surficial and subsurface soils during site redevelopment, future site maintenance and future use of the site post redevelopment	Ingestion; Dermal contact; Inhalation of asbestos fibres and dust particulates	Current commercial occupants at the site Construction and maintenance workers End users of the site post redevelopment
		Atmospheric dispersion from soil to indoor and outdoor air spaces	Inhalation of asbestos fibres and dust particulates	
	HM, TRH, PAH, BTEX, OCP	Plant uptake of contamination present in root zone	Plant uptake	Future ecological receptors (e.g. site vegetation post redevelopment)
Groundwater	HM, TRHs, BTEX, PAHs, volatile organic compounds (VOCs), and Phenols (Total).	Volatilisation of contamination from groundwater to indoor or outdoor air spaces (onsite and offsite)	Inhalation of vapours	End users of the site post-development Basements users (on and offsite)
		Migration of dissolved phase impacts in groundwater	Contaminants arriving at receiving surface water bodies could lead to ingestion and dermal contact	Aquatic ecosystems Ecological Receptors (Cook's River) Recreational water users
	F1 and F2 TRH, BTEXN, Phenols (Total) and VOCs	Potential seepage into deep basement intercepting water table (on and offsite)	Dermal contact Ingestion	Basements users
Building fabrics containing hazardous materials	Lead, PCB and asbestos	Release of hazardous materials during uncontrolled demolition of building fabrics	Ingestion; Dermal contact; Inhalation of airborne contaminants	Construction and maintenance workers

EIA (2018) provided the following conceptual site model for 25-33 Brighton Avenue, Croydon Park.

Detailed Site Investigations (DSI)
25 - 33 Brighton Avenue, Croydon Park NSW
Report Number: E23775.E02_Rev0 | 20 April 2018

Page | 11

Table 4-5 Preliminary Conceptual Site Model

Site Area	Subsurface Profile	Potential Sources	Potential Contaminants	Media	Sensitive Receptor	Migration & Exposure Pathways	Potential Risk of Complete Exposure Pathway
(overall site area) 25 - 33 Brighton Avenue, Croydon Park NSW	Anthropogenic fill overlying residual clays	Commercial activities, UPSS, asbestos sheeting, filling, termiticides, lead paint, vehicle storage, general waste.	Pesticides, Heavy Metals, Petroleum Hydrocarbons (including PAHs), OCPs, Asbestos, Unknown	Building fabric Soils/Bedrock Groundwater Air/Soil Vapour LNAPL/DNAPL (if present)	Cooks River Site Workers during demolition and construction Future site residents	Seepage into the subsurface soils, bedrock and groundwater. Dermal Contact Ingestion Inhalation	M – H (should contamination be present) M – H (should contamination be present) L (post development)

Notes: L = Low Risk; M = Moderate Risk; H = High Risk

Auditor Comment: The Auditor concludes the CSM adequately summarises the likely source-pathway-receptor linkages at the site.

9. STAGES OF SITE INVESTIGATIONS AND MILESTONES

9.1. Chronology

A summary of key stages of the investigations is presented in Table 3.

Table 3 Key Stages of the Investigation and remediation

Date	Investigation or Milestone
May 2016	Preliminary Site Investigation (EIA)
20 April 2018	Detailed Site Investigation (EIA) 25-33 Brighton Avenue, Croydon Park.
10 September 2018	Detailed Site Investigation (EIA) 15-21 Brighton Avenue, Croydon Park.
12 th July 2019	Site Audit Notification submitted
14 th August 2019	Auditor Site Visit
30 September 2019	Remediation Action Plan (EIA)

9.2. Summary of Reports

An overview of the investigation reports provided by the consultants is provided by the Auditor below to allow a sound understanding of the assessment, remediation and validation processes undertaken at the site.

Detailed examinations of key parts of the documents are provided elsewhere in the relevant sections of this Audit Report.

9.2.1. Environmental Investigations Australia (EIA), Preliminary Site Investigation (May 2016)

The Auditor has summarised the works conducted in the PSI report as follows:

- Collation and interpretation of data from the following sources to assess the environmental setting and update the site historical information:
 - Published data including geological and acid sulfate soil maps;
 - Historical aerial photographs;
 - Historical land title information;
 - Council records;
 - NSW EPA Contaminated Land and Protection of Environment Operations databases;
 - NSW EPA/OEH records;
 - SafeWorks NSW Stored Chemical Information Database (SCID)

The Auditor's summary of the report conclusions is as follows:

- The site was historically used primarily for residential purposes until between the late 1940's and 1980's. It has been used for commercial/industrial purposes from the 1980's until present.
- At the time of the EIA inspection, the site contained 6 large commercial/industrial warehouses and one former residential dwelling, with unsealed and sealed areas surrounded the site building.
- The site walkover inspection identified areas of environmental concern:
 - Radiator mechanical workshop (19 Brighton Ave).
 - Potential for hazardous building materials to be present across the site;
 - Potential for fill material of unknown origin to be present;
 - Presence of a diesel underground storage tank and bowser identified within the south western corner of the site.

- The qualitative risk assessment was derived for the site with respect to the proposed development, which involves sensitive land use (residential with minimal access to soils).
 - The risk assessment identified a general medium risk of contamination to be present at the site.
- Based on the findings of the investigation, EIA (2016) recommended that a Hazardous Materials Survey (HMS) and Detailed Site Investigation (DSI) should be conducted at the site.

9.2.2. Environmental Investigations Australia (EIA), Detailed Site Investigation 25-33 Brighton Avenue, Croydon Park (April 2018)

The Auditor has summarised the works conducted at 25-33 Brighton Avenue, Croydon Park:

- The site comprised of a rectangular shaped block, covering a total area of approximately 1.47 ha;
- The site was free of statutory notices issued by the NSW EPA/DECC;
- The presence of a diesel bowser and fill points indicated a UST in the South west portion of the site in the vicinity of BH7M;
- Soil sampling and analysis were conducted at 21 targeted test bore locations (BH1M-BH21) down to a maximum depth of 6.4m bgl.
- The sub-surface layers comprised of anthropogenic fill materials underlain by residual clays and sandstone and shale bedrock;
- Soil samples were screened using a PID, the maximum reading (64.1ppm) was observed at BH13M in the sample collected at 5.5-5.6m bgl.
- A total of 5 bores were converted into monitoring wells ranging from 6.0-6.4m deep (BH1M; BH4M; BH7M; BH10M; and BH13M);
- Groundwater was encountered at depths ranging from 14.35 to 18.25m AHD;
- Asbestos was reported in fill soils at locations BH3 and BH10M;
- The heavy metals: copper; nickel; and zinc were identified at levels above the adopted GILs in all groundwater sampling locations.
 - Sample BH13-1 found concentrations of Acetone (2-propane) above laboratory PQLs.
- EIA concluded due to the absence of the majority of contaminants highlighted within the CSM, the potential risk of complete exposure pathways to exist is considered to be low.

EIA Recommend:

- Preparation of a Remedial Action Plan (RAP) that outlines:
 - Removal of the identified UST and associated infrastructure including the bowser, feed lines and vent pipes;
 - Development of suitable remediation options for identified impacted fill (asbestos) and other excess soil by excavation and disposal or other appropriate method;
 - Document waste classification assessment of soil earmarked for any excavation that may occur including piling waste, backfill material from excavations at the site, in accordance with the EPA (2014) Waste Classification Guidelines;
 - Document waste classification assessment of soil earmarked for any excavation that may occur including piling waste, backfill material from excavations at the site, in accordance with the EPA (2014) Waste Classification Guidelines;

- Document preliminary environmental management consideration and a preliminary validation sampling and quality plan;
- Implementation of the RAP; and
- Preparation of a site validation report.

9.2.3. Environmental Investigations Australia (EIA), Detailed Site Investigation 15-21 Brighton Avenue, Croydon Park (September 2018)

The Auditor has summarised the works conducted at 15-21 Brighton Avenue, Croydon Park:

- The site, which fronts Brighton Avenue to the west, consists of four allotments (Lot C DP440959; Lot 2A Section 2 in DP3010; Lot A & B in DP 333556; and Lot 1 in DP 123636), covering a total area of 5074m²;
- Historical records indicated the site appears to have been residential from the early 1900s to early 1970s-1990s. Land use changed from residential to commercial/industrial, with all residential dwellings demolished, and several large warehouses built across the site.
- The site is currently used for commercial/industrial purposes (storage and distribution of radiators; air conditioning units; and textile goods (including linen and clothing)).
- The site was free of statutory notices issued by the NSW EPA and was not recorded on the list of NSW Contaminated Sites Notified to EPA or the POEO register;
- A search of SafeWork NSW records relating to the site confirmed no records indicating the storage of dangerous goods on the allotments;
- The sub-surface layers consisted of primarily clayey, gravelly, sand fill materials, overlying residual clays (low to high plasticity) and weathered shale bedrock;
- Groundwater was encountered at depths ranging from 2.98 to 3.90 m bgl;
- Soil sampling and analysis were conducted at 14 borehole locations (BH101M to BH114) down to a maximum depth of 8.2m bgl;
- All tested analytes were below the adopted HIL/HSL levels and the ecological criteria, with the following exceptions:
 - BH105_0.3-0.4 exceeded the EIL for copper (150 mg/kg) and zinc (270 mg/kg); and
 - BH108M_0.4-0.5 exceeded the EIL for zinc (210 mg/kg) and TRH F2 (130 mg/kg).
- Three groundwater monitoring wells (BH101M, BH108M and BH112M) were installed during the investigation.
 - Groundwater was encountered in one of the three monitoring wells during the installation at a depth of 7.0m bgl.
 - During the GME, groundwater was detected in all three monitoring wells with standing water levels between 2.98m BTOC and 3.90 mBTOC;
- The tested analytes for the groundwater samples collected from BH101M, BH108M and BH112M were below the GIL criteria, with the following exceptions:
 - BH101M-1 exceeded copper (64µg/L) and zinc (200µg/L);
 - BH108M-1 exceeded copper (63µg/L), nickel (89µg/L) and zinc (300µg/L); and
 - BH112M-1 exceeded copper (59µg/L) and zinc (210µg/L).
- The following data gaps identified:

- The quality of soils beneath building structure areas (including areas of parked vehicles) of the site not assessed during this investigation; and
- Potential presence of hazardous materials present within the existing structure.

EIA Recommend:

- Prior to any future development onsite, this report is to be reviewed in conjunction with the proposed architectural plans;
- Prior to site demolition, carry out a Hazardous Materials Survey on existing site structures to identify potentially hazardous products that may be released to the environment during demolition;
- Prior to any redevelopment of the site, supplementary investigations are to be completed to close current investigation data gaps to ascertain if any unknown contamination is present that could require remediation and preparation of a supplementary report;
- Any material being removed from site (including VENM) should be classified for offsite disposal in accordance with the EPA (2014) Waste Classification Guidelines; and
- Any material being imported to the site should be assessed for potential contamination in accordance with NSW EPA guidelines as being suitable for the intended use or be classified as VENM.

9.3. Auditor Comment

The number of sampling locations (35) is sufficient to characterise the site. The data indicates the site has remained relatively free of gross contamination, with the main contaminants in soil identified being asbestos and metals in shallow fill and petroleum hydrocarbons in close proximity to the UST on the south-western portion.

The groundwater data indicates the UST and other commercial land uses have not impacted the subsurface.

10. SITE ASSESSMENT CRITERIA

The selected criteria and data evaluation methods adopted for the various investigation and validation phases of works conducted by the consultants are detailed and discussed in this section.

10.1. Assessment Criteria for Soil

The assessment criteria have been chosen in accordance with current Australian and NSW EPA guidelines. Australian Guidelines have been used in preference to international guidelines where available. The criteria provided are the most current and widely accepted for Tier 1 assessment of land use suitability at present in Australia and have generally been developed using a risk-based approach. Criteria from the NEPM (NEPC, 2013) Schedule B1 were utilised for this assessment.

The appropriate assessment criteria for the proposed site use used by EIA (2018) includes the following:

- Health Investigation Levels B (residential with minimal access to soil) – NEPM, 2013.
- Health Screening Level D (commercial/industrial sites for vapour intrusion) – NEPM, 2013.
 - Applied to assess for potential human health impacts from residual vapours resulting from petroleum, BTEX and naphthalene due to the basements planned use as a carpark.
- Management Limits for Petroleum Hydrocarbons – NEPM, 2013.
 - Should the ESLs and HSLs be exceeded for petroleum hydrocarbons, soil samples would also be assessed against the NEPM 2013 *Management Limits* for the TRH Fractions F1-F4 to assess propensity for phase-separated hydrocarbons (PSH), fire and explosive hazards and adverse effects on buried infrastructure.
- Ecological Investigation Levels/Ecological Screening Levels – NEPM, 2013.
- Health Screening Level A & B (low to high density residential) – NEPM, 2013.
- Soil asbestos results to be assessed against the NEPM, 2013 Soil HSL thresholds for “all forms of asbestos”.
 - Asbestos contamination HSL – A&B (residential) – Bonded ACM (%w/w).
 - Asbestos contamination HSL for Non Bonded/Friable Asbestos (%w/w).

The Auditor has reproduced the criteria in Table 4 below.

Table 4 Assessment Criteria for Soil (mg/kg)

Analyte	HIL-B	HSL-D a/b/c/d	Management Limits	EILs/ ESLs	HSL A&B a/b/c/d	LOR
METALS						
Arsenic	500	-	-	100	-	1
Cadmium	150	-	-	-	-	0.3
Chromium (VI)	500	-	-	205	-	0.3
Copper	30 000	-	-	90	-	0.5
Lead	1200	-	-	1260	-	1
Nickel	1200	-	-	35	-	0.5
Mercury	120	-	-	-	-	0.05
Zinc	60 000	-	-	190	-	0.5
Pesticides						

OPPs	-	-	-	-	1.7	
OCPs (total)	600	-	-	180	1	
PCBs (total)	1	-	-	-	1	
BTEX						
Benzene	-	3/3/3/3	-	50	0.7/1/2/3	0.1
Toluene	-	NL	-	85	280/NL	0.1
Ethylbenzene	-	NL	-	70	NL	0.1
Xylene	-	230/NL	-	105	-	0.3
TRH						
F1	-	260/370/630/NL	700	180	50/90/150/290	25
F2	-	NL	1000	120	180/NL	25
F3	-	-	3500	300	-	90
F4	-	-	10 000	2800	-	120
PAH						
B(a)P TEQ	4	-	-	-	-	0.3
B(a)P	-	-	-	0.7	-	0.1
Naphthalene	-	NL	-	170	5/NL	0.1
Total PAH	400	-	-	-	-	0.8
Asbestos (%w/w)	Presence/ absence		-	-	-	0.01

Notes:**a:** 0-<1m bgl**b:** 1-<2m bgl**c:** 2-<4m bgl**d:** 4+m bgl

The Auditor is satisfied that the methodology followed to calculate the EIL based on published data and site specific data was appropriate.

The Auditor is satisfied that the assessment criteria applied during the site assessment were suitable for site characterisation based on the site history and proposed residential use with minimal access to soil.

10.2. Criteria for Groundwater

In accordance with DEC (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*, groundwater acceptance criteria are based on environmental values considered relevant for groundwater use at the site and surrounding uses of groundwater and surface waters that may be affected by the site.

Groundwater criteria selected by EIA (2018) were:

- Groundwater Investigation Levels for Marine Water – NEPM, 2013.
 - For typical, slightly moderately disturbed aquatic ecosystems, which are based on the ANZECC and ARMCANZ 2000 Trigger Values for the 95% level of protection of aquatic ecosystems;
 - The 99% Trigger Values were applied for the bio-accumulative metals, cadmium and mercury.
- Groundwater Investigation Levels for Drinking Water – NEPM, 2013.

- Groundwater Investigation Levels for Fresh Water – NEPM, 2013.
- Health Screening Level A & B (low to high density residential) – NEPM, 2013.
- Health Screening Level D (industrial/commercial sites) – NEPM, 2013.
- NHMRC (2017) Recreational Water Guidelines

The Auditor has reproduced the criteria in Table 5 below. Note that whilst other analytes were analysed, only those with criteria are reproduced in Table 5.

Table 5: Assessment Criteria for Groundwater (µg/L)

Analyte	GIL (Marine)	GIL (Drinking Water)	GIL (Fresh Water)	NHMRC (2017) Recreational Water	HSL A&B a/b/c	HSL D	LOR
METALS							
Arsenic	NR	10	24 (AsIII) 13 (AsV)	100	-	NR	1
Cadmium	0.7	2	0.2	20	-	NR	0.1
Chromium	27 (Cr III) 4.4 (Cr VI)	50	3.3 (CrIII) 0.4 (CrVI)	50	-	NR	2
Copper	1.3	2000	1.4	1000	-	NR	1
Lead	4.4	10	3.4	100	-	NR	1
Nickel	7	20	11	200	-	NR	1
Mercury	0.1	1	0.6	10	-	NR	0.0001
Zinc	15	NR	8	3000	-	NR	5
BTEX							
Benzene	500	1	950	10	5/5/5	5000	0.5
Toluene	NR	800	180	25	NL	NL	0.5
Ethylbenzene	NR	300	80	3	NL	NL	0.5
Xylene	NR	600	275	20	NL	NL	1.5
TRHs							
F1	NR	NR	50	-	NL	6000	50
F2	NR	NR	60	-	NL	NL	60
F3	NR	NR	500	-	NL	NR	500
F4	NR	NR	500	-	NL	NR	500
PAH							
Naphthalene	50	0.01	16	-	NL	NL	0.5
Total PAHs	NR	NR	-	-	-	NR	1
Total Phenols	400	NR	320	2	-	NR	0.01
VOC							
Total VOCs	NR	NR	-	-	-	NR	10
Acetone (2-propanone)	NR	NR	-	-	-	NR	10

Notes:**a:** 2m to <4m**b:** 4m to <8m**c:** 8m+**NR:** None Recorded

The Auditor agrees the assessment criteria for groundwater are appropriate for site characterisation.

10.3. Criteria for Soil Vapour

Soil vapour were not assessed and criteria for soil vapour were not presented. See Section 10.5 below for the Auditors discussion of the absence of soil vapour sampling.

10.4. Data Evaluation

EIA (2018) adopted a direct comparison approach to use of the guidelines. Statistical analysis was not relied upon.

10.5. Audit Discussion

10.5.1. Appropriateness of Criteria

The Auditor is satisfied that the soil criteria adopted for soil and groundwater are appropriate to the proposed site use.

Soil vapour was not assessed, and the Auditor is satisfied that there is no indication that volatile contaminants are present. See Section 11.3 for further discussion.

10.5.2. Criteria and LORs

Tabulated comparison of criteria and assessment LORs for soils is presented in Table 4 and Table 5 above. All LOR values were below the adopted criteria and are therefore acceptable.

11. ASSESSMENT OF INVESTIGATION RESULTS

This section provides an overview of the soil results obtained from the environmental investigations conducted at the site. The figures provided in Appendix A show the site layout and sampling locations.

11.1. Soil

A summary of the primary soil sample results is reproduced by the Auditor in Table 6 below. The Auditor has summarised all data from EIA (2018) irrespective of geological strata with the intent of identifying those contaminants which were identified at the site as requiring remediation. This evaluation is intended to be a high-level screening assessment of the data to identify which contaminants may be problematic at the site.

Soil data are summarised in Table 6 below. Concentrations exceeding adopted criteria are highlighted in red.

Resolution by strata, where required, is discussed in Section 11.5 below.

Table 6: Analysis of Soil Data (mg/kg)

Analyte	HIL-B	HSL D a/b/c/d	Management Limits (Coarse grain)	EILs/ ESLs	HSL A&B a/b/c/d	Min	Max	LOR
METALS								
Arsenic	500	-	-	100	-	<1	25	1
Cadmium	150	-	-	-	-	<0.3	2.2	0.3
Chromium (VI)	500	-	-	205	-	1.2	62	0.3
Copper	30 000	-	-	90	-	<0.5	280	0.5
Lead	1200	-	-	1260	-	1	480	1
Nickel	1200	-	-	35	-	<0.5	73	0.5
Mercury	120	-	-	-	-	<0.05	0.13	0.05
Zinc	60 000	-	-	190	-	2.8	2200	0.5
Pesticides								
OPPs		-	-	-	-	<1.7	<1.7	1.7
OCPs (total)	600	-	-	180	-	<1	<1	1
PCBs (total)	1	-	-	-	-	<1	<1	1
BTEX								
Benzene	-	3/3/3/3	-	50	0.7/1/2/3	<0.1	<0.1	0.1
Toluene	-	NL	-	85	280/NL	<0.1	0.2	0.1
Ethylbenzene	-	NL	-	70	NL	<0.1	0.2	0.1

Xylene	-	230/NL	-	105	-	<0.3	1.3	0.3
TRH								
F1	-	260/370/ 630/NL	700	180	50/90/ 150/290	<25	36	25
F2	-	NL	1000	120	180/NL	<25	130	25
F3	-	-	3500	300		<90	760	90
F4	-	-	10 000	2800		<120	<120	120
C ⁶ -C ⁹	-	-	-	-		<20	24	20
C ¹⁰ -C ³⁶	-	-	-	-		<110	830	110
PAH								
B(a)P TEQ	4	-	-	-		<0.3	3.2	0.3
B(a)P	-	-	-	0.7		<0.1	2.3	0.1
Naphthalene	-	NL/NL/NL/NL	-	170	5/NL	<0.1	0.5	0.1
Total PAH	400	-	-	-		<0.8	23	0.8
Asbestos (%w/w)								
Presence/absence	-	-	-	-		No	Yes	0.01

Notes:

a: 0-<1m bgl

b: 1-<2m bgl

c: 2-<4m bgl

d: 4+m bgl

The Auditor is satisfied that the soil data is adequate to characterise the contamination status at the site. The number of sample locations (35) sampled by EIA (2018) is in line with the requirements for the site area of approximately 1.1 ha.

11.2. Groundwater

A summary of the primary groundwater sample results is reproduced by the Auditor in Table 7 below. The Auditor has summarised all data from EIA (2018) with the intent of identifying those contaminants which were identified at the site as requiring remediation. This evaluation is intended to be a high-level screening assessment of the data to identify which contaminants may be problematic at the site.

Groundwater data are summarised in Table 7 below. Concentrations exceeding site criteria are highlighted in red.

Table 7: Analysis of Groundwater Data (µg/L unless otherwise stated)

Analyte	GIL (Marine)	GIL (Drinking Water)	GIL (Fresh Water)	NHMRC (2017) Recreational Water	HSL A&B a/b/c	HSL D	Min	Max	LOR
METALS									
Arsenic	NR	10	24 (AsIII) 13 (AsV)	100	-	NR	<1	20	1
Cadmium	0.7	2	0.2	20	-	NR	<0.1	0.9	0.1
Chromium	27 (Cr III) 4.4 (Cr VI)	50	3.3 (CrIII) 0.4 (CrVI)	50	-	NR	1	3	2
Copper	1.3	2000	1.4	1000	-	NR	25	64	1
Lead	4.4	10	3.4	100	-	NR	2	4	1
Nickel	7	20	11	200	-	NR	35	170	1
Mercury	0.1	1	0.6	10	-	NR	<0.1	<0.1	0.0001
Zinc	15	NR	8	3000	-	NR	84	900	5
BTEX									
Benzene	500	1	950	10	5/5/5	5000	<0.5	<0.5	0.5
Toluene	NR	800	180	25	NL	NL	<0.5	<0.5	0.5
Ethylbenzene	NR	300	80	3	NL	NL	<0.5	<0.5	0.5
Xylene	NR	600	275	20	NL	NL	<0.5	<1.8	1.5
TRHs									
F1	NR	NR	50	-	NL	6000	<50	<50	50
F2	NR	NR	60	-	NL	NL	<60	<60	60
F3 (>C ₁₆ -C ₃₄)	NR	NR	500	-	NL	NR	<500	<500	500
F4 (>C ₃₄ -C ₄₀)	NR	NR	500	-	NL	NR	<500	<500	500
PAH									
Naphthalene	50	0.01	16	-	NL	NL	<0.1	<0.4	0.5
Total PAHs	NR	NR	-	-	-	NR	<1	<4	1
Total Phenols	400	NR	320	2	-	NR	<0.01	<10	0.01
VOC									
Total VOCs	NR	NR	-	-	-	NR	<10	28	10
Acetone (2-propanone)	NR	NR	-	-	-	NR	<10	24	10

Notes:

a: 2m to <4m

b: 4m to <8m

c: 8m+

NR: None Recorded

The Auditor is satisfied that the groundwater data is adequate to provide characterise the contamination status at the site.

11.3. Soil Vapour

Soil vapour was not assessed. As PID readings were very low and volatile compounds were not detected, a soil vapour assessment was not required.

11.4. Quality Assurance/Quality Control

This section of the SAR discusses both QA/QC sampling in the assessment stage as well as the adequacy of the sampling methods and sampling densities adopted and other similar aspects of the site assessment requiring appropriate documentation

11.4.1 Field QC Samples

The field QC evaluation is provided in Appendix I and J of EIA (2018). The Auditors summary of the field QC is provided below:

Table 8: Site Investigation Field QA/QC

Investigation	Field QA/QC Summary
Detailed Site Investigation EIA (2018) 25-33 Brighton Avenue	<p>Soil:</p> <p>One intra-laboratory duplicate and one inter-laboratory duplicate was collected and analysed for 14 primary samples. RPD results are summarised below:</p> <ul style="list-style-type: none"> BH8_0.3-0.4 and QD1 – acceptable results BH8_0.3-0.4 and QT1 – RPD exceedances for chromium, lead, nickel and zinc. <p>One rinsate, one trip blank, and one trip spike samples were collected during soil investigation works with acceptable results.</p> <hr/> <p>Groundwater:</p> <p>One intra-laboratory duplicate and one inter-laboratory duplicate was collected and analysed for 5 primary samples. RPD results are summarised below:</p> <ul style="list-style-type: none"> BH1M-1 and GWQD1 for chromium, copper and lead. BH1M-1 and GWQT1 for chromium, copper and lead. <p>One rinsate, one trip blank, and one trip spike sample was collected during groundwater investigation works. Zinc was detected in one rinsate sample at a concentration of 63µg/L.</p>
Detailed Site Investigation EIA (2018) 15-21 Brighton Avenue	<p>Soil:</p> <p>One intra-laboratory duplicate and one inter-laboratory duplicate was collected and analysed for 20 primary samples. RPD results are summarised below:</p> <ul style="list-style-type: none"> BH101M_04-0.5 and BH_QD1 – RPD exceedances for chromium, copper, lead, nickel and zinc. BH101M_04-0.5 and BH_QT1 – RPD exceedances for chromium, nickel and zinc. <p>One rinsate, one trip blank, and one trip spike sample was collected during soil investigation works with acceptable results.</p> <hr/> <p>Groundwater:</p> <p>One intra-laboratory duplicate and one inter-laboratory duplicate was collected and analysed for 5 primary samples. RPD results are summarised below:</p> <ul style="list-style-type: none"> BH101M-1 and GWQD1 for chromium, copper and lead. BH101M-1 and GWQT1 for F2, chromium, copper and lead. <p>One rinsate, one trip blank, and one trip spike sample was collected during groundwater investigation works.</p>

The concentrations of analytes where elevated RPD were observed were generally <5x the LOR and therefore a high RPD is likely to occur. Exceedances to criteria were not observed in the primary or duplicate samples therefore the non-compliance to the RPD criteria is not seen to affect the outcome of the assessment. The field QC data is considered acceptable.

11.4.2 Laboratory QC

The Auditor has reviewed the laboratory quality control data for the following laboratory reports relied upon in the site assessment reports. Laboratory QC results are within the acceptability ranges except as noted:

Table 9 Laboratory QA/QC

Laboratory Report	Laboratory	Comments
EIA (2018) Detailed Site Investigation (25-33 Brighton Avenue)		
SE177041	SGS	<ul style="list-style-type: none"> Laboratory duplicate RPD non-compliance for copper (2 samples), chromium (2 samples), lead (1 sample) and zinc (1 sample). The laboratory reported these non-conformances were due to sample heterogeneity. MS recovery for lead exceeded DQI in one sample. The laboratory reported the recovery failed acceptance criteria due to sample heterogeneity.
SE177041A	SGS	Acceptable results.
SE177844	SGS	Acceptable results.
187794	Envirolab	Acceptable results.
EIA (2018) Detailed Site Investigation (15-21 Brighton Avenue)		
SE183030	SGS	Laboratory duplicate RPD non-compliances for arsenic (1 sample) and copper (1 sample). The laboratory reported these non-conformances were due to sample heterogeneity.
SE183285	SGS	Acceptable results.
199110	Envirolab	Acceptable results.
199643	Envirolab	Acceptable results.

Chain of custody documentation was complete. Signed sample receipt notices from the laboratory were included in the reports.

The Auditor is satisfied that the laboratory QC generally indicates reliable data quality for the assessment.

11.4.3 General Requirements

Table below provide summaries of general requirements and field methods adopted in the assessment of the site. The Auditor's discussion is presented below.

Table 10: Summary of General Reporting Requirements

General Reporting Requirement	EIA (2018)	EIA (2018)	Auditor Comment
Figures showing sample locations	✓	✓	Acceptable
Sampling density appropriate – soil	21 targeted locations	14 targeted locations	Sample density is compliant to EPA (1995).
Sampling locations adequate – groundwater and vapour	GW: ✓ SV: NA	GW: ✓ SV: NA	Acceptable – see Section Error! Reference source not found.
Borehole logs recording sample locations	✓	✓	Acceptable
Laboratory reports and discussion of rationale	✓	✓	Acceptable
Presentation of results	Tabulated	Tabulated	Acceptable
Identification of fill and natural materials	Results, discussion and bore logs	Results, discussion and bore logs	Acceptable
Groundwater and vapour well construction	GW: ✓ SV: NA	GW: ✓ SV: NA	Acceptable

Table 11: Summary of Field Methods and QA/QC

Field Methods and QA/QC	EIA (2018)	EIA (2018)	Auditor Comment
Method of Soil Sampling	Dry grab	Dry grab	Acceptable
Decontamination between Samples	✓	✓	Acceptable
Use of PID	✓	✓	Acceptable
Use of laboratory prepared/preserved containers as required	✓	✓	Acceptable
Unique sample identification	✓	✓	Acceptable.
Storing of samples in eskies	✓	✓	Acceptable
Chain of custody documentation	✓	✓	Acceptable
Details of well construction provided	✓	✓	Acceptable
Purging of wells appropriately prior to sampling	✓	✓	Acceptable
Groundwater sampling method	✓	✓	Acceptable
Soil vapour sampling method	PID	PID	PID and soil/groundwater data do not indicate the potential for vapour to be an issue at the site.

11.5 Audit Discussion on Contamination Status

11.5.1 Soil

The soil sampling completed at the site by EIA (2018) at the site provided sufficient vertical and lateral coverage in accessible areas, although it was noted that large parts of the site were inaccessible due to operational restrictions. Although the current data set does not indicate the presence of gross or widespread contamination of the subsurface, further sampling would be required in the previously inaccessible areas to confirm this.

The contamination identified at the site to date appears to be limited to a small area of asbestos impacted fill, metals at concentrations exceeding the EILs in fill and TRH impacted localised around the UST in the southwest.

11.5.2 Vapour

Soil vapour impacts were not assessed.

The Auditor is satisfied that soil vapour assessment is not required as the soil and groundwater data does not indicate the need for a soil vapour assessment.

11.5.3 Groundwater and Surface Water

Groundwater data did not indicate the presence of gross contamination at the site. Acetone was detected at concentrations marginally exceeding the LOR in groundwater in the August 2018 GME but was not detected in the April 2018 GME. No other VOCs were detected in groundwater in both GMEs. There are no published assessment criteria for acetone in groundwater.

Permanent or semi-permanent surface water bodies are not present at the site nor is it expected to be present.

12. REMEDIAL ACTION PLAN

12.1. Summary of proposed remediation

A Remediation Action Plan (RAP) was written by EIA (30 September 2019) in order to render the site suitable for the proposed future land use (residential with minimal access to soils) and to ensure that the works will not pose unacceptable risks to human health or the environment.

12.1.1. Extent of known contamination

Former investigations have indicated the presence of COCs at the site. Based on the findings from previous investigations completed by EIA in 2016 and 2018:

- An underground petroleum storage system (UPSS) in the south western corner of the site; and
- Asbestos-impacted filling in the vicinities of investigation bores BH3 and BH10M.

12.1.2. Data Gaps

The following data gaps require closure as part of the site remediation/validation phase:

- Delineation of the identified asbestos hotspots (i.e. BH3 in the north western portion of 27-33 Brighton Avenue and BH10M in the south east portion of 27-33 Brighton Avenue, the latter coinciding with the south eastern site corner);
- Further assessment of (beneath) the building footprints and pavements not accessible at the time of the investigation phase; and
- Waste classification of site (fill) soils, to assist the offsite disposal of (contaminated) materials during the remediation phase.

12.1.3. Extent of Remediation

Based on the available site characterisation data and as suggested by the Auditor in Interim Advice 01, removal of the diesel UPSS and remediation of the asbestos-impacted filling materials in the vicinities of investigation bores BH3 and BH10M are required to render the site suitable for residential use.

12.1.4. Remedial Strategy

Six remedial options were assessed with consideration to minimising risk to human health and the environment:

1. No action
 - a. No cost or disturbance to the Site, however it is not suitable as the Site will not be made suitable for residential use due to the presence of ACMs.
2. On-Site Bioremediation: Excavated soils are thoroughly broken down and aerated, mixed with microorganisms and nutrients, stockpiles and aerated in above ground enclosures.
 - a. Cost effective, limited requirement to import fill, however, it is not suitable as soils impacted with heavy metals and asbestos would not be remediated. Insufficient area is available across the site for this method (once basement excavation commences).
3. In-situ treatment: E.g. soil vapour extraction, injection of oxidizing agents etc.
 - a. Creates minimal disturbance to the Site, cost effective, potential to simultaneously remediate dissolved phase hydrocarbons in groundwater. However, it is not suitable as this method is not applicable to the kinds of contamination encountered at the Site, it is expensive to establish and creates potential for odour problems. This method is designed for widespread, volatile hydrocarbon impacted soils. Since the present dataset provides evidence of other contamination (non-volatile), this is not considered to be an economically viable option.

4. Consolidation and/or capping: Impacted soils are managed onsite by capping the ground surface with a clean, impermeable layer of fill material.
 - a. Effectively removes risk to human health by eliminating exposure pathways, however, it allows for the potential of offsite migration of contamination impacts on groundwater and limits land use options. This would typically require an EMP and ongoing monitoring. This is a suitable option for residual (non-volatile) contamination. However, it is best suited as a secondary option, in combination with the following options, especially where waste disposal costs are an issue.
5. Excavation and off-site disposal: Excavate impacted materials. Transport directly to a licensed landfill facility. Reinstall the Site with imported clean fill material.
 - a. Fast, effective option. This is a suitable option - it is compatible with the proposed development and allows removal of potentially leachable contamination sources from the Site and prevent vertical migration to the groundwater system. Bulk excavation is required for a 1 to 2 level basement construction.
6. Natural Attenuation: Allowing the contaminants to biodegrade naturally following removal of the contamination source.
 - a. No remedial excavation is required of the Site, retains natural materials on Site, sustainable and cost effective, however, this is not suitable as this approach is not applicable to the types of contamination on Site. This approach is primarily suited to addressing groundwater contamination.

12.1.5. Preferred Remediation Option

The preferred remedial strategy is off-site disposal of impacted soils to licensed waste facilities. Following approvals and site establishment, the main remediation works will include, but not be limited to:

- Stage 1: Additional Investigations for Data Gap Closure;
- Stage 2: Site Preparation;
- Stage 3: Ground Surface Inspection;
- Stage 4: UPSS Excavation and Disposal;
- Stage 5: Handling and Management of Fill Soil for Offsite Disposal;
- Stage 6: Site Validation and VENM Classification; and
- Stage 7: Validation Report Preparation.

After formal classification, all wastes shall be transported to appropriate, EIA licensed facilities. All excavated (remediation) areas shall be validated to confirm that remaining site soils are suitable for the proposed land use. Site reinstatement with validated natural materials will be performed where required.

1) Additional Investigations for Data Gap Closure:

As noted by the Auditor in Interim Advice 01, data gaps exist due to areas of the site being inaccessible at the time of soil and groundwater investigations. Supplementary investigations to close the data gaps involve:

- Inspection and soil sampling of (building) areas with ACMs on the surface, if encountered;
- Soil sampling at a density that ultimately complies with the minimum density recommended under the EPA (1995) Sampling Design Guidelines, focusing on the former building footprints and pavements (e.g. 17 Brighton Avenue).

- Delineation of the asbestos-impacted areas (i.e. the vicinities of EIA (2018) sampling locations BH3 and BH10M;
 - A minimum of four sampling locations is recommended per hotspot (within 2-5m radius)
- Sample analyses for the identified contaminants of concern:
 - Soil (remediation areas): heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH's, VOC's (including the monocyclic aromatic hydrocarbons BTEX) and asbestos.
 - Soil (building footprints and pavements): heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH's, VOC's (including BTEX), PAH's, OCP's/OPP's, PCB's and asbestos.

2) Site Preparation:

- Notice will be given to Council at least 30 days prior to the commencement of remediation works.
- The Site will be prepared in accordance with the requirements of the Site Management Plan.
- The property developer will also implement a Construction Environmental Management Plan (CEMP), Work Health and Safety Plan (WHSP) and Asbestos Management Plan (AMP) prior to any works.
- Establishment of environmental controls, site access, security, fencing, warning signage and preparation of the CEMP, WHSP and AMP are required prior to works commencement. A project plan should also be developed to outline engineering design for excavation support (if required), water treatment requirements and design, staging of excavation works, stockpiling, waste stabilisation, waste material loading, traffic management and waste tracking.
- As part of the preparation phase, a remediation workshop will be conducted with the appointed contractor(s).
- Also prior to commencing work, each contractor is to prepare a staging or project plan that outlines the basic stages of the remediation works.

3) Ground Surface Inspection

- After site preparation, including the removal of any pavements, an inspection of the exposed ground surface must be undertaken by qualified persons:
 - Survey for underground tanks (i.e. ground penetration radar);
 - Confirm the absence of ACMs (e.g. fragments); and
 - Check for evidence (previously unidentified hotspots) of potential contamination.

At least one underground tank is present in the south western site corner.

- Emphasis shall be given to former building area(s) and pavements. Additional characterisation of soils will be performed, as deemed appropriate.
- The analytical results will be combined with the existing data set to assist the waste classification of site (fill) soils designated for disposal, as well as evaluation against human-health acceptance criteria applicable for residential exposure settings with minimal access to soil.

4) UPSS Excavation and Disposal

- Any underground tank infrastructure, including tanks, anchors, fuel feed lines, air vent pipes and direct or remote fill points will require decommissioning and removal as part of the site remediation process.
- **Decommissioning:**

- Residual fuel and flammable liquids, and fuel/solvent/water mixtures may be present within the tank and product lines. Any liquid waste remaining within the infrastructure should firstly be drained and classified for disposal purposes. The liquid waste must be removed from site by a licensed liquid waste transporter and disposed to a suitably licensed liquid waste facility, with appropriate documentation provided.
- A SafeWork NSW licensed and experienced tank removal contractor must be engaged to manage the tank and infrastructure removal process, in accordance with the Australian Standard for the removal and disposal of underground petroleum storage tanks (AS4976-2008), SafeWork NSW guidelines and the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019 (the UPSS Regulation).
- SafeWork NSW should be notified within 7 days of the removal of any UPSS.
- Where buried UPSS's are discovered, these will be targeted for decommissioning and offsite destruction in accordance with SafeWork NSW guidelines and the UPSS Regulation.
- The contractor is to record the condition of any tanks and associated infrastructure, and provide documentary evidence on destruction of the USTs for final validation report.

- **Remedial Soil Excavations:**

- Following decommissioning and removal, contaminated soils may be found in the vicinity of the tank and associated lines including the former bowser area. Such materials will require separate management from the remainder of the site, via remedial excavations, followed by waste classification and off-site disposal.
 - Any infrastructure, residual product and liquid in the excavation area should be removed. Localised deep excavations (sumps) may be created within the area to allow perched groundwater to drain to the sumps. The accumulated liquid will be removed by a licensed liquid waste removal contractor for appropriate disposal and/or recycling, after on-site treatment (if necessary).
 - “Chase out” excavation of walls and base of the area, with regular field screening of soil headspace samples using a PID. Materials exhibiting unusual odour, staining and/or PID reading >30ppm will be stockpiled separately for waste classification. Excavation should not jeopardise the stability of adjoining properties and structures. The open excavation pits should be clearly demarcated with star pickets and tapes.
 - “Chase out” excavation should continue until all walls and base of the excavation are observed to be free of odour and staining and PID reading of headspace sample are less than 30ppm. Validation samples will be collected for laboratory analysis, from the base and side walls of the final remedial excavations, in accordance with EPA (2014) *Technical Note: Investigation of Service Station Sites*.
 - Spoils from remedial excavations will be visually inspected, sampled and analysed for waste classification in accordance with Section 7.5 of Schedule B2 in NEPC (2013) and EPA (2014) Waste Classification Guidelines:
 - Collection of one sample per 25m³ of stockpiled materials up to 250m³. A minimum of three samples is required for any stockpile. For stockpiles >250m³ but <2500m³ in size, a statistical analysis approach may be used with the collection of 10 samples.
 - The analytical suite for waste classification will include the 8 priority metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH's, BTEX, PAH's, OCP's/OPP's, PCB's and asbestos, and any additional chemicals of potential concern that may be identified during site remediation (e.g. CVOC's).

- Waste classification certificates will be prepared for stockpiles, which will be transported and disposed to appropriately licensed waste landfill facilities.
- Validation of voids following remedial excavation of UPSS and associated contaminated soil.

5) Handling and Management of Fill Soil for Offsite Disposal:

- Site fill will be screened to remove coarse (>75mm fraction) materials;
- The coarse fraction will be inspected for ACM, with manual removal and bagging of ACM fragments if identified, followed by loading onto licensed transport vehicles and appropriate offsite recycling or disposal as construction/demolition waste.
- Remaining fill soils will be stockpiled as individual (physically separate) stockpiles each containing not more than 250m³ of fill.
- Fill materials will be stored on impermeable surfaces (remaining hardstand or a plastic liner) and re-assessed to produce final waste classifications, which will be used to determine the appropriately licensed waste landfill facility able to receive the materials.
- Any fill exhibiting heavy staining and/or odours is to be isolated from other excavated materials, for separate waste classification sampling and testing.
 - One sample per 25m³ of stockpiled material for the fill/soils produced by any excavation;
 - One intra-laboratory duplicate for every 10 primary samples collected and one inter-laboratory duplicate for every 20 primary samples collected;
 - Collection of one rinsate blank per sampling round;
 - Using NATA registered laboratory methods, analyse each sample for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH's, VOC's (including BTEX and CVOC's), PAH's, OCP's/OPP's, PCB's and asbestos, with TCLP testing of the two highest metals and PAH results for leachability assessment; and
 - Prepare a waste classification certificate for each category of soil waste, to enable appropriate offsite disposal.
- Waste movements will be tracked and waste dockets maintained.
- **Hotspot Remediation:**

Localised hotspots of soil contamination (e.g. BH3 in north western portion of 27-33 Brighton Avenue and BH10M in south eastern portion of 27-33 Brighton Avenue):

 - Mark out the hotspot area (determined by Stage 1).
 - Hotspot/fill soils which have been classified under the same waste category will be excavated and directly loaded onto the same transport vehicle.
 - Different waste streams must be kept separate.
 - Should the temporary stockpiling of excavated, contamination hotspots be necessary, soils from different areas must be stockpiled separately and isolated from other excavated materials on an impermeable surface.
 - Stockpiles with heavy staining and/or exhibiting odours are to be isolated from other excavated materials for additional waste classification sampling and testing.
 - Validation samples will be collected from the walls and base of the excavation.
 - Should any validation sample be found to contain concentrations that exceed the adopted criteria, additional chase-out excavations will be conducted to remove more fill from the area, followed by resampling and revalidation.

6) Site Validation and VENM Classification

Validation of in situ Natural Soils:

- All contaminated (fill) soil needing to be remediated must be removed from the site and a validation assessment of freshly exposed soil must be completed prior to the commencement of bulk excavation works.
 - Natural soil is potentially classifiable as VENM, however, validation by near surface sampling is required.
 - Where impact is identified in natural soils, the impact would be remediated and validated. The resulting spoils will be assessed and classified in accordance with the EPA (2014) *Waste Classification Guidelines*.

Validation of Imported Backfill Soils:

- Should reinstatement (backfilling) of remedial excavations require importation of soils from offsite source(s), the imported material must be classified as VENM.

Validation of Local Groundwater:

- At least one groundwater monitoring event (GME) is to be undertaken during the remedial program.
- The GME should involve sampling and analysis of water in the existing/protected monitoring wells (southern wells: BH1M, BH4M, BH7M, BH10M and BH13M; northern wells: BH101M, BH108M and BH112M); otherwise, new groundwater monitoring well(s) may need to be installed for this purpose.

7) Validation Report Preparation

A site validation report will be prepared in accordance with the OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites* and EPA (2017) *Guidelines for the NSW Site Auditor Scheme*.

After review of the RAP, the Auditor notes that there has been insufficient delineation of previous site use, including: (Refer to Figure 5 in Appendix A).

1) The Timber Yard at 17 Brighton Avenue:

- The contaminants of potential concern for this area are creosotes, PAH and B(a)P. The Auditor suggests the bore hole be drilled in the western portion of 17 Brighton Avenue as proposed by EIA (2019).

2) The Printing Factory at 21 Brighton Avenue:

- The contaminants of potential concern for this area are TCE and PFAS. The Auditor suggests the 2 additional boreholes be drilled in the western and eastern portion of 21 Brighton Avenue as proposed by EIA (2019). However, it is suggested by the Auditor that these 2 boreholes be converted into groundwater monitoring wells.

- The Auditor also suggests soil and groundwater be analysed for VOC's, including TCE, and PFAS. The Auditor notes that chlorinated solvents do not adsorb to soil and partition readily into the vapour-phase in unsaturated soils. Therefore, it is important that groundwater be analysed to indicate the presence of chlorinated solvents and PFAS in the area of the former printing factory.

- It is suggested that based on the results of the additional groundwater monitoring event, a soil vapour study may be required to be conducted at 21 Brighton Avenue (location of the former Printing Factory).

3) The Hoist at 23 Brighton Avenue:

- The contaminant of potential concern for this area is TRH. The Auditor agrees that 2 additional boreholes be drilled in the locations proposed by EIA (2019).

4) The UST:

- The Auditor is satisfied with the proposed delineation of the UST.

The above suggestions from the Auditor should be included in the Data Gap Investigation prior to the commencement of remedial works.

With the provision that the Auditor's comments above area applied, the Auditor considers the proposed remediation is adequate to address the identified impacts at the site and the proposed validation sampling is appropriate.

12.2. Guideline Compliance

The Auditor has assessed EIA (2019) against the OEH (2011) reporting criteria for remedial action plans.

Section 2.3 of NSW OEH (2011) Contaminated Sites: Guideline for Consultants Reporting on Contaminated Sites states that:

The RAP should:

- *set remediation goals that ensure the remediated site will be suitable for the proposed use and will pose no unacceptable risk to human health or to the environment*
- *document in detail all procedures and plans to be implemented to reduce risks to acceptable levels for the proposed site use*
- *establish the environmental safeguards required to complete the remediation in an environmentally acceptable manner*
- *identify and include proof of the necessary approvals and licences required by regulatory authorities.*

Once remedial work is complete, a report should be prepared detailing the site work conducted and regulatory decisions made.

12.3. Audit Discussion

The remedial options letters prepared by EIA (2019), were of sufficient quality to define the extent of remediation and the validation sampling required to show the site can be made suitable, given that the Auditor's suggestions are applied.

13. REMEDIATION AND VALIDATION

The remediation and validation of the site has not yet occurred, but the Auditor is satisfied that the site may be made suitable if the Remedial Action Plan is followed. A Section B site audit will be generated to confirm this for Canterbury-Bankstown Council.

14. ASSESSMENT OF RISK

Assessment of risk was conducted through comparison to guideline criteria (tier 1 risk assessment) without requirement for site specific risk assessment.

The Auditor is satisfied that soil contamination is adequately addressed and that there is no appreciable risk to soil vapour or groundwater quality.

15. LONG TERM MANAGEMENT

Long term site management of contamination is not required at the site.

16. POTENTIAL FOR OFF-SITE MIGRATION

The Auditor is satisfied that there is no significant potential for off-site migration of contaminants from the site.

17. REGULATORY REQUIREMENTS

The following regulatory aspects are considered to relate to the investigations, remediation and validation works conducted at the site.

17.1. Protection of the Environment Operations Act, 1997

Activities governed by the Protection of the Environment Operations Act 1997 (PoEO Act 1997) and associated regulations include waste disposal.

17.2. Guidelines made by the NSW EPA

EPA (1995a) *Contaminated Sites: Guidelines for the Vertical Mixing of Soil on Former Broad-acre Agricultural Land*. NSW EPA, Sydney

EPA (1995b) *Contaminated Sites: Sampling Design Guidelines*. NSW EPA, Sydney

EPA (1997a) *Contaminated Sites: Guidelines for Assessing Banana Plantation Sites*. NSW EPA, Sydney

EPA (2012) *Guidelines for the Assessment and Management of Sites Impacted by Hazardous Ground Gases*, NSW EPA Sydney

NSW EPA (2014) *Waste Classification Guidelines*. NSW DECC, NSW EPA Sydney

NSW EPA (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*. NSW EPA Sydney

NSW EPA (2017) *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme – 3rd Edition*. NSW EPA, Sydney

DEC (2005) *Contaminated Sites: Guidelines for Assessing Former Orchards and Market Gardens*. DEC, Sydney

DEC (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*. NSW DEC, Sydney

OEH (2011) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*. NSW EPA, Sydney

17.3. Guidelines approved by the EPA

AGI (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian Government Initiative;

ANZECC/NHMRC (1992) *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*. Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council, Canberra;

Department of Health and Ageing and EnHealth Council (2002) *Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards*. Commonwealth of Australia, Canberra;

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

NEPC (1999) *National Environment Protection (Assessment of Site Contamination) Measure, Schedule A and Schedules B(1)-B(10)*. National Environment Protection Council, Adelaide;

NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure No 1, Schedule A and Schedules B(1)-B(9)*. National Environment Protection Council, Adelaide;

NHMRC, NRMCC (2011) *Australian Drinking Water Guidelines* Paper 6 National Water Quality Management Strategy; and

17.4. Guidelines from International Sources

International guidelines were not relied on by any of the consultants working at this site.

17.5. NSW EPA (2017) Appendix A: Decision-making process for assessing urban redevelopment sites

The site is to be subdivided for mixed commercial and high rise residential development. As such, the decision-making process for assessing this site falls under Item 3 of Appendix A, NSW EPA (2017) high density residential with minimal access to soil and the following items are required to be checked as part of the Site Audit:

A. Check that:

all site assessment, reports follow applicable guidelines

any aesthetic issues relating to site soils have been adequately addressed

soils have been assessed against relevant health-based investigation levels and potential for migration of contamination from soils to groundwater has been considered

groundwater (where relevant) has been assessed against relevant health-based investigation levels and, if required, any potential impacts to buildings and structures from the presence of contaminants considered

hazardous ground gases (where relevant) have been assessed against relevant health-based investigation levels and screening values

any issues relating to local area background soil concentrations that exceed relevant investigation levels have been adequately addressed in the site assessment report(s)

the impacts of chemical mixtures have been assessed

any potential ecological risks have been assessed

any evidence of, or potential for, migration of contaminants from the site has been appropriately addressed, including potential risks to off-site receptors, and reported to the site owner or occupier

the site management strategy (where relevant) is appropriate including post-remediation environmental plans.

B. Prepare a site audit report and site audit statement.

These points are covered below. Where relevant, reference is also made to other sections of this document.

17.6.1. OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites

The investigation and RAP reports compiled for the site generally comply with the guideline requirements. Where non-compliance has been noted, the Auditor's review has indicated that the non-compliances do not materially affect the required technical approach or conclusions able to be drawn from the reports and as such are considered acceptable.

The Auditor's review of these reports is presented throughout this document.

17.6.2 Aesthetic Issues

No odours or visual indication of contamination were reported currently.

17.6.3 Investigation Levels

Appropriate investigation levels were adopted for the site. See Section 10 of this report for detailed discussion.

17.6.4 Groundwater Assessment

As discussed in Section 11.5.3, groundwater was appropriately assessed.

17.6.5 Hazardous Ground Gases

A source of hazardous ground gases was not identified at the site.

17.6.6 Background Soil Concentrations

Background soil conditions were not assessed.

17.6.7 Assessment of Chemical Mixtures

Chemical mixtures were not assessed as part of the investigations.

The Auditor is satisfied that assessment of chemical mixtures would not have a bearing on the results of the suitability of the site for the residential subdivision with basement carparking and that in this case the absence of assessment of mixtures is acceptable.

17.6.8 Assessment of Ecological Risks

The concentrations of all CoPC at the site were shown to be below the ecological criteria and as such there is no ecological risk at the site.

17.6.9 Migration of Contaminants

The migration of contaminants is discussed above in Section 16.

17.6.10 Site Management Strategy

The Auditor is satisfied that no ongoing site management is not required based on current data but will review a Validation Report with the objective of completing a Section A Site Audit Statement once the site has been validated as suitable for the proposed land use..

17.7 Audit Discussion

The Auditor is satisfied that the assessment and RAP conducted at the site have satisfactorily complied with the appropriate guidelines and are consistent with current industry standards.

The Auditor is satisfied that other regulatory requirements and EPA guidelines have been adequately met.

18.ADEQUACY OF CONSULTANT'S WORK

The work completed at the site by EIA was adequate and has appropriately characterised the contamination at the site. With the provision that the RAP by EIA (2019) and the additional Auditor comments are applied, the site may be made suitable for the proposed residential land use with minimal access to soil.

18.1. Audit Conclusions

Based on the discussion presented above, the Auditor is satisfied that the site has been demonstrated through comprehensive assessment and intrusive sampling to comply with current guidelines. The Auditor concludes that if the RAP by EIA (2019) and the additional suggestions by the Auditor are followed and implemented, the site may be made suitable for the proposed residential land use with minimal access to soil.

Accordingly, it is the Auditor's conclusion that the site may be made suitable for the proposed residential land use with minimal access to soil.



APPENDIX A

FIGURES

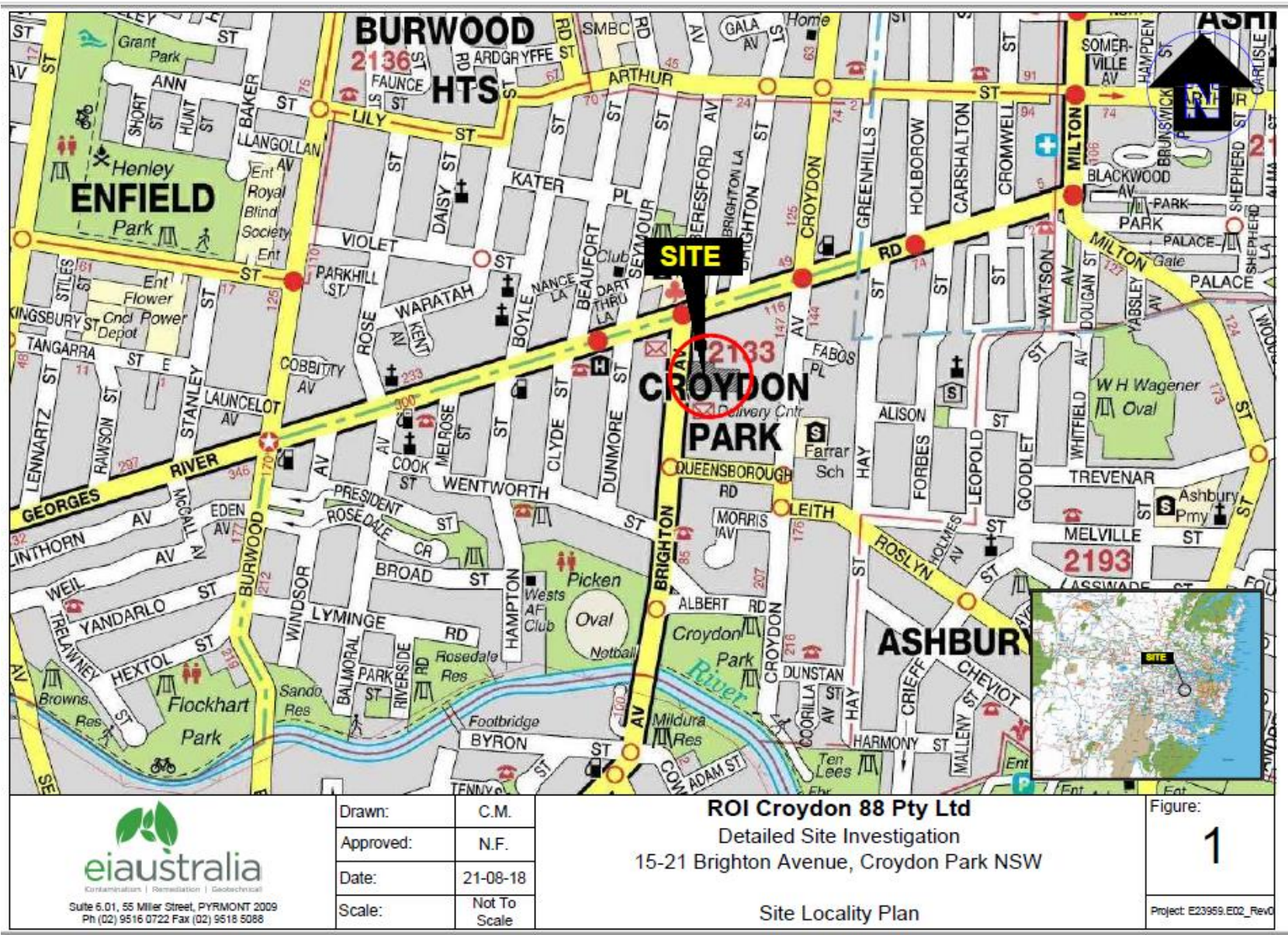


Figure 1: Site Location.

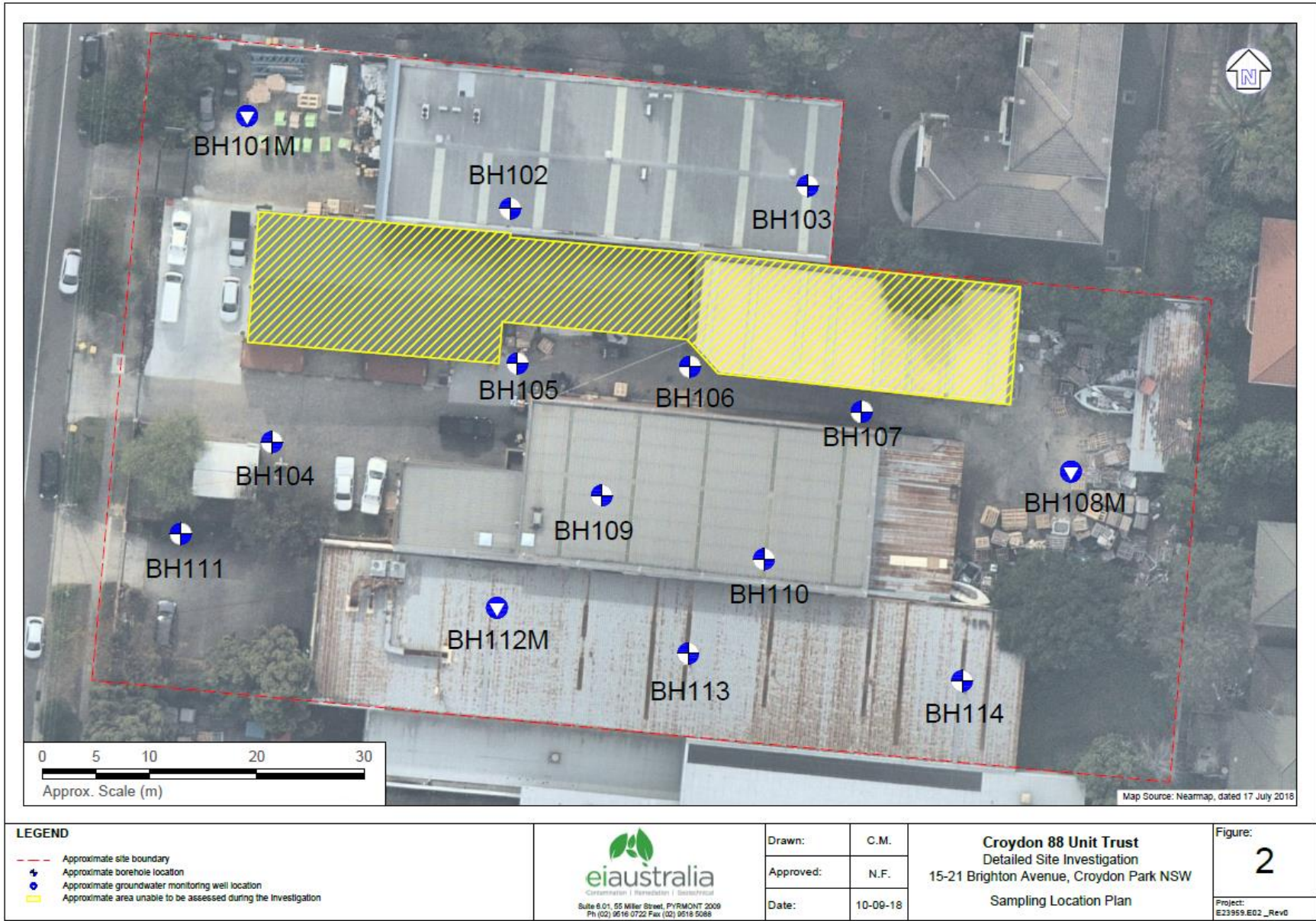


Figure 2: DSI sampling locations, 15-21 Brighton Avenue.

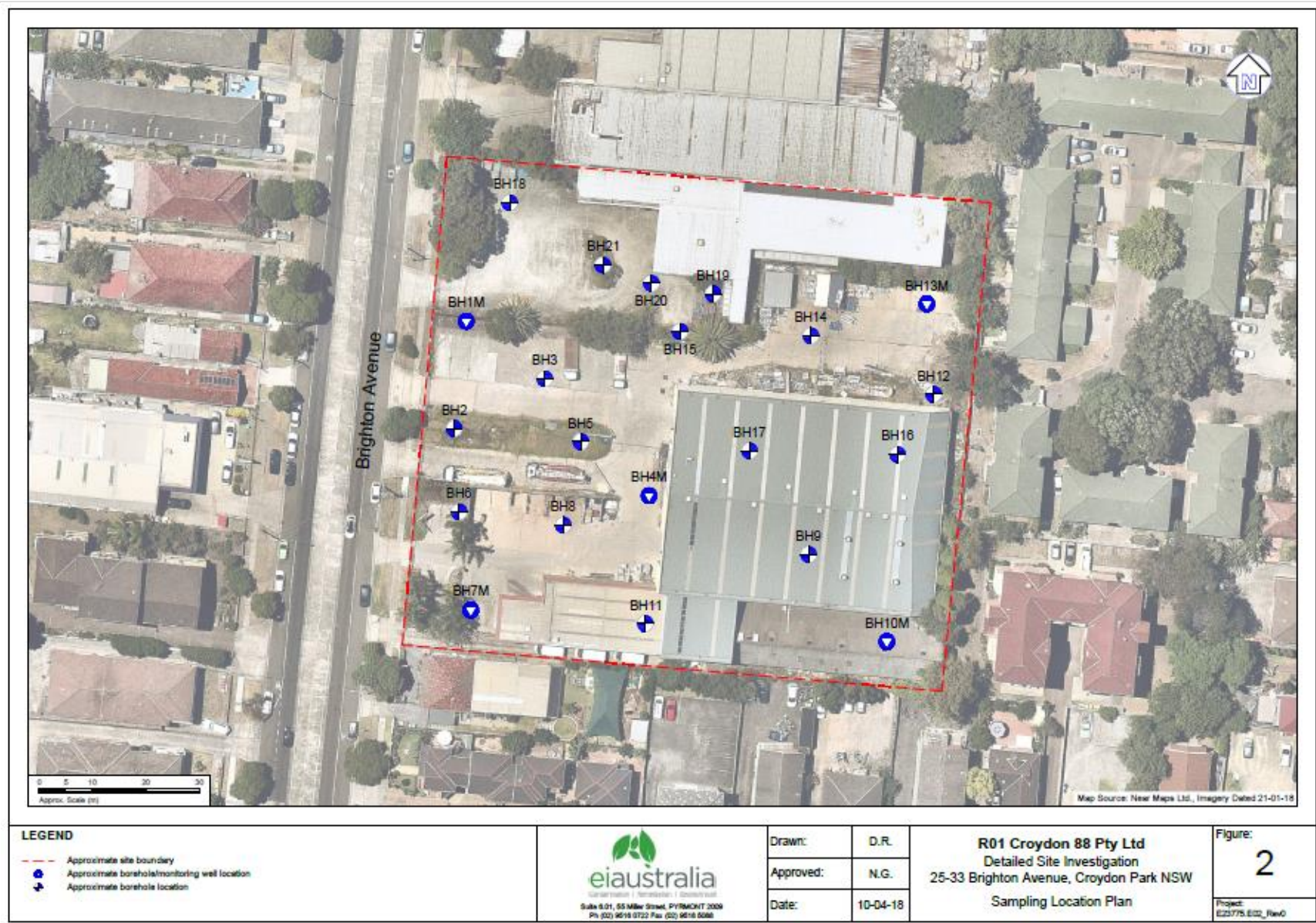


Figure 3: DSI sampling locations, 25-33 Brighton Avenue.

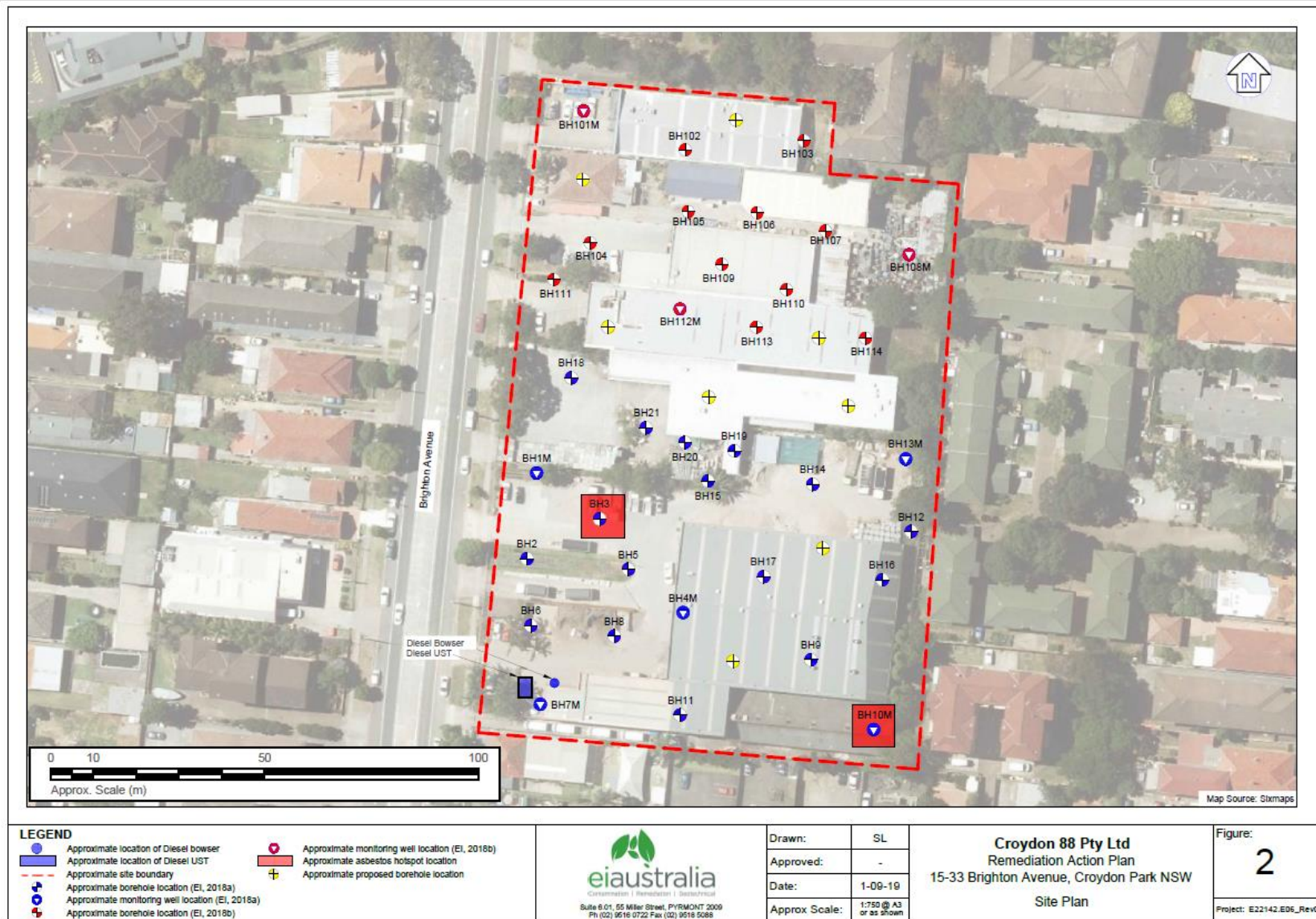


Figure 4: Locations of boreholes, monitoring wells, asbestos hotspots and UST locations. In addition, the proposed boreholes to be drilled during the data gap investigation are shown in yellow.

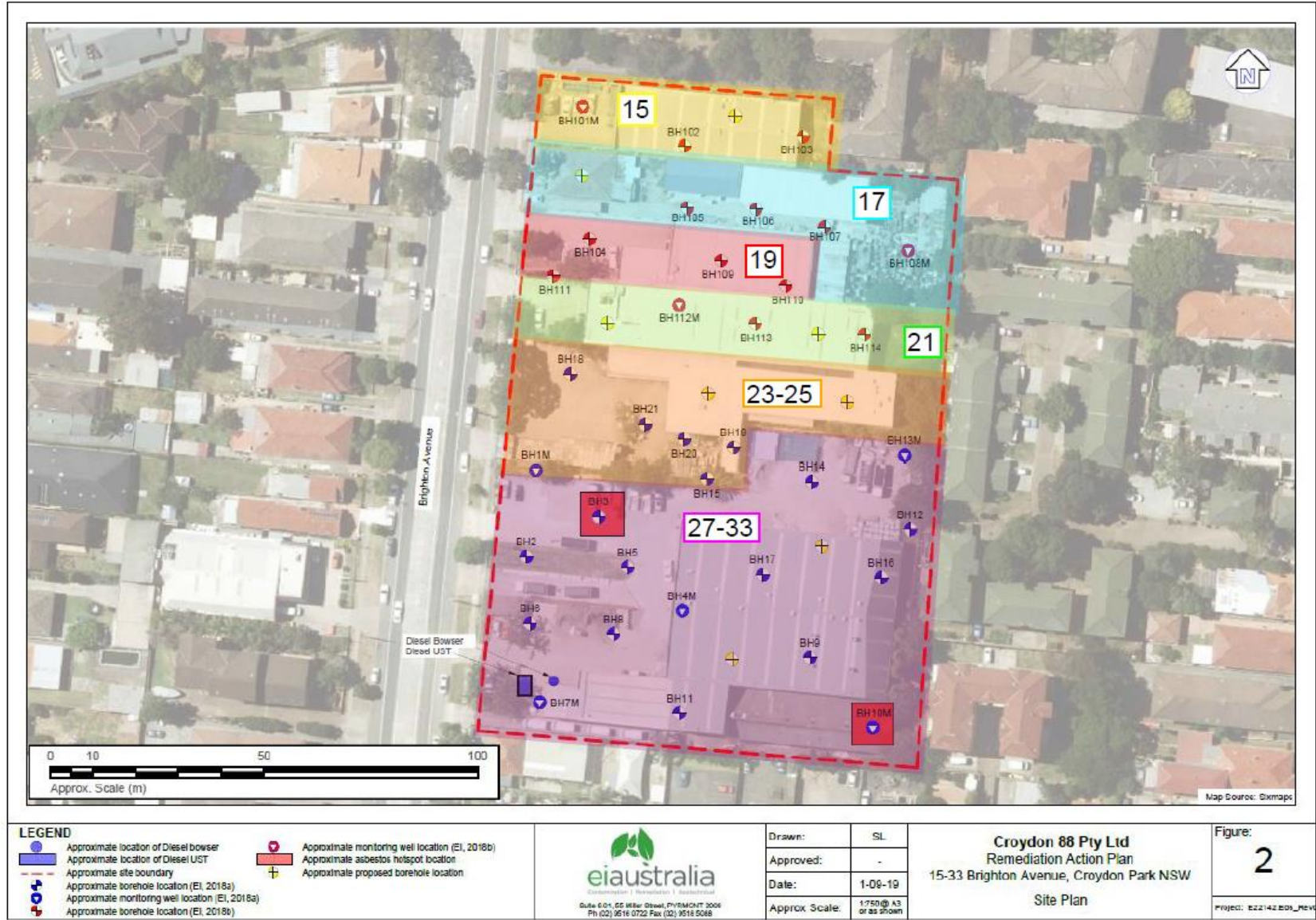


Figure 5: Reproduced by the Auditor to show the street address of each area of the site (source: SIXMaps). This can be referred to when implementing the Auditor’s additional suggestions regarding the data gap investigation.

APPENDIX B

INTERIM ADIVCE



Harwood Environmental Consultants
Gunners Barracks
Suite F, 38 Suakin Drive
Georges Heights, Mosman 2088

1 July 2019

Mr. Andrew Shehadeh
Dyldam
By email

INTERIM ADVICE 01: Review of Existing Reports, 15-21 and 23-55 Brighton Avenue, Croydon Park, NSW

Dear Andrew

1 Introduction and Background

Dyldam engaged Rod Harwood, a New South Wales (NSW) Environmental Protection Authority (EPA) Accredited Contaminated Land Site Auditor (Accreditation Number 03-04), who is employed by Harwood Environmental Consultants Pty Ltd (HEC) to provide Contaminated Site Audit Services for the site located at 15-21 and 23-55 Brighton Avenue, Croydon Park, NSW.

HEC understand the site is currently used for mixed commercial use and is proposed to be redeveloped for high density residential land use with limited access to soil.

The final outcome of this engagement is to be a Site Audit Statement (SAS) and associated Site Audit Report (SAR), indicating the suitability of the site for the proposed development in accordance with the Guidelines for the NSW Site Auditor Scheme (3rd Edition), 2017.

Canterbury-Bankstown Council made the request for Audit as follows:

A preliminary assessment has now been completed of the two Detailed Site Investigation (DSI) reports you have submitted.

This assessment notes that the DSI for 15-21 Brighton Avenue Croydon Park recommends that prior to future redevelopment of the site, supplementary investigations are completed to close current investigation data gaps. The DSI for 25-33 Brighton Avenue recommends development and implementation of a Remedial Action Plan and preparation of a final site validation report by a suitably qualified environmental consultant to certify the site suitability for the proposed land use.

The findings of the DSIs clearly state that further investigation, and/or reporting is required.

The preliminary assessment recommends that a NSW EPA accredited site auditor be engaged to review and endorse the DSIs and the proposed actions required, and to issue a 'Section B' Site Audit Statement and Report to indicate suitability of the site for the proposed use. Council will require this to occur before the Planning Proposal can be further progressed.

The engagement of a site auditor and Site Audit Statement and Report is necessary to advise on what further investigation and reporting is required to establish the site's suitability for the proposed land use, and also to review the information contained in

the submitted DSIs.

This is to ensure Council meets SEPP 55 requirements that it must be satisfied that the land is suitable, or will be suitable, after remediation, for all the purposes permitted in the proposed R4 zone. Council is not fully satisfied that the land can be made suitable for the proposed zone, and requires the measures outlined above to occur before it can proceed further.

Accordingly, the Audit is a Statutory Audit under the Contaminated Land Management Act 1997 and the resulting Site Audit Statement will therefore need to be issued to the Client, and to NSW EPA.

1.1 Nature of Interim Advice

This interim audit advice does not constitute an SAS or a SAR, but rather is provided to assist Childcare Property Holdings in the assessment and management of contamination issues at the site. The information provided herein should not be considered pre-emptive of the final site audit conclusions, but rather represents the Auditor's opinion based on the current review of available site information.

1.2 Scope of Audits

This interim audit advice is provided to assist in the assessment and management of contamination issues at the subject site and should not be regarded as 'approval' of any proposed investigations or remedial activities, as any such approval is beyond the scope of an independent review.

EPA (2017) '*Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd Edition)*', describes the site assessment and audit process as:

Consultant is commissioned to assess contamination. In most cases, a site owner or developer engages a contaminated site consultant to assess a site for contamination and, where required, to develop a remediation plan, implement the plan and validate the remediation.

Site Auditor reviews the consultant's work. The site owner or developer commissions the site auditor to review the consultant's work. The auditor prepares a site audit report and a site audit statement at the conclusion of the review, which are given to the owner or developer.

Section 3.1 of the Auditor Guidelines states that the site auditor must meet the following particular requirements regardless of whether the audit is statutory or non-statutory:

- a) comply with applicable provisions of the CLM Act, regulations, environmental planning instruments, and any guidelines made or approved by the EPA under the CLM Act
- b) not have a conflict of interest in relation to the audit as defined by the CLM Act
- c) where these guidelines allow an auditor to adopt or endorse an approach that differs from policies made or approved by the EPA, exercise independent professional judgement in doing so and provide in the site audit report adequate and explicit justification for taking this course
- d) finalise the site audit report before signing the site audit statement
- e) provide in the site audit report a clear, logical discussion of issues covered in the site audit and clearly substantiate the rationale for the auditor's conclusions. Therefore, the contaminated land consultant and other relevant parties should be satisfied that the work to be conducted conforms to all appropriate regulations, standards and guidelines and is suitable based on the site history and the proposed land use.
- f) discuss in the site audit report all issues pertinent to the actual or potential contamination of the site and all issues required by these guidelines to be raised during a site audit
- g) state clearly why any human health and environmental issues that would normally be

of concern are not of concern in the case of this audit

- h) make every reasonable effort to identify and review all relevant data, reports and other information held by the person who commissioned the site audit, or which is readily available from other sources, that provides evidence about conditions at the site which is relevant to the audit
- i) obtain advice from the appropriate expert support team members on issues that are outside the auditor's professional education, training or experience, and document in the site audit report where and from whom advice has been obtained
- j) exercise independent and professional judgement in deciding whether or not they have sufficient information to make a decision about the suitability of a site or a plan or to draw any other conclusion in relation to actual or potential contamination of a site in the course of a site audit, with justification for conclusions to be given in the site audit report
- k) make reasonable endeavours to find out whether any other audits have been commissioned in relation to the site and, if so, whether any of them were prematurely ceased and why
- l) state in the audit report the scope and findings of any previous audits
- m) in cases where the audit involves a review of site assessment, remediation or management work, visit the site to observe and verify, as far as is practicable, the completion of this work.

2 Current Interim Advice

The current interim advice is a review of the following documents:

- EIAustralia (26 May 2016) Preliminary Site Investigation Report, 15-33 Brighton Avenue, Croydon Park NSW (ref: E22142_AA_Rev 0).
- EIAustralia (20 April 2018) Detailed Site Investigation, 25-33 Brighton Avenue, Croydon Park NSW (ref: E23775.E02_Rev0).
- EIAustralia (10 September 2018) Detailed Site Investigation, 15-21 Brighton Avenue, Croydon Park NSW (ref: E23959.E02_Rev0).

A summary of the key points from the above reports is provided below:

Report	Key Items
EIAustralia (26 May 2016) Preliminary Site Investigation Report, 15-33 Brighton Avenue	<p>Site use was historically residential until the late 1940s when it became commercial/ industrial.</p> <p>Potentially contaminating activities/areas identified at the site included:</p> <p>Timber yard at 17 Brighton Avenue.</p> <p>An oil spill was reported to have occurred at 17 Brighton Avenue in 2005.</p> <p>A radiator mechanical workshop occupied 19 Brighton Avenue.</p> <p>Printing factory at 21 Brighton Avenue.</p> <p>A possible lift/hoist system was identified at 23 Brighton Avenue.</p> <p>An underground diesel storage tanks and bowser was identified in the southwest corner of the site.</p>

Report	Key Items
	<p>Fill and hazardous building materials are likely to be present at the site.</p> <p>The site is located on Class 5 acid sulfate soil risk.</p> <p>Nearby sensitive receptors include residential dwellings to the east, south and west and the Cooks River 500m to the south.</p> <p>Soil, groundwater and vapour sampling were not completed as part of the PSI.</p>
<p>EIAustralia (20 April 2018) Detailed Site Investigation, 25-33 Brighton Avenue</p>	<p>The scope included drilling 21 targeted soil bores to depths ranging between 0.6m and 6.4mbgl. – The Auditor notes this number of sampling locations is compliant the sample density required by NSW EPA (1995) <i>Sampling Design Guidelines</i> for the site area of 0.67ha.</p> <p>Five groundwater monitoring wells were installed to depths ranging between 6.0m and 6.4mbgl.</p> <p>Standing water levels were recorded at depths ranging between 0.6m and 1.4mbgl.</p> <p>The lithology was described as anthropogenic fill material (maximum depth of 1.3mbgl) overlying residual clay and sandstone and shale bedrock.</p> <p>Asbestos was detected in fill at two locations. The concentrations of all remaining CoPC were below the site assessment criteria.</p> <p>Copper, nickel and zinc were detected at concentrations exceeding the site criteria in all groundwater wells.</p> <p>VOCs were not detected in groundwater samples.</p>
<p>EIAustralia (10 September 2018) Detailed Site Investigation, 15-21 Brighton Avenue</p>	<p>The scope included drilling 14 targeted soil bores to depths ranging between 0.3m and 8.2mbgl. – The Auditor notes this number of sampling locations is compliant the sample density required by NSW EPA (1995) <i>Sampling Design Guidelines</i> for the site area of 0.5ha.</p> <p>Three groundwater monitoring wells were installed to depths ranging between 6.3m and 7.5mbgl.</p> <p>Standing water levels were recorded at depths ranging between 2.98m and 3.9mbgl. Groundwater flow direction was to the south.</p> <p>The lithology was described as fill material overlying residual clay and shale bedrock.</p> <p>TRH F2, copper and zinc were detected at concentrations exceeding the ecological assessment levels in soil. The concentrations of all remaining CoPC were below the site assessment criteria.</p> <p>Copper, nickel and zinc were detected at concentrations exceeding the site criteria in groundwater samples.</p> <p>VOCs were not detected in groundwater samples.</p>

Conclusions

Based on the information above, historical land use does not appear to have significantly impacted soil and/or groundwater at the site. The Auditor notes that data gaps exist due to areas of the site being inaccessible at the time of the soil and groundwater investigations.

Remediation of the site is likely to be required in relation to the asbestos detections and excavation and removal of the diesel UST and bowser in the southwest corner of the site.

We consider that it will be more cost effective to provide Interim Advice that the site may be made suitable rather than a Section B audit report.

◆◆◆◆◆

I trust this letter meets your requirements at this stage.

Yours Sincerely

A handwritten signature in dark ink, appearing to read 'Rod Harwood', is written over a light blue rectangular background.

Rod Harwood

Principal Hydrogeologist

NSW EPA Accredited Contaminated Sites Auditor – Accreditation No. 03-04

0438 200 055

ATTACHMENT

1: xxxx



APPENDIX C

SITE PHOTOGRAPHS



Photograph 1: Western/front façade of the commercial warehouse located at 15 Brighton Avenue.



Photograph 2: Commercial rubbish accumulated west of 15 Brighton Avenue.



Photograph 3: Conditions inside the commercial warehouse located at 15 Brighton Avenue.



Photograph 4: The new commercial warehouse located in the Westernmost portion of 17 Brighton Avenue.



Photograph 5: Concrete hardstand and the external conditions of 17 Brighton Avenue.



Photograph 6: Warehouse located in the middle of 17 Brighton Avenue.



Photograph 7: Eastern view of the site from the middle of 17 Brighton Avenue.



Photograph 8: Easternmost warehouse on 17 Brighton Avenue.



Photograph 9: East of the third warehouse located on 17 Brighton Avenue.



Photograph 10: Material accumulated east of the third warehouse at 17 Brighton Avenue.



Photograph 11: Western portion of 19 Brighton Avenue.



Photograph 12: Concrete hardstand west of warehouse located at 19 Brighton Avenue.



Photograph 13: Stormwater drain in between the warehouses at 17 & 19 Brighton Avenue, running parallel to the buildings.



Photograph 14: Material accumulated east of the warehouse located at 19 Brighton Avenue.



Photograph 15: Excess radiator parts and timber pallets accumulated east of 19 Brighton Avenue.



Photograph 16: Timber pallets accumulated east towards the site boundary at 19 Brighton Avenue.



Photograph 17: Stormwater pit located east of the warehouse at 19 Brighton Avenue.



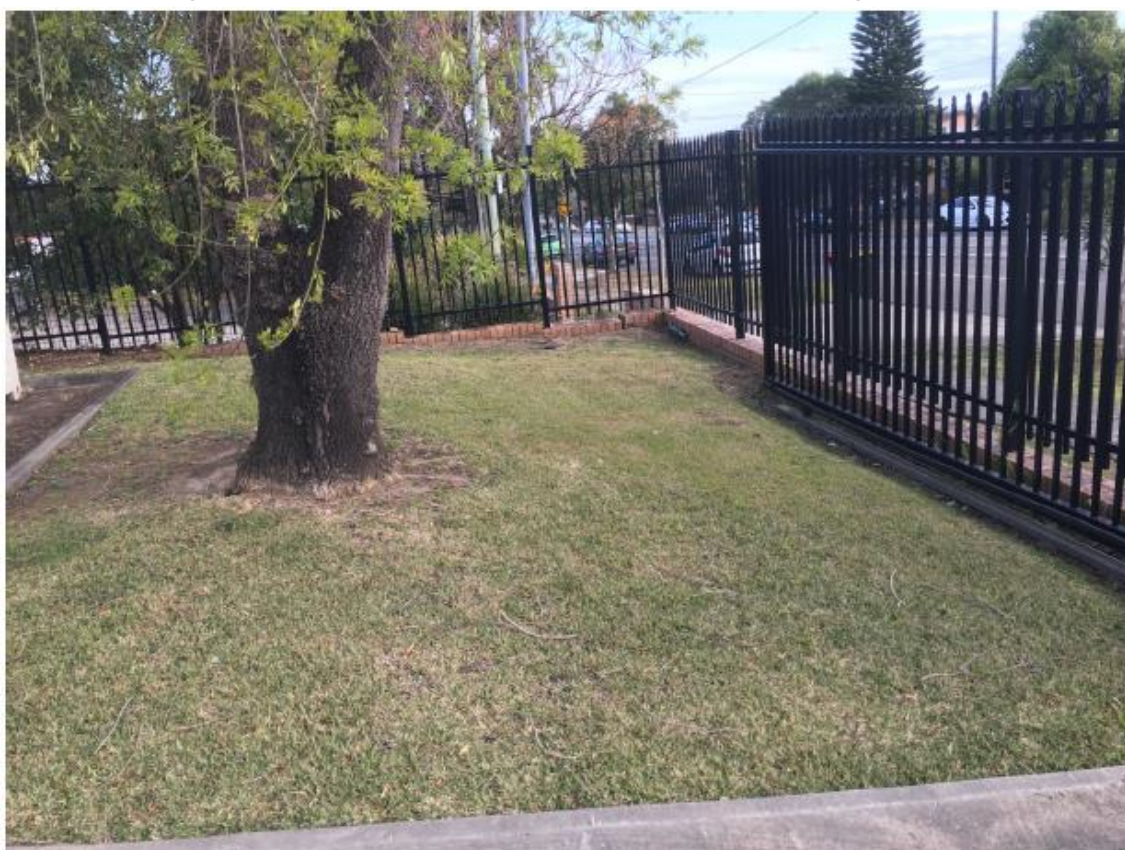
Photograph 18: Overgrown/distressed vegetation along the eastern site boundary of 19 Brighton Avenue.



Photograph 19: Tub of mouldy water and excess waste directly adjacent 19 Brighton Avenue.



Photograph 20: Storage containers located west of the warehouse at 19 Brighton Avenue.



Photograph 21: Maintained grass evident along the western site boundary of 19 Brighton Avenue.



Photograph 22: Western façade of the warehouse located at 21 Brighton Avenue.



Photograph 23: Goods stored inside the warehouse located at 19 Brighton Avenue.



Photograph 24: Internal condition of the warehouse located at 19 Brighton Avenue.



Photograph 25: Overgrown/distressed vegetation directly behind the warehouse at 21 Brighton Avenue.



Photograph 26: Stormwater drain located directly west of the warehouse at 21 Brighton Avenue.



Photograph 27: Material from Borehole BH111, in the south-western portion of the site (21 Brighton Avenue).

Note: Photographs 1 – 27 were taken by EIA during the Detailed Site Investigation.



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The HEC difference here