



barnson.
DESIGN . PLAN . MANAGE

Site Contamination Investigation

Client: Bourke Aboriginal Corporation Health Service (BACHS)

Site Address: 88-96 Mitchell Street,
Bourke, NSW 2840

30 October 2024

Our Reference: 42571 ER01_C

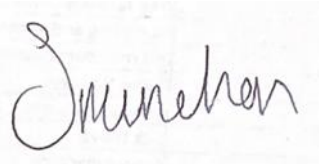
© Barnson Pty Ltd 2024. Confidential.

DISCLAIMER

This report has been prepared solely for Bourke Aboriginal Corporation Health Service (BACHS) in accordance with the scope provided by the client and for the purpose(s) as outlined throughout this report.

Barnson Pty Ltd accepts no liability or responsibility for or in respect of any use or reliance upon this report and its supporting material by anyone other than the client. Material may not be extracted, copied or altered from this report without the written permission of BARNSON. Barnson does not accept responsibility arising from modifications to this or previous reports.

Project Name:	Preliminary Site Contamination Assessment 88-96 Mitchell Street, Bourke, NSW 2840
Client:	Bourke Aboriginal Corporation Health Service (BACHS)
Project Number:	42571
Report Reference:	42571 ER01_C
Revision	C
Date:	30/10/2024

Prepared by:	Reviewed by:
	
Seb Minehan B. Human Geog UOW, U/G Urb. Reg. Plan U/G Town Planner	Nardus Potgieter MSc(Chem) BSc(Hons)(Env.Tech.) Senior Environmental Scientist

Executive Summary

Barnson Pty Ltd was engaged by the Bourke Aboriginal Corporation Health Service to undertake a Preliminary Site Investigation (PSI) of the property located at Lot 6, 7, 8, 9, 10 DP 35797 (88-96 Mitchell Street, Bourke, NSW 2840).

The purpose of the PSI was for investigations to assess whether the Site is suitable, or could be made suitable from a contamination perspective, for proposed health care land use.

The PSI was conducted with reference to the following legislation and guidelines:

- State Environmental Planning Policy (Resilience and Hazards) 2021.
- NSW EPA (2020) Consultants Reporting on Contaminated Land Guidelines.
- Schedule B2 or the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).

The objectives of the PSI are to:

- Identify evidence of potentially contaminating activities that may currently or have historically occurred.
- Assess Areas of Environmental Concern and contaminants of potential concern and develop a preliminary Conceptual Site Model (CSM).
- Prepare a report detailing desktop review, site inspection findings and provide recommendations for further investigation, remedial works and/ or management, as required.

The site inspection and confirmatory sampling showed that concentrations of all contaminants investigated were below screening criteria in all surface soil samples collected. However, the presence of asbestos containing material was confirmed at the site. Visible fragments of asbestos containing material represent a risk to human health and the site is not suitable for the proposed development without remedial action to remove the asbestos contamination.

Visible fragments of asbestos containing material in surface soils leads to the classification of any surface material excavated from the site as Special Waste in the Asbestos Waste Category. Generators of special waste do not need to make any further assessment of their waste if it falls within the definitions of one of the special waste categories.

It is recommended that a suitable contractor, licensed to manage and dispose hazardous materials, be appointed to remove the contaminated surface soil. Validation of the remedial works is to be undertaken under supervision of a licenced asbestos assessor.



Contents

1. Introduction	1
1.1. Background and Objectives	1
1.2. Objectives	1
1.3. Scope of Work	1
1.4. Limitations	2
2. Site Description	3
2.1. Site Identification	3
2.2. Site Setting.....	3
2.3. Site Layout	5
2.4. Historical Aerial Photographs	8
2.5. Proposed Development.....	8
2.6. Historical Record of Site Contamination	8
2.7. Previous Site Investigations.....	9
2.8. Findings.....	10
2.9. Data Gaps	11
3. Preliminary Conceptual Site Model	12
3.1. Potential Sources of Contamination and Associated Contaminants of Concern	12
3.2. Contamination Sources, Transport Mechanisms, Pathways and Receptors.....	13
3.3. Key Potential Exposure Pathways	13
4. Site Investigation	15
4.1. General	15
4.2. Confirmatory Sampling.....	18
4.3. Analytical Results.....	21
4.4. Analytical Data Quality	21
5. Assessment.....	23
5.1. Assessment Criteria – Human Health and Environmental Risk.....	23
5.2. Findings.....	24
5.3. Discussion	25
6. Conclusions and recommendations	26
6.1. Conclusions.....	26
6.2. Recommendations.....	26

7. References..... 28

List of Tables

Table 2.1: Summary of Subject Site.....	3
Table 2.2: Summary of Environmental Setting Information	3
Table 2.3: Summary of findings.....	10
Table 3.1: Potential Contamination Sources and Associated Contaminants of Concern.	12
Table 3.2: Potential Contamination Sources, Pathways and Receptors	13
Table 3.3: Potential Exposure Pathways	14
Table 4.1: Summary of sample details.	18
Table 4.2: Summary of detected metal and pesticide concentrations	21
Table 5.1: Human health and ecological risk screening levels.	23

List of Figures

Figure 2.1: Location of the Subject Site.....	6
Figure 2.2: Existing Subject Site layout.....	6
Figure 2.3: Photo A – View across Subject Site looking east toward Tarcoon Street.....	7
Figure 2.4: Photo B – View across Subject Site looking west.	7
Figure 2.5: Proposed lot layout for the re-zoning and subdivision of the Subject Site.....	9
Figure 4.1: View across the Subject Site looking west, vehicle and pedestrian tracks visible.	15
Figure 4.2: Dry grass cover on site.....	16
Figure 4.3: Fragments of fibre reinforced cement sheet.	17
Figure 4.4: Fragments of fibre reinforced cement sheet in excavated soil.....	17
Figure 4.5: Sand and demolition waste.	18
Figure 4.6: Surface soil sample locations.....	20

Appendices

APPENDIX A	Historical Aerial Imagery.....	29
APPENDIX B	Chain of Custody and Laboratory Report	30



1. INTRODUCTION

1.1. Background and Objectives

Barnson was engaged by Bourke Aboriginal Corporation Health Service to undertake a preliminary site contamination investigation (PSI) of the property located at 88-96 Mitchell Street, Bourke, NSW, hereafter referred to as the Subject Site.

The Preliminary Site Investigation (PSI) is in support of healthcare land use and potential further development of the Subject Site. Any development of the Site will require planning consent. In accordance with the State Environmental Planning Policy (Resilience and Hazards, 2021) a consent authority must determine if land is contaminated and, if so, whether it is suitable for the intended purpose or require remediation, before development consent may be given.

The PSI will assess the contamination status and identify potential risks at the site, which will inform Bourke Aboriginal Corporation Health Service of the potential liability and future costs to rectify the site. The purpose of the PSI is to support due diligence investigations associated with the development of the site and assess whether the Site is suitable, or can be made suitable from a contamination perspective, for use as a healthcare facility. The PSI was conducted with reference to the following legislation and guidelines:

- Chapter 4, State Environmental Planning Policy (Resilience and Hazards) 2021 (SEPP R&H).
- NSW EPA (2020) Consultants Reporting on Contaminated Land Guidelines (CRCL).
- Schedule B2 or the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) (ASWC NEPM).
- Resource Recovery Order under Part 9, Clause 93 of the protection of Environment Operations (Waste) regulation 2014 – The Excavated natural material order (NSW EPA, 2014)
- NSW Environmental Protection Authority Waste Classification Guidelines – Part 1: Classifying Waste (NSW EPA, 2014a)

1.2. Objectives

The objectives of the PSI are to:

- Identify evidence of potentially contaminating activities that may recently or have historically occurred.
- Assess Areas of Environmental Concern (AEC's) and contaminants of potential concern (COPCs) at Site and develop a preliminary Conceptual Site Model (CSM).
- Prepare a report outlining the findings of the desktop review and site investigation, as well as provide recommendations for further investigation, remedial works and/ or management, as required.
- Provide recommendations on the disposal of excavated material based on the results of a classification and observations made during the site investigation.

1.3. Scope of Work

The scope of works undertaken to meet the objectives are:

- A review of published information related to soils, geology and hydrogeology relevant to the Subject Site.
- A review of electronic resources, historical land titles, historical aerial images and NSW EPA records.
- Review and collation of the above information, supplemented with a site inspection and confirmatory sampling, to determine the presence of potential contamination at the site and development of a preliminary Conceptual Site Model.
- Investigation of surface soils in support of classification for off-site disposal.
- Data appraisal and interpretation.
- Preparation of this PSI report with reference to the NSW EPA 2020 CRCL and recommendations for disposal of excavated materials.

These aspects are further explained within the body of the report.

1.4. Limitations

It is the nature of contaminated site investigations that the degree of variability in site conditions cannot be known completely, and no sampling and analysis program can eliminate all uncertainty concerning the condition of the site. Professional judgment must be exercised in the collection and interpretation of the data.

In preparing this report, current guidelines for assessment and management of contaminated land were followed. This work has been conducted in good faith in accordance with Barnson Pty Ltd's understanding of the client's brief and general accepted practice for environmental consulting.

This report was prepared for Bourke Aboriginal Corporation Health Service with the objectives of identifying past and present land use activities that may have affected the contamination status of the site, assessing areas of environmental concern and contaminants of potential concern for the site and providing recommendations for further assessment and or management (if required). No warranty, expressed or implied, is made as to the information and professional advice included in this report. Anyone using this document does so at their own risk and should satisfy themselves concerning its applicability and, where necessary, should seek expert advice in relation to the particular situation.

2. SITE DESCRIPTION

2.1. Site Identification

Table 2.1 presents a summary of the available information pertaining to the identification of the subject site.

Table 2.1: Summary of Subject Site

Information	Details
Site address	88-96 Mitchell Street, Bourke, NSW 2840
Site area (approx.)	4,601m ² (as surveyed)
Lot and Deposited Plan No.	Lot 6, 7, 8, 9, 10 DP 35797
Land Zoning	R1 – General Residential
County	Cowper
Parish	Bourke
Local Government Area	Bourke Shire Council
Current Land Use	Vacant
Future Land Use	Healthcare
Adjoining Site Uses	North – Residential East – Bourke High School South – Catholic Church/Residential West – Residential

Figure 2.1 illustrates the subject site's location approximately 800m east of the town of Bourke CBD.

2.2. Site Setting

Table 2.2 present a summary of the site setting information for the Subject Site.

Table 2.2: Summary of Environmental Setting Information

Item	Summary of Finding
Topography	Barnson reviewed online topographic data for NSW. The information reviewed indicate the Subject Site is relatively flat throughout and has a natural slope to the north-west towards the Darling River.

Geology	The 1:250,000 Geological Map of Bourke presented on the NSW MinView on-line geospatial database depicts the site being underlain with Canozoic aged floodplains of clayey silt, sand, and gravel. An examination of the Geological Survey of NSW maps of Naturally Occurring Asbestos (accessed on 28th of September 2023), shows that the geological units underlaying the Subject Site has no asbestos potential.
Acid Sulphate Soils	A search of the NSW eSpade V2.22 online database identified the Site as being within an area having no known occurrence of acid sulfate soil. A search of the NSW ePlanning Spatial Viewer confirm this finding, indicating no-acid sulphate soils are present.
Soils	A search of the NSW eSpade V2-2 database indicate the Subject Site is underlain by the Parkes Soil Landscape. It includes footslopes and sideslopes on Ordovician metasediments at Parkes. Soil types include shallow to moderately deep (80 cm), imperfectly drained Red Brown Earths (Haplic, Calcic and Hypocalcic Red Chromosols). Narrow drainage lines have deep (>150 cm), poorly drained Brown Solodic Soils (, Db3.22; Eutrophic Subnatric, Brown Sodosols).
Soil Salinity	A search of the NSW eSpade V2-2 database contained no information regarding the status of salinity at the Subject Site. Additionally, examination of the data available on eSpade for soil landscapes to identify salinity as a potential constraint for the general area covered by the Bourke Soil Landscape.
Surface Water	Rain falling on the site will infiltrate the site soils. Excess surface water generated from rainfall at the site is expected to migrate towards Mitchell Street and into existing Council stormwater infrastructure.
Groundwater	Groundwater flow direction from Site is expected to follow local topography in a general north-westerly direction. Groundwater data sourced from WaterNSW show that there are three (3) registered bores within 500m of the site. A summary of the available data is as follows: GW804841 – Final Depth 11.50m/ S.W.L 10.172m/ W.B.Z 7.50m GW804842 – Final Depth 12.0mm/ S.W.L 10.253m/ W.B.Z 11.00m GW804840 – Final Depth 11.50m/ S.W.L 10.21m/ W.B.Z 11.00m
Naturally Occurring Asbestos	A search of the NSW Maps of Naturally Occurring Asbestos identified the site is not located within or near any naturally occurring asbestos areas.

NSW Department of Primary Industries	A search of the NSW Department of Primary Industries (DPI) Cattle Dip Site Locator found no registered premises that was known to have a cattle dip within the Parkes Shire Council LGA.
Previous Assessments	No previous assessments are known to have been undertaken at the Subject Site.
Anecdotal Information	No anecdotal information provided.

2.3. Site Layout

The Subject Site is identified as Lot 6, 7, 8, 9, 10 DP 35797 and has an area of approximately 4,601m² and a land zoning of R1 – General Residential. The site is bounded by Mitchel Street to the north, Tarcoon Street to the East and an unnamed laneway to the South. The site adjoins an occupied residential lot to the west. Other adjoining land use include residential to the north and south with a church building also located to the south of the site. Bourke High School is located to the east across Tarcoon Street.

The Subject Site is currently unoccupied but was historically used for residential purposes with dwellings on each of the 5 lots comprising the Subject Site. The surface of the Subject Site is currently covered with grass with established trees are observed along the site boundaries.

Figure 2.2 presents a plan of the Subject Site that is supplemented with photographs showing the different elements of the Site (Figure 2.3 and Figure 2.4). Figure 2.2 includes markers indicating the vantage point and direction of the photographs.

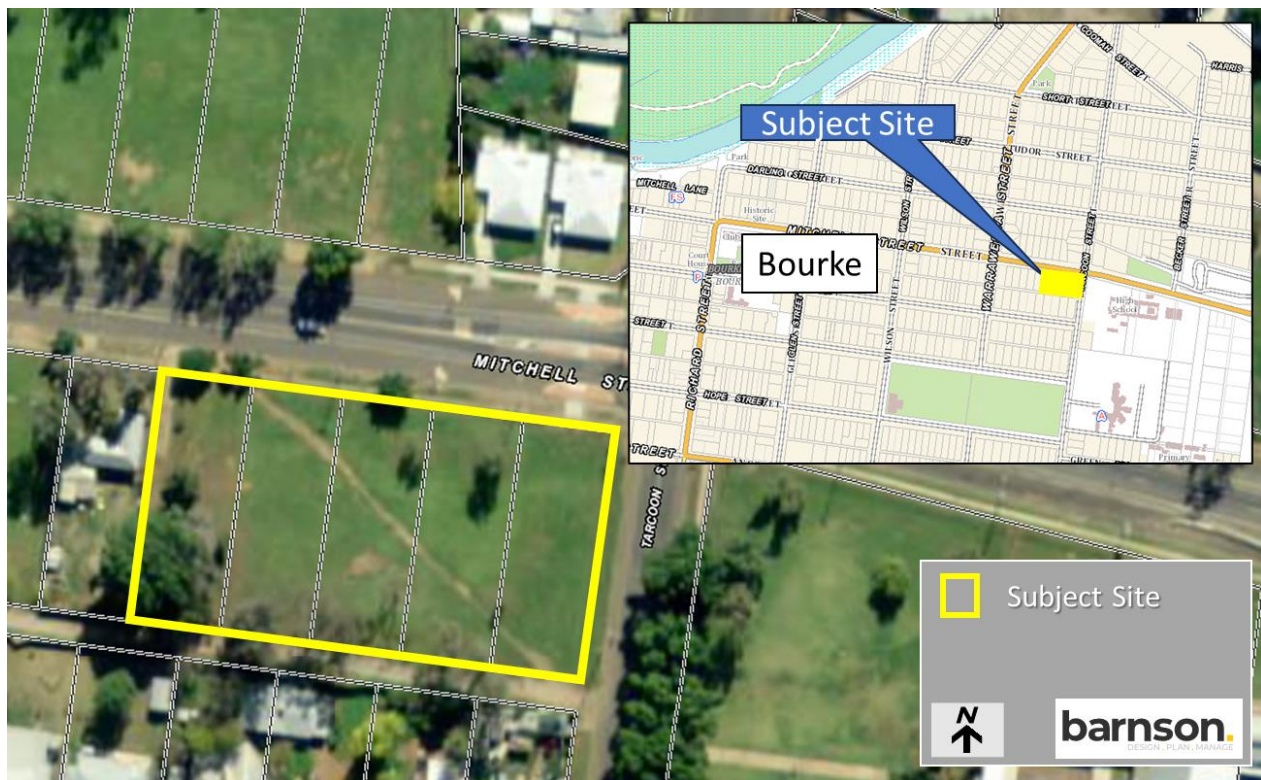


Figure 2.1: Location of the Subject Site.

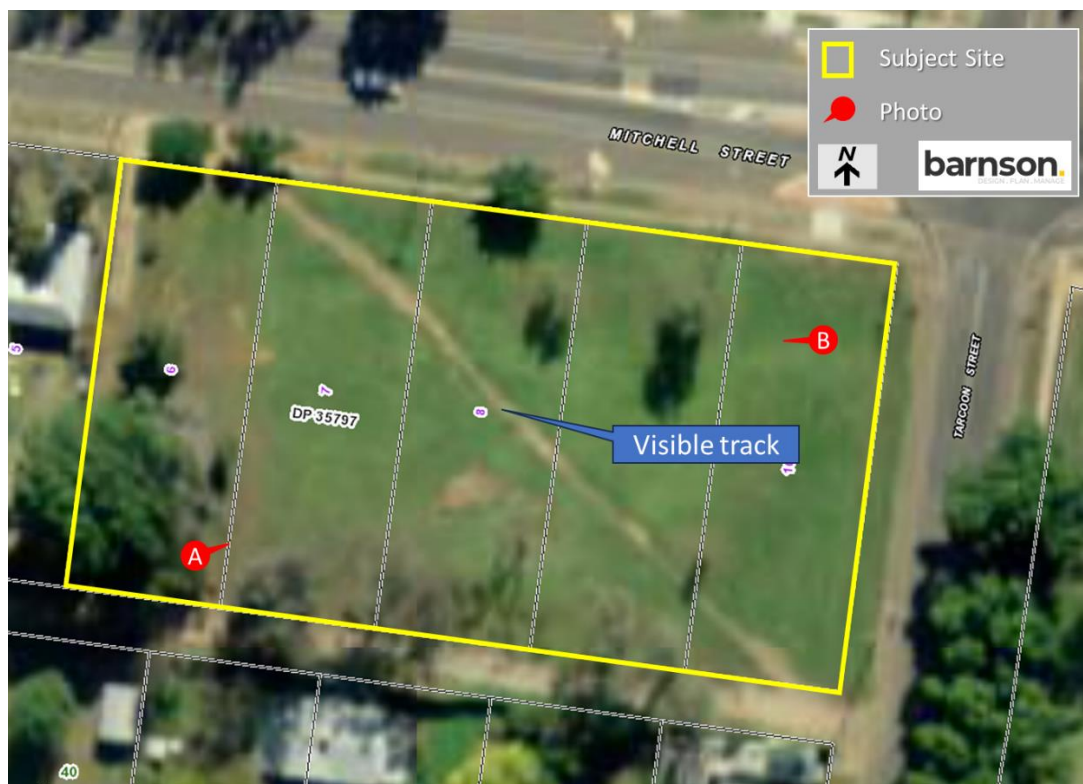


Figure 2.2: Existing Subject Site layout.



Figure 2.3: Photo A – View across Subject Site looking east toward Tarcoon Street.



Figure 2.4: Photo B – View across Subject Site looking west.

2.4. Historical Aerial Photographs

A review of historical aerial photographs dating back to 1963 was undertaken. Historical aerial photographs are presented in **Appendix A**. A summary of the Site features is provided as follows:

- 1965 – Each of the five (5) lots are occupied by individual structures, most likely residential dwellings.
- 1979 – No change in previous fourteen (14) years.
- 1994 – No substantial changes to the Site, however a new industrial development is evident adjoining the western side of the site.
- Sometime after 1994 – SixMaps offers aerial imagery (circa unknown). The aerial imagery depicts that all 5 dwelling structures and inter-lot fencing have been demolished and the site levelled.
- Present. – The site remains unoccupied and is unfenced. Path used by pedestrians bisect the site diagonally from north-west to south-east.

2.5. Proposed Development

The Bourke Aboriginal Corporation Health Service (BACHS), which is an Aboriginal Community Controlled Health Service (ACCHS) providing primary healthcare services initiated and operated by the local Aboriginal community. The BACHS is proposing to develop the new Bourke Integrated Primary Healthcare Centre (BIPHCC) to deliver holistic, comprehensive, and culturally appropriate healthcare to the community.

The Subject Site was identified as a candidate location for the development of the new BIPHCC. A preliminary concept for the proposed BIPHCC is presented in Figure 2.5.

2.6. Historical Record of Site Contamination

Datasets maintained by the Office of Environment and Heritage (OEH) including notices under CLM Act, POEO Environment Protection License Register, and environmental incidents were reviewed.

- **List of NSW contaminated sites notified to EPA** – The sites appearing on the OEH “List of NSW contaminated sites notified to the EPA” indicate that the notifiers consider that the sites are contaminated and warrant reporting to EPA. However, the contamination may or may not be significant enough to warrant regulation by the EPA. The EPA needs to review information before it can make a determination as to whether the site warrants regulation. A search of the listing returned no record for the subject site.
- **Contaminated Land Record of Notices** – A site will be on the Contaminated Land Record of Notices only if the EPA has issued a regulatory notice in relation to the site under the *Contaminated Land Management Act 1997*. A search of the register in August 2023 returned no record for the subject site.

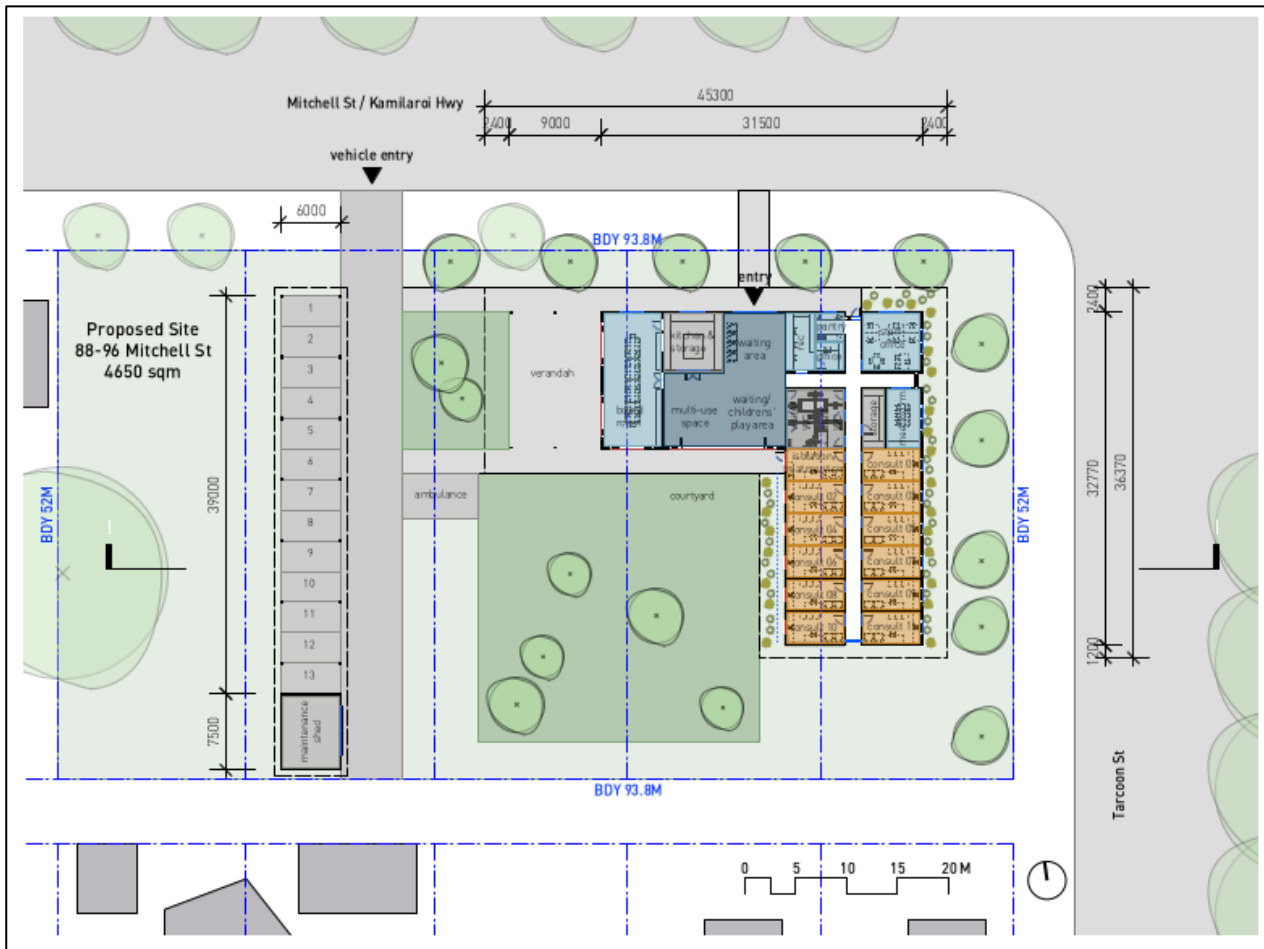


Figure 2.5: Proposed lot layout for the re-zoning and subdivision of the Subject Site.

There is further no record of the Subject Site in any of the following databases:

- Former Gasworks Database
- EPA PFAS Investigation Program
- Defence PFAS Investigation & Management Program
- Air Services Australia National PFAS Management Program
- Defence 3 Year Regional Contamination Investigation Program.

2.7. Previous Site Investigations

No information relating to any previous assessment of contamination at the Subject Site were available for review.

2.8. Findings

Table 2.3 presents a summary of the findings from the desktop review of the Subject Site.

Table 2.3: Summary of findings

Item	Site
Site Surfaces and Condition	Surfaces across the site seem generally covered with managed grasslands and some trees on boundaries. A path is evident to bisect the site.
Pathways	No nearby surface water resources. Site runoff is low and no erosion observed. Site runoff enters council stormwater infrastructure and is not directly to environment. Groundwater is deep and unlikely to be contaminated through leaching of localised contamination. Site is largely covered with vegetation. Wind erosion of site surface may seasonably occur during dry conditions.
Buildings and Structures	N/A – No structures on site. Overhead electrical cables supported with poles located on north-east corner and along northern boundary of the site.
Vegetation	Maintained grasslands and some trees are evident on boundaries.
Historical land use	Residential structures and historical residential land use represent a potential source of site contamination.
Signs of Contamination	No obvious signs of contamination were easily observed from a desktop review. A path is observed dissecting the site. The path most likely have been created by foot traffic, bicycles and motorbikes. In general, actual signs of potential contamination are difficult to conclusively identify from a desktop perspective.

2.9. Data Gaps

Based on the desktop review and observations made from aerial photos, the following data gaps have been identified:

- Multiple residential developments occupied the site in the recent past. It is unclear whether there has been import of fill to facilitate the constructions or during the levelling of the site following demolition of the dwellings.
 - There is the potential that contamination impacts from the historical residential use of the site exist including oils, greases, heavy metals and petroleum hydrocarbons.
 - The potential presence of hazardous materials in the construction of the residential structures and the procedures followed during demolition to safely remove potentially hazardous materials may potentially have contributed to the contamination of the Subject Site.
 - Given the changes to the configuration of the Site across the years the gaps of time between available historic images may conceal important changes not able to be assessed.
-

3. PRELIMINARY CONCEPTUAL SITE MODEL

3.1. Potential Sources of Contamination and Associated Contaminants of Concern

Table 3.1 presents a summary of the potential areas of environmental concern (AECs), potential sources of contamination and the associated contaminants of potential concern (COPCs).

Table 3.1: Potential Contamination Sources and Associated Contaminants of Concern.

AEC	Potentially Contaminating Activity	COPCs	Likelihood of Contamination	Comments
Maintenance/Demolition of buildings	Former dwelling structures onsite would have required general maintenance. Demolition of structures. Lead paint and asbestos may be present in surface soils.	Heavy metals (lead), asbestos,	Moderate to high	Dispersion of hazardous materials through building maintenance, demolition, or disposal of waste.
Fill of Unknown Origin	Fill of unknown origin and quality potentially placed within the Site during historical construction or subsequent demolition/levelling activities.	Heavy metals, TRH, BTEX, PAH, phenols, VOC, oil and grease.	Moderate	Potential for contamination f surface water runoff.
Vehicles and motorised equipment	Use of equipment in the maintenance of the site and historic use of motorised vehicles and equipment in the demolition of structures and levelling of the site.	Heavy metals, TRH, BTEX, PAH, phenols, VOC, oil and grease.	Moderate to high	Potentially impacted surface and near surface soils, possibly beneath existing hardstand areas and building footprints. If fill is petroleum impacted, possibility for vertical migration to surface water.

Notes: This is a qualitative assessment of the probability of contamination being detected at the potential AEC.

Total Recoverable Hydrocarbons (TRH), Benzene, Toluene, Ethylbenzene and Xylene (BTEX), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAH), heavy metals (arsenic, cadmium, chromium, copper, lead, mercury and zinc).

3.2. Contamination Sources, Transport Mechanisms, Pathways and Receptors

Table 3.2 presents a summary of the potentially affected media, key potential receptors and transport mechanisms for the Subject Site.

Table 3.2: Potential Contamination Sources, Pathways and Receptors

Primary Sources	Secondary Sources	Transport Mechanisms	Exposure Routes	Potential Receptors
Maintenance/demolition of buildings	Asbestos containing materials and lead paint	- Physical transfer of contaminated soil (e.g. windblown dust) - Run off into surface water	- Soil and surface water ingestion - Dermal contact with soil and surface water - Vapour (gas) or particulate (dust) inhalation	- Site occupants and visitors. - Maintenance and construction workers. - Neighbouring lands.
Fill of unknown origin	Impacted fill and natural soil underlying the fill	- Leaching from fill to natural soils - Run off into surface water - Wind erosion and release of contaminated dust to air	- Soil ingestion - Dermal contact of soil and surface water - Dust and fibre inhalation	- Site occupants and visitors. - Maintenance and construction workers. - Neighbouring lands.
Historic activities including possible motor vehicle use	Localised hydrocarbon spills and leaks	- Leaching from fill to natural soils - Run off into surface water	- Soil and surface water ingestion - Dermal contact of soil and surface water - Vapour (gas) inhalation	- Site occupants. - Maintenance and construction workers. - Neighbouring lands.

3.3. Key Potential Exposure Pathways

A summary of the key potential exposure pathways for Site is presented in Table 3.3.

Table 3.3: Potential Exposure Pathways

Receptor/Media	Exposure Pathways	Comment
Maintenance/Construction Workers	Potentially Complete	Should contaminated soils be present there is a potential for workers involved in excavation to be exposed to soils containing COPCs via dermal contact, volatilisation, ingestion and inhalation pathways during earthworks, and any ongoing maintenance works that involve excavation.
Ecological	Unlikely	Surface water runoff has the potential to transport sediment containing COPCs from unsealed surfaces during rainfall events into stormwater drainage systems. However, given the distance to the nearest receptor a complete pathway may only exist during periods of heavy rain or storm events.
Groundwater	Unlikely	The potential for groundwater to be impacted from top-down contamination exists depending on the depth to groundwater. This cannot be estimated with certainty given unavailability of nearby bore data.

4. SITE INVESTIGATION

4.1. General

The objective of the investigation is to determine whether there are any environmental risks associated with the Subject Site that could affect the proposed future development and would require further investigation or action to render the site suitable for its intended use.

The desktop evaluation of the site history and current use of the site did not identify any significant risks in this regard but did identify both historical and current land use activities that could contribute to contamination of the surface soils of the Subject Site.

Barnson conducted an inspection of the Subject Site on 28 September 2023. The purpose of the site inspection was to verify the findings of the desktop assessment, as well as to collect confirmatory samples of soil from areas of the Subject Site where development is proposed, or contamination is suspected.

Based on the findings of the CSM the inspection and sampling were focussed on the surface soils (0-150mm). Samples of soil at a depth of 300mm was collected for classification of excavated material for disposal. The site inspection included all areas of the Subject Site.

During the site inspection the following observations were made:

- The Subject Site is not fenced and access to the site is possible by vehicle and pedestrians. Both vehicle tracks and a footpath are evident (Figure 4.1).



Figure 4.1: View across the Subject Site looking west, vehicle and pedestrian tracks visible.

- At the time Barnson conducted the site inspection, most of the Subject Site was covered with maintained grass (very dry) with trees around the perimeter (Figure 4.2).
- No large-scale discoloration or staining visible of open ground or soil, and no obvious discoloration or irregularities in the occurrence of vegetation was observed during the site inspection.
- Fragments of fibre reinforced cement sheet was observed on the surface of the site (Figure 4.3). Fragments were also observed in the layer of soil just under the surface (approx.. 100mm to 200mm) upon excavations undertaken along the northern half of the site (Figure 4.5).
- Stockpiled sand as well as brick and concrete fragments observed under trees in the southwest corner of the site No other evidence of illegal waste disposal observed anywhere on site.



Figure 4.2: Dry grass cover on site..



Figure 4.3: Fragments of fibre reinforced cement sheet.



Figure 4.4: Fragments of fibre reinforced cement sheet in excavated soil.



Figure 4.5: Sand and demolition waste.

4.2. Confirmatory Sampling

The purpose of collecting confirmatory samples as part of the site inspection is to determine if any of the potential contaminants identified from the CSM are present. The samples are not intended for statistically valid characterisation or quantification of contamination levels.

Based on the findings of the CSM the inspection and sampling were focussed on the surface soils (0-150mm). The site inspection included all accessible areas of the Subject Site. Samples were collected in a regular spaced pattern across the site. The waste disposal area in the southwest of the Subject Site was also specifically investigated with separate surface soil samples collected. Figure 4.6 presents a map of the Subject Site with the locations of the surface soil samples indicated. Sample locations numbered 1 to 6 was excavated using a vehicle mounted auger drill, while sample location marked A to G was excavated by hand. A total of 8 samples were collected for the investigation of potential contaminants (chemical analysis) while a total of 12 samples were collected for the classification of excavated material (ENM). Table 4.1 is a summary description of the collected samples.

Table 4.1: Summary of sample details.

Reference in Error! Reference s ource not found.	Description	Assigned Sample Number
1	Geotechnical drill excavated sample (0-150mm) sample for chemical analysis and ENM classification collected along southern boundary.	BH-1
2	Geotechnical drill excavated sample (0-150mm) sample for chemical analysis and ENM classification collected from central portion west.	BH-2
3	Geotechnical drill excavated sample (0-150mm) sample for ENM classification collected central portion east.	BH-3
4	Geotechnical drill excavated sample (0-150mm) sample for ENM classification collected in central portion of site.	BH-4
5	Geotechnical drill excavated sample (0-150mm) sample for chemical analysis and ENM classification collected along southern boundary.	BH-5
6	Geotechnical drill excavated sample (0-150mm) sample for ENM classification collected central portion east.	BH-6
A	Hand excavated surface soil (0-150mm) sample for chemical analysis and ENM classification collected collected in north-west corner	BH-A
B	Hand excavated surface soil (0-150mm) sample for ENM classification collected in central portion	BH-B
C	Hand excavated surface soil (0-150mm) sample for chemical analysis and ENM classification collected at south east corner	BH-C
D	Hand excavated surface soil (0-150mm) sample for chemical analysis and ENM classification collected at north-east corner.	BH-D
E	Hand excavated surface soil (0-150mm) sample for chemical analysis and ENM classification collected along the centre of the site	BH-E
F	Hand excavated surface soil (0-150mm) sample for ENM classification collected along northern boundary.	BH-F
G	Hand excavated surface soil (0-150mm) sample for chemical analysis and ENM classification collected near demolition waste.	BH-G

The pattern followed for the soil sampling can be described as a combination of Systematic and Judgement Sampling, where points are selected on a regular spaced grid with certain locations excavated to a greater depth based on the investigator's knowledge of the proposed land use and likely distribution of contaminants

at a site. It is an efficient sampling method for confirmatory sampling that utilises knowledge of the site history and field observations to direct sample collection (NSW EPA, 2020).



Figure 4.6: Surface soil sample locations.

The eight (8) samples numbered BH-1,2,5 and BH-A,C,D,E and G were submitted to the Australian Laboratory Services (ALS) laboratory in Mudgee, for determination of the following parameters:

- metallic element (cadmium, chromium, copper, lead, nickel and zinc) concentrations, including arsenic and mercury in soil;
- Extraction with organic solvent and analysis of Total Recoverable Hydrocarbons (TRH) fractions C6 to C40, benzene, toluene, ethylbenzene and total xylene (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and phenols; and
- Extraction with organic solvent and analysis of Organochlorine (OCP) and Organophosphorus (OPP) pesticide compounds.

Samples of soil from locations 2,3,C,B and G were submitted for asbestos screening. In addition four (4) fragments of fibre reinforced cement sheeting collected from the surface of the Subject Site and one fragment of a buried utility pipe discovered next to sample location 6, were submitted for determination of fibre content type.

The ALS laboratory is NATA accredited for all the analysis indicated above.

The soil samples collected for determination of the soil classification for disposal were not submitted for analysis. The fragments of asbestos containing material observed both on the surface and in the sub-surface soils of the site indicate a pre-classification of any surface soil excavated from the site. Analysis and classification of the soil samples collected was therefore not undertaken.

4.3. Analytical Results

The ALS report for the samples of soil and construction material submitted for analysis is attached as Appendix B. The laboratory report indicates that only heavy metals and trace quantities of organochlorine pesticide were detected in the soil. The concentrations of hydrocarbon, polycyclic organic compounds as well as total polychlorinated biphenyls are indicated as below the limits of detection in all surface soil and sediment samples.

The metals detected include chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), and zinc (Zn). Concentrations of arsenic (As), cadmium (Cd) and mercury (Hg) were shown to be below the limit of reporting in all samples.

Table 4.2 presents a summary of the compounds and elements detected above the limit of detection in surface soil samples.

Of the 5 soil samples screened for asbestos only one (BH-G) tested positive for asbestos containing material. All four fragments of fibre reinforced cement sheeting collected from the surface of the Subject Site was shown to contain asbestos fibres. The fragment of utility pipe submitted for analysis was shown to contain no asbestos fibres.

Table 4.2: Summary of detected metal and pesticide concentrations

	BH-1	BH-2	BH-5	BH-A	BH-C	BH-D	BH-E	BH-G
Element	mg.kg ⁻¹							
Arsenic (As)	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium (Cd)	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	20	23	19	15	16	13	16	15
Copper (Cu)	14	46	23	8	15	9	12	31
Lead (Pb)	25	32	65	47	39	23	33	79
Mercury (Hg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel (Ni)	13	15	10	8	9	8	9	13
Zinc (Zn)	125	76	281	262	120	26	88	136
Aldrin and dieldrin	0.16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11

4.4. Analytical Data Quality

Samples were collected in new, clean containers using cleaned equipment and soils were placed in glass jars provided by the laboratory that were refrigerated after filling and transported in an insulated container to

the laboratory. Chain of custody was recorded for all samples. A copy of the signed sheet is attached as Appendix B.

The analyses were undertaken at a NATA accredited laboratory. The laboratory quality control procedures in the form of duplicates as well as analyte and surrogate spikes were applied to all contaminant classes analysed. The results reported for the duplicate is within the Relative Percent Difference range of the acceptance criteria for a duplicate sample. The analyte spike recoveries reported for the different sets of organic analytes are indicated as within the acceptance criteria (see Appendix B).

All media appropriate to the objectives of this investigation have been adequately analysed and no area of significant uncertainty exist. It is concluded the data is suitable for the purposes of the preliminary site investigation.

5. ASSESSMENT

5.1. Assessment Criteria – Human Health and Environmental Risk

Screening for human health and ecological risk, utilises published human health investigation levels (HILs) and ecological screening and investigation levels (ESLs & EILs) from the National Environment Protection (Assessment of Site Contamination) Measure (NEPC, 1999) to identify contaminant concentrations in soil that may pose a risk to future residents, people visiting the site, or to ecological receptors.

HILs are scientifically based, generic assessment criteria designed to be used in the screening of potential risks to human health from chronic exposure to contaminants. HIL's are conservatively derived and are designed to be protective of human health under the majority of circumstances, soil types and human susceptibilities and thus represent a reasonable 'worst-case' scenario for specific land-use settings.

The HILs selected for evaluation of the Investigation Areas are those derived for a standard residential scenario (HIL-A), which assumes typical residential land use with garden/accessible soil (home grown produce <10% fruit and vegetable intake, and no poultry). The standard residential scenario is conservative to use for evaluation. Although all of the exposure pathways included in the residential scenario are unlikely to exist in the proposed development, the more conservative HILs are used to account for sensitive receptors such as children, the elderly or persons with illnesses which may be residing in the proposed development.

Although the primary concern in most site assessments is protection of human health, the assessment should also include consideration of ecological risks and protection of groundwater resources that may result from site contamination. Ecological investigation levels (EILs) provide screening criteria to assess the effect of contaminants on a soil ecosystem and afford species level protection for organisms that frequent or inhabit soil and protect essential soil processes.

EILs have been derived for common metallic contaminants in soil. The values selected for the evaluation of the heavy metals detected in the soil samples from the Subject Site considers the physicochemical properties of soil and contaminants and the capacity of the soil to accommodate increases in contaminant levels above natural background while maintaining ecosystem protection for identified land uses. The Environmental Investigation Limit (EIL) used for the assessment is derived by summing the added contaminant limit (ACL) and the ambient background concentration (ABC).

ACLs are based on the soil characteristics of pH, CEC and clay content. Empirical relationships that can model the effect of these soil properties on toxicity are used to develop soil-specific values. These soil-specific values take into account the biological availability of the element in various soils. Using this approach different soils will have different contaminant EILs rather than a single generic EIL for each contaminant.

Table 5.1 presents a summary of the health-risk based criteria and ecological investigation levels selected for assessment of the detected metal and pesticide concentrations.

Table 5.1: Human health and ecological risk screening levels.

Element	Health-based Investigation Levels	Ecological Investigation Levels (EIL)
---------	-----------------------------------	---------------------------------------

	HIL A Residential	Urban residential and public open space
	mg.kg ⁻¹	mg.kg ⁻¹
Arsenic (As)	100	100
Cadmium (Cd)	20	NA
Chromium	NR	190
Copper (Cu)	6,000	190
Lead (Pb)	300	1,100
Mercury (Hg)	40	NA
Nickel (Ni)	400	30
Zinc (Zn)	7,400	420
Aldrin and dieldrin	6	NA

Note: NR=not relevant due to low human toxicity of Cr(III). NA=No applicable screening level available. EILs selected are most conservative values relevant to residential land use scenario.

The health risks associated with Aldrin is assessed as the sum of aldrin and dieldrin (related organochlorine pesticide compounds) is assessed using HIL values developed to be protective of human health. Ecological risk screening levels for organochlorine pesticide are available only for DDT. Ecological risks for Aldrin is therefore not evaluated.

The National Environment Protection (Assessment of Site Contamination) Measure (NEPC, 1999) notes health risk based screening levels for asbestos contaminated soil (for the Residential A scenario) as 0.01% (w/w) for Bonded ACM, 0.0001 for friable asbestos and no visible asbestos in surface soil (all forms of asbestos).

It was confirmed that limits of detection reported by the laboratory are below the criteria values. All other contaminants analysed for in the soil samples that are reported below the limit of detection by the laboratory can therefore be excluded from further assessment.

5.2. Findings

Direct comparison of the analytical results presented in Table 4.1 with the assessment criteria (refer Table 5.1) show that the detected metal and pesticide concentrations in samples collected from the Subject Site are well below residential health-risk based and ecological screening criteria values. The general low concentrations of heavy metals detected suggest naturally occurring element abundance.

The presence of asbestos containing material (ACM) as fragments on surface as well as in sub-surface soil was confirmed. The proposed development will require excavation of the site which will disturb the surface and buried fragments. Although broken, the bonded ACM fragments appear in reasonable condition and are not easily crumbled i.e. not fibrous asbestos. There is no evidence from the site history or direct observation during the site walkover that other fibrous asbestos materials (such as insulation or woven materials) are present on the site. Soil samples analysed for asbestos confirmed the presence of bonded ACM fragments only.

5.3. Discussion

The number of samples and sampling methodology followed is not sufficient to quantify the weight percentage of ACM for comparison to the HSL-A value. However, visible fragments are observed at the surface of the site and light disturbance of the surface soil reveals more fragments. Further action to remediate the ACM contamination is therefore required.

The recommended general process for assessment of site contamination, including for assessment of asbestos, is shown in Schedule of the National Environment Protection (Assessment of Site Contamination) Measure (NEPC, 1999). The process starts with a Preliminary Site Investigation (PSI), which may lead to a Detailed Site Investigation (DSI).

Depending on the site-specific circumstances and the proposed remediation approach, conservative management of the asbestos contamination may avoid the need for a DSI. Where remediation is required, appropriate validation sampling should be carried out to verify the effectiveness of the measures undertaken.

A DSI is not necessary where there is a high degree of confidence that the asbestos contamination is confined to bonded ACM in superficial soil, i.e. the site history can be established with confidence and this clearly indicates that there is no reason to suspect buried asbestos materials and the site inspection confirms that any bonded ACM is in sound condition and only present on the surface/near surface of the site. In these circumstances the assessment can proceed directly to remediation (removal of bonded ACM fragments and ensuring that the soil surface is free of visible asbestos) and validation.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

In accordance with the objectives stated in Section 1.2, and based on the information contained within this assessment, the following conclusions are presented (subject to the limitations noted in Section 1.4):

- Activities associated with the historical and current use of the Subject Site were identified as having a potential to contaminate surface soil at the site.
- The following potential sources of contamination were identified:
 - Maintenance/demolition of buildings
 - Fill of unknown origin
 - Historic activities including possible motor vehicle use, and
 - Waste disposal.
- A review of the available historical information, including contaminated sites databases and aerial photographs, indicated a low potential for significant environmental contamination to be present across the Subject Site.
- Confirmatory sampling showed that concentrations of all contaminants investigated were below screening criteria in all surface soil samples collected.
- The screening criteria used in the evaluation of the contaminant concentrations were appropriately conservative and suitable for assessment of the proposed residential land use categories.
- The presence of asbestos containing material was confirmed at the site. Visible fragments of asbestos containing material represent a risk to human health and the site is not suitable for the proposed development without remedial action to remove the asbestos contamination.
- Visible fragments of asbestos containing material in surface soils leads to the classification of any surface material excavated from the site as Special Waste in the Asbestos Waste Category. Generators of special waste do not need to make any further assessment of their waste if it falls within the definitions of one of the special waste categories.

6.2. Recommendations

- Based on the findings of the desktop review and site investigation it can be stated with a reasonable level of confidence that the Subject Site is not currently suitable for the proposed development.
- The Subject Site is not currently subject to a Statutory Site Audit, and in terms of the Guidelines for the NSW Site Auditor Scheme (NSW EPA, 2017), the EPA may recommend that any remedial work proposed as a result of this assessment be independently verified.
- Two potential options for rendering the site suitable for development exist:
 - Option A - excavate all the affected material (and validate the work undertaken including that no visible asbestos is present on the site surface) and either manage by containment on-site or off-site disposal at an appropriate waste facility. Validation assessment of the remedial works will confirm the asbestos impacted material as being removed and a detailed contamination investigation is not

required to demonstrate suitability for residential land-use. The remedial works are expected to be classified as category 2 remediation. The remediation category can be confirmed in a remediation action plan.

- Option B - carry out a Detailed Site Investigation to delineate the volume of contaminated soil requiring on-site containment or off-site disposal

Based on the recommendations of the National Environment Protection (Assessment of Site Contamination) Measure (NEPC, 1999) Option A can be implemented as evidence presented indicate that only bonded ACM is present.

- The asbestos containing material (ACM) at the Subject Site, requires specialist attention during any removal or remedial action. It is recommended that during any removal of waste from this area, the ACM be removed and transported to a landfill, licensed to accept the waste, for disposal. The removal and disposal task can be undertaken by either a competent person or a licensed asbestos removalist.
 - Clearance inspection of the asbestos removal area must be undertaken following completion of removal work. The clearance inspection is to be carried out by a licensed, independent, asbestos assessor. A clearance certificate must be obtained from the asbestos assessor.
 - Notification to SafeWork of the asbestos removal works will be required if the ACM to be removed is more than 10m².
 - Tracking of the collected ACM will be required. Transport of asbestos waste is regulated under EPA legislation. Disposal sites are regulated by the NSW EPA and local government.
-

7. REFERENCES

- DPIE. (2020, April). *eSpade*. Retrieved March 3, 2021, from NSW Department of Planning, Industry and Environment: <https://www.environment.nsw.gov.au/eSpade2WebApp#>
- NEPC. (1999). *National Environment Protection (Assessment of Site Contamination) Measure (as amended, 2013)*. National Environment Protection Council.
- NSW EPA. (2014). *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014*. Sydney: NSW Environment Protection Authority.
- NSW EPA. (2014a). *Waste Classification Guidelines - Part 1: Classifying Waste, EPA2014/0796*. Sydney: NSW Environmental Protection Authority.
- NSW EPA. (2020). *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*. NSW Environmental Protection Agency.
- NSW EPA. (2020). *Sampling Design Part 1 - Application, Contaminated Land Guidelines*. Sydney: NSW EPA.
- NSW Gov. (2015). *Mapping of naturally occurring asbestos in NSW - Known and potential for occurrence*. Sydney, NSW: Heads of Asbestos Coordination Authorities - NSW Trade & Investment, Division of Resources & Energy.
- NSW Government. (2017, December 7). *Planning Portal, Groundwater Vulnerability, Spacial Data*. Retrieved July 30, 2019, from Department of Planning, Industry and Environment: <https://www.planningportal.nsw.gov.au/opendata/dataset/epi-groundwater-vulnerability>
- WaterNSW. (2023). *Real Time Data*. Retrieved August 22, 2023, from Water NSW: <https://realtimedata.watarnsw.com.au/water.stm>

barnson.

APPENDIX A

Historical Aerial Imagery

1963 – Houses onsite



1979 – No Change



1994 – No Change



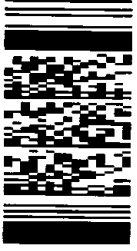
Sometime after 1994 – Demolished



barnson.

APPENDIX B

**Chain of Custody and Laboratory
Report**



Telephone : 02 6372 6736

CHAIN OF CUSTODY AND ANALYTICAL REQUEST

Job Number	42571	Date	9 October 2023
Laboratory	ALS Mudgee	Report to	Nardus Potgieter npotgieter@barnson.com.au
Sample Temperature on Receipt 15 °C	Signature:	Notes	

Sample ID	Sample Description	Sample Date	Sample type	Analysis request				
				1	2	3	4	5
BH-1	BH-1 Surface soil	05/10/2023	Soil	X				
BH-2	BH-2 Surface soil	05/10/2023	Soil	X				
BH-5	BH-5 Surface soil	05/10/2023	Soil	X				
BHA	BHA Surface soil	05/10/2023	Soil	X				
BHC	BHC Surface soil	05/10/2023	Soil	X				
BHD	BHD Surface soil	05/10/2023	Soil	X				
BHE	BHE Surface soil	05/10/2023	Soil	X				
BHG	BHG Surface soil	05/10/2023	Soil	X				
ACM-01	BH-B on surface	05/10/2023	Bulk solid		X			
ACM-02	BH-E on surface	05/10/2023	Bulk solid		X			
ACM-03	BH-5 on surface	05/10/2023	Bulk solid		X			
ACM-04	BH-G on surface	05/10/2023	Bulk solid		X			
ACM-05	Pipe BH-6	05/10/2023	Bulk solid		X			
SA-01	BH-2 surface soil	05/10/2023	Soil			X		
SA-02	BH-3 surface soil	05/10/2023	Soil			X		
SA-03	BH-C surface soil	05/10/2023	Soil			X		
SA-04	BH-B surface soil	05/10/2023	Soil			X		
SA-05	BH-G surface soil	05/10/2023	Soil			X		

Analysis request		Method Code
1	TRH (C6-C40) / BTEXN / PAH / OC / PCB / 8 Metals	S-8
2	Asbestos – in Bulk Solids	EA200B
3	Asbestos – in 50g Soil (Grab sample) includes presence/absence for free fibres	EA200G
4		
5		

Relinquished by / Affiliation <td>Accepted by / Affiliation <td>Date 9 October 2023</td></td>	Accepted by / Affiliation <td>Date 9 October 2023</td>	Date 9 October 2023
--	---	------------------------



CERTIFICATE OF ANALYSIS

Work Order	: ME2301837	Page	: 1 of 14
Client	: BARNSON	Laboratory	: Environmental Division Mudgee
Contact	: Nardus Potgieter	Contact	: Mary Monds (ALS Mudgee)
Address	: Unit 4 108-110 Market Street MUDGEES NSW 2850	Address	: 1/29 Sydney Road Mudgee NSW Australia 2850
Telephone	: 0429 464 067	Telephone	: +61 2 6372 6735
Project	: Soil	Date Samples Received	: 09-Oct-2023 13:00
Order number	: ----	Date Analysis Commenced	: 10-Oct-2023
C-O-C number	: ----	Issue Date	: 16-Oct-2023 18:28
Sampler	: Client Sampler		
Site	: ----		
Quote number	: SY/053/14		
No. of samples received	: 18		
No. of samples analysed	: 18		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alana Smylie	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Brendan Schrader	Laboratory Technician	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- **EA200 Legend**
 - EA200 'Am' Amosite (brown asbestos)
 - EA200 'Cr' Crocidolite (blue asbestos)
 - EA200 'Ch' Chrysotile (white asbestos)
 - EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
 - EA200: Analysis of asbestos from swabs and tapes is not covered under the current scope of NATA accreditation.
 - EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
 - EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
 - EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
 - EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
 - EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.
 - EA200: N/A - Not Applicable



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH-1 BH-1 Surface Soil	BH-2 BH-2 Surface Soil	BH-5 BH-5 Surface Soil	BHA BHA Surface Soil	BHC BHC Surface Soil
Sampling date / time				05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	ME2301837-001	ME2301837-002	ME2301837-003	ME2301837-004	ME2301837-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	1.8	2.0	1.3	1.2	<1.0
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	20	23	19	15	16
Copper	7440-50-8	5	mg/kg	14	46	23	8	15
Lead	7439-92-1	5	mg/kg	25	32	65	47	39
Nickel	7440-02-0	2	mg/kg	13	15	10	8	9
Zinc	7440-66-6	5	mg/kg	125	76	281	262	120
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	0.16	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Sub-Matrix: SOIL
(Matrix: SOIL)

Sample ID

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-1 BH-1 Surface Soil	BH-2 BH-2 Surface Soil	BH-5 BH-5 Surface Soil	BHA BHA Surface Soil	BHC BHC Surface Soil
Sampling date / time				05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	
Compound	CAS Number	LOR	Unit	ME2301837-001	ME2301837-002	ME2301837-003	ME2301837-004	ME2301837-005	
				Result	Result	Result	Result	Result	
EP068A: Organochlorine Pesticides (OC) - Continued									
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	0.16	<0.05	<0.05	<0.05	<0.05	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6	
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10	
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100	
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									

EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions

Sub-Matrix: SOIL (Matrix: SOIL) Sample ID

EP080S: TPH(V)/BTEX Surrogates



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-1 BH-1 Surface Soil	BH-2 BH-2 Surface Soil	BH-5 BH-5 Surface Soil	BHA BHA Surface Soil	BHC BHC Surface Soil
Sampling date / time					05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00
Compound	CAS Number	LOR	Unit		ME2301837-001	ME2301837-002	ME2301837-003	ME2301837-004	ME2301837-005
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		89.0	89.4	95.0	88.0	90.5
Toluene-D8	2037-26-5	0.2	%		94.9	96.7	106	92.8	98.7
4-Bromofluorobenzene	460-00-4	0.2	%		99.8	102	106	96.2	99.9



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BHD BHD Surface Soil	BHE BHE Surface Soil	BHG BHG Surface Soil	SA-01 BH-2 surface soil	SA-02 BH-3 surface soil
Sampling date / time				05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	ME2301837-006	ME2301837-007	ME2301837-008	ME2301837-014	ME2301837-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	<1.0	<1.0	1.7	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	No	No
Asbestos (Trace)	1332-21-4	-	-	----	----	----	No	No
Asbestos Type	1332-21-4	-	--	----	----	----	-	-
Sample weight (dry)	----	0.01	g	----	----	----	190	268
APPROVED IDENTIFIER:	----	-	--	----	----	----	J. WILLIAMS	J. WILLIAMS
Synthetic Mineral Fibre	----	-	--	----	----	----	No	No
Organic Fibre	----	-	--	----	----	----	Yes	No
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	13	16	15	----	----
Copper	7440-50-8	5	mg/kg	9	12	31	----	----
Lead	7439-92-1	5	mg/kg	23	33	79	----	----
Nickel	7440-02-0	2	mg/kg	8	9	13	----	----
Zinc	7440-66-6	5	mg/kg	26	88	136	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BHD BHD Surface Soil	BHE BHE Surface Soil	BHG BHG Surface Soil	SA-01 BH-2 surface soil	SA-02 BH-3 surface soil
Sampling date / time				05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	ME2301837-006	ME2301837-007	ME2301837-008	ME2301837-014	ME2301837-015
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.11	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	0.11	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BHD BHD Surface Soil	BHE BHE Surface Soil	BHG BHG Surface Soil	SA-01 BH-2 surface soil	SA-02 BH-3 surface soil
Sampling date / time				05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	ME2301837-006	ME2301837-007	ME2301837-008	ME2301837-014	ME2301837-015
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	113	113	97.3	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	143	137	120	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	57.0	69.3	101	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BHD BHD Surface Soil	BHE BHE Surface Soil	BHG BHG Surface Soil	SA-01 BH-2 surface soil	SA-02 BH-3 surface soil
Sampling date / time					05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	ME2301837-006	ME2301837-007	ME2301837-008	ME2301837-014	ME2301837-015	
				Result	Result	Result	Result	Result	
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%	69.5	71.2	68.8	----	----	
2-Chlorophenol-D4	93951-73-6	0.5	%	73.5	76.1	76.7	----	----	
2,4,6-Tribromophenol	118-79-6	0.5	%	52.0	56.2	60.4	----	----	
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%	88.2	90.1	89.9	----	----	
Anthracene-d10	1719-06-8	0.5	%	78.5	76.9	81.2	----	----	
4-Terphenyl-d14	1718-51-0	0.5	%	116	118	108	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	104	106	108	----	----	
Toluene-D8	2037-26-5	0.2	%	110	114	115	----	----	
4-Bromofluorobenzene	460-00-4	0.2	%	115	118	120	----	----	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SA-03 BH-C surface soil	SA-04 BH-B surface soil	SA-05 BH-G surface soil	----	----
Sampling date / time					05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	----	----
Compound	CAS Number	LOR	Unit		ME2301837-016	ME2301837-017	ME2301837-018	-----	-----
				Result	Result	Result		----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	Yes		----	----
Asbestos (Trace)	1332-21-4	-	-	No	No	No		----	----
Asbestos Type	1332-21-4	-	--	-	-	Ch		----	----
Sample weight (dry)	----	0.01	g	229	240	280		----	----
APPROVED IDENTIFIER:	----	-	--	J. WILLIAMS	J. WILLIAMS	J. WILLIAMS		----	----
Synthetic Mineral Fibre	----	-	--	No	No	No		----	----
Organic Fibre	----	-	--	No	Yes	Yes		----	----



Analytical Results

Sub-Matrix: **SOLID**
 (Matrix: **SOLID**)

Sample ID

				ACM-01 BH-B on surface	ACM-02 BH-E on surface	ACM-03 BH-5 on surface	ACM-04 BH-G on surface	ACM-05 Pipe BH-6
Sampling date / time				05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00	05-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	ME2301837-009	ME2301837-010	ME2301837-011	ME2301837-012	ME2301837-013
				Result	Result	Result	Result	Result
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	Yes	Yes	Yes	No
Asbestos Type	1332-21-4	-	--	Ch	Ch + Am	Ch	Ch + Am + Cr	-
Asbestos (Trace)	1332-21-4	-	-	N/A	N/A	N/A	N/A	No
Sample weight (dry)	----	0.01	g	27.6	19.5	18.5	20.0	195
Synthetic Mineral Fibre	----	-	-	No	No	No	No	No
Organic Fibre	----	-	-	No	No	No	No	No
APPROVED IDENTIFIER:	----	-	--	B.SCHRADER	B.SCHRADER	B.SCHRADER	B.SCHRADER	B.SCHRADER

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Sample ID - Sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	SA-01BH-2 surface soil - 05-Oct-2023 00:00	A soil sample containing several pieces of cement sheeting.
EA200: Description	SA-02BH-3 surface soil - 05-Oct-2023 00:00	A soil sample.
EA200: Description	SA-03BH-C surface soil - 05-Oct-2023 00:00	A soil sample.
EA200: Description	SA-04BH-B surface soil - 05-Oct-2023 00:00	A soil sample containing one piece of cement sheeting.
EA200: Description	SA-05BH-G surface soil - 05-Oct-2023 00:00	A soil sample containing one piece of asbestos cement sheeting approximately 30 x 10 x 5mm.

Sub-Matrix: **SOLID**

Method: Compound	Sample ID - Sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples		
EA200: Description	ACM-01BH-B on surface - 05-Oct-2023 00:00	One piece of asbestos cement sheeting approximately 65x45x5mm.
EA200: Description	ACM-02BH-E on surface - 05-Oct-2023 00:00	One piece of asbestos cement sheeting approximately 55x30x5mm.
EA200: Description	ACM-03BH-5 on surface - 05-Oct-2023 00:00	One piece of asbestos cement sheeting approximately 65x35x5mm.
EA200: Description	ACM-04BH-G on surface - 05-Oct-2023 00:00	Two pieces of asbestos cement sheeting approximately 45x40x5mm.
EA200: Description	ACM-05Pipe BH-6 - 05-Oct-2023 00:00	Two pieces of cement sheeting.



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	63	125
Toluene-D8	2037-26-5	67	124
4-Bromofluorobenzene	460-00-4	66	131



Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOLID) EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples

(SOIL) EA200: AS 4964 - 2004 Identification of Asbestos in Soils

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(SOIL) EP080: BTEXN

(SOIL) EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions

(SOIL) EP080S: TPH(V)/BTEX Surrogates

(SOIL) EP075(SIM)B: Polynuclear Aromatic Hydrocarbons

(SOIL) EP075(SIM)S: Phenolic Compound Surrogates

(SOIL) EP075(SIM)T: PAH Surrogates

(SOIL) EP068A: Organochlorine Pesticides (OC)

(SOIL) EP068T: Organophosphorus Pesticide Surrogate

(SOIL) EP068S: Organochlorine Pesticide Surrogate

(SOIL) EA055: Moisture Content (Dried @ 105-110°C)

(SOIL) EP066: Polychlorinated Biphenyls (PCB)

(SOIL) EP066S: PCB Surrogate

(SOIL) EG005(ED093)T: Total Metals by ICP-AES

(SOIL) EG035T: Total Recoverable Mercury by FIMS

(SOIL) EP080/071: Total Petroleum Hydrocarbons

Important Information About your Barnson Pty Ltd Environmental Report

Introduction

This report has been prepared by Barnson Pty Ltd for you, as Barnson Pty Ltd's client, in accordance with our agreed purpose, scope, schedule, and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information

n gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience.

Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice.

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Barnson Pty Ltd may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Barnson Pty Ltd has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

Your result has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Barnson Pty Ltd.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Barnson Pty Ltd should be kept apprised of any such events

and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statutes and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Barnson Pty Ltd would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through possible discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Barnson Pty Ltd assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Barnson Pty Ltd be consulted before the report is provided to another party who may not be familiar with the background and

the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Barnson Pty Ltd prepared the report and has familiarity with the site, Barnson Pty Ltd is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Barnson Pty Ltd disowns any responsibility for such misinterpretation.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.